U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1437
Supplement 52

Generic Environmental Impact Statement for License Renewal of Nuclear Plants

Supplement 52

Regarding Davis-Besse Nuclear Power Station

Draft Report for Comment

Office of Nuclear Reactor Regulation

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ABSTRACT

This draft supplemental environmental impact statement (SEIS) has been prepared in response to an application submitted by FirstEnergy Nuclear Operating Company (FENOC) to renew the operating license for Davis-Besse Nuclear Power Station, Unit No.1, (Davis-Besse) for an additional 20 years.

This draft SEIS includes the preliminary analysis that evaluates the environmental impacts of the proposed action and alternatives to the proposed action. Alternatives considered include replacement power from a new, natural-gas-fired combined-cycle (NGCC) power plant; combination alternative of NGCC and wind farm; a coal-fired power plant; and not renewing the license (the no-action alternative).

The NRC's preliminary recommendation is that the adverse environmental impacts of license renewal for Davis-Besse are not great enough to deny the option of license renewal for energy-planning decisionmakers. This recommendation is based on the following:

- analysis and findings in the generic environmental impact statement (GEIS),
- the Environmental Report (ER) submitted by FENOC,
- consultation with Federal, State, Tribal, and local agencies,
- NRC staff's own independent review, and
- NRC staff's consideration of public comments received during the scoping process.

TABLE OF CONTENTS

FIGURES

TABLES

EXECUTIVE SUMMARY

Background

By letter dated August 27, 2010, FirstEnergy Nuclear Operating Company (FENOC) submitted an application to the U.S. Nuclear Regulatory Commission (NRC) to issue a renewed operating license for Davis-Besse Nuclear Power Plant, Unit No.1, (Davis-Besse) for an additional 20-year period.

Pursuant to Title 10, Part 51.20(b)(2) of the *Code of Federal Regulations* (10 CFR 51.20(b)(2)), the renewal of a power reactor operating license requires preparation of an environmental impact statement (EIS) or a supplement to an existing EIS. In addition, 10 CFR 51.95(c) states that the NRC shall prepare an EIS, which is a supplement to the NRC's NUREG-1437, "Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants."

The GEIS was originally published in 1996, and amended in 1999. Subsequently, on June 20, 2013, the NRC published a final rule (78 FR 37282) revising 10 CFR Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." The final rule updates the potential environmental impacts associated with the renewal of an operating license for a nuclear power reactor for an additional 20 years. A revised GEIS, which updates the 1996 GEIS, provides the technical basis for the final rule. The revised GEIS specifically supports the revised list of National Environmental Policy Act (NEPA) issues and associated environmental impact findings for license renewal contained in Table B–1 in Appendix B to Subpart A of the revised 10 CFR Part 51. The 2013 rule revised the previous rule to consolidate similar Category 1 and 2 issues, change some Category 2 issues into Category 1 issues, consolidate some of those issues with existing Category 1 issues, and adds new Category 1 and 2 issues.

The final rule became effective July 22, 2013, after publication in the Federal Register. Compliance by license renewal applicants is not required until June 20, 2014, (i.e., license renewal applications submitted later than 1 year after publication must be compliant with the new rule). Nevertheless, under NEPA, the NRC must now consider and analyze, in its license renewal Supplemental Environmental Impact Statement (SEIS), the potential significant impacts described by the revised rule's new Category 2 issues, and to the extent there is any new and significant information, the potential significant impacts described by the revised rule's new Category 1 issues.

Upon acceptance of FENOC's application, the NRC staff began the environmental review process described in 10 CFR Part 51 by publishing a Notice of Intent, in the Federal Register, to prepare a supplemental environmental impact statement (SEIS) and conduct scoping. In preparation of this SEIS for Davis-Besse, the NRC staff performed the following:

- conducted public scoping meetings on November 4, 2010, in Port Clinton, Ohio
- conducted a site audit at the plant in March 8–10, 2011
- reviewed FENOC's environmental report (ER) and compared it to the GEIS
- consulted with other agencies

- conducted a review of the issues following the guidance set forth in NUREG-1555, "Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal"
- considered public comments received during the scoping process

Proposed Action

FENOC initiated the proposed Federal action—issuing a renewed power reactor operating license—by submitting an application for the license renewal of Davis-Besse, for which the existing license (NPF-003) will expire on April 22, 2017. The NRC's Federal action is the decision whether or not to renew the license for an additional 20 years (April 22, 2037).

Purpose and Need for Action

The purpose and need for the proposed action (issuance of a renewed license) is to provide an option that allows for power generation capability beyond the term of the current nuclear power plant operating license to meet future system generating needs. Such needs may be determined by other energy-planning decisionmakers, such as state, utility, and, where authorized, Federal (other than NRC). This definition of purpose and need reflects the NRC's recognition that, unless there are findings in the safety review required by the Atomic Energy Act (AEA) or findings in the National Environmental Policy Act (NEPA) environmental analysis that would lead the NRC to reject a license renewal application (LRA), the NRC does not have a role in the energy-planning decisions of whether a particular nuclear power plant should continue to operate.

If the renewed license is issued, the appropriate energy-planning decisionmakers, along with FENOC, will ultimately decide if the plant will continue to operate based on factors such as the need for power. If the operating license is not renewed, then the facility must be shut down on or before the expiration date of the current operating license—April 22, 2017.

Environmental Impacts of License Renewal

The SEIS evaluates the potential environmental impacts of the proposed action. The environmental impacts from the proposed action are designated as SMALL, MODERATE, or LARGE. As set forth in the GEIS, Category 1 issues are those that meet all of the following criteria:

- The environmental impacts associated with the issue is determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.
- A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts, except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal.
- Mitigation of adverse impacts associated with the issue is considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

SMALL: Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE: Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

LARGE: Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

For Category 1 issues, no additional site-specific analysis is required in this draft SEIS unless new and significant information is identified. Chapter 4 of this report presents the process for identifying new and significant information. Site-specific issues (Category 2) are those that do not meet one or more of the criterion for Category 1 issues; therefore, an additional site-specific review for these non-generic issues is required, and the results are documented in this SEIS.

FENOC submitted its Environmental Report (ER) under NRC's 1996 rule governing license renewal environmental reviews (61 FR 28467, June 5, 1996, as amended), as codified in NRC's environmental protection regulation, 10 CFR 51. The 1996 GEIS and Addendum 1 to the GEIS provided the technical basis for the list of NEPA issues and associated environmental impact findings for license renewal contained in Table B–1 in Appendix B to 40 Subpart A of 10 CFR Part 51. For Davis-Besse, the NRC staff initiated its environmental review in accordance with the 1996 rule and GEIS and documented its findings in Chapter 4 of this SEIS.

Under NEPA, the NRC must now consider and analyze in this SEIS the potential significant impacts described by the 2013 rule's new Category 2 issues, and to the extent there is any new and significant information, the potential significant impacts described by the 2013 rule's new Category 1 issues.

The new Category 1 issues include geology and soils, exposure of terrestrial organisms to radionuclides, exposure of aquatic organisms to radionuclides, human health impact from chemicals, and physical occupational hazards. Radionuclides released to groundwater, effects on terrestrial resources (non-cooling system impacts), minority and low-income populations (i.e., environmental justice), and cumulative impacts were added as new Category 2 issues. These issues are described in Chapter 4 of this SEIS.

The NRC staff did not identify any new issues applicable to Davis-Besse that have a significant environmental impact. The NRC staff, therefore, relies upon the conclusions of the 1996 and 2013 GEIS for all Category 1 issues applicable to Davis-Besse.

Table ES-1 summarizes the Category 2 issues applicable to Davis-Besse, as well as the NRC staff's findings related to those issues. If the NRC staff determined that there were no Category 2 issues applicable for a particular resource area, the findings of the GEIS, as documented in Appendix B to Subpart A of 10 CFR Part 51, stand. Hereafter in this SEIS, general references to the GEIS, without stipulation, are inclusive of the 1996 GEIS. Information and findings specific to the June 2013, final rule and GEIS, are identified as such.

Table ES-1. Summary of NRC Conclusions Relating to Site-Specific Impact of License Renewal

Resource Area	Relevant Category 2 Issues	Impacts
Land use	NONE	SMALL
Air quality	NONE	SMALL
Geology and soils	NONE[(a)]	SMALL
Surface water resources	NONE	SMALL
Groundwater resources	Radionuclides released to groundwater[(a)]	SMALL
Aquatic resources	NONE	SMALL
Terrestrial resources	Effects on terrestrial resources (non-cooling system impacts)[(a)]	SMALL

Resource Area	Relevant Category 2 Issues	Impacts
Protected species	Threatened or endangered species	No effect/ may affect, but is not likely to adversely affect[b]
Human health	Electromagnetic fields-acute effects (electric shock)	SMALL
Socioeconomics	Housing Impacts	SMALL
	Public services (public utilities)	SMALL
	Offsite land use	SMALL
	Public services (public transportation)	SMALL
	Historic and archaeological resources	SMALL to MODERATE
Cumulative Impacts	Surface water resources[a]	SMALL to MODERATE
	Aquatic resources[a]	LARGE
	Terrestrial resources[a]	MODERATE
	Human health-microbiological organisms[a]	MODERATE
	All other evaluated resources[a]	SMALL

[a] These issues are new Category 2 issues identified in the 2013 GEIS and Rule (78 FR 37282). U.S. Nuclear Regulatory Commission. "Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses." June 2013.

[b]: For Federally protected species, the 2013 GEIS and rule state that, in complying with the Endangered Species Act (ESA), the NRC will report the effects of continued operations and refurbishment in terms of its ESA findings, which varies by species for Davis-Besse.

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (NRC 1996, 61 FR 28467), unless otherwise specified.

With respect to environmental justice, the NRC staff determined that there would be no disproportionately high and adverse impacts to these populations from the continued operation of Davis-Besse during the license renewal period. Additionally, the NRC staff determined that no disproportionately high and adverse human health impacts would be expected in special pathway receptor populations in the region as a result of subsistence consumption of water, local food, fish, and wildlife.

Severe Accident Mitigation Alternatives

Since FENOC had not previously considered alternatives to reduce the likelihood or potential consequences of a variety of highly uncommon, but potentially serious, accidents at Davis-Besse, NRC regulation 10 CFR 51.53(c)(3)(ii)(L) requires that FENOC evaluate severe accident mitigation alternatives (SAMAs) in the course of the license renewal review. SAMAs are potential ways to reduce the risk or potential impacts of uncommon, but potentially severe, accidents and may include changes to plant components, systems, procedures, and training.

The NRC staff reviewed the ER's evaluation of potential SAMAs. Based on the staff's review, the NRC staff concluded that none of the potentially cost-beneficial SAMAs relate to adequately managing the effects of aging during the period of extended operation. Therefore, they need not be implemented as part of the license renewal, pursuant to 10 CFR Part 54.

Alternatives

The NRC staff considered the environmental impacts associated with alternatives to license renewal. These alternatives include other methods of power generation and not renewing the Davis-Besse operating license (the no-action alternative). Replacement power options considered were as follows:

- natural-gas-fired combined-cycle (NGCC),
- combination alternative (wind, solar, NGCC, and compressed air energy storage), and
- coal-fired power.

The NRC staff initially considered a number of additional alternatives for analysis as alternatives to license renewal of Davis-Besse; however, these were later dismissed due to technical, resource availability, or commercial limitations that currently exist and that the NRC staff believes are likely to continue to exist when the existing Davis-Besse license expires in 2017. The no-action alternative by the NRC staff, and the effects it would have, were also considered.

Where possible, the NRC staff evaluated potential environmental impacts for these alternatives located both at the Davis-Besse site and at some other unspecified alternate location. Alternatives considered but dismissed were as follows:

- wind power,
- wind power with compressed air energy storage,
- solar power,
- solar power with compressed air energy storage,
- wood waste,
- conventional hydroelectric power,
- ocean wave and current energy,
- geothermal power,
- municipal solid waste (MSW),
- biofuels,
- oil-fired power,
- fuel cells,
- energy conservation and energy efficiency, and
- purchased power.

The NRC staff evaluated each alternative using the same impact areas that were used in evaluating impacts from license renewal.

Recommendation

The NRC's preliminary recommendation is that the adverse environmental impacts of license renewal for Davis-Besse are not great enough to deny the option of license renewal for energy-planning decisionmakers. This recommendation is based on the following:

- analysis and findings in the GEIS;
- ER submitted by FENOC;
- consultation with Federal, State, and local agencies;
- NRC staff's own independent review; and
- consideration of public comments received during the scoping process.

ABBREVIATIONS AND ACRONYMS

AADT	annual average daily traffic
AEC	Atomic Energy Commission
BSBO	Black Swamp Bird Observatory
Btu	British thermal unit
C	Celsius
CDF	core damage frequency
CEQ	Council on Environmental Quality
CET	containment event tree
CFR	*Code of Federal Regulations*
cfs	cubic feet per second
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
CWS	circulating water system
Davis-Besse	Davis-Besse Nuclear Power Station
DSM	demand-side management
EFH	essential fish habitat
EIA	Energy Information Administration
EPRI	Electric Power Research Institute
ER	environmental report
ESA	Endangered Species Act
F	Fahrenheit
FBC	fluidized-bed-combustion
FE	FirstEnergy Corporation
FENGenCo	FirstEnergy Nuclear Generation Corp.
FENOC	FirstEnergy Nuclear Operating Company
FERC	Federal Energy Regulatory Commission
FES	final environmental statement
fps	feet per second
ft^3	cubic feet
gal	gallon
GEIS	generic environmental impact statement
GHG	greenhouse gas
gpd	gallons per day
gpm	gallons per minute
IGCC	integrated gasification combined cycle
IPA	integrated plant assessment
kWh	kilowatt-hour
kV	kilovolt
lb	pound
lb/MMBtu	pounds per million British thermal units
LOS	level of service

m^3	cubic meters
mA	milliampere
MAAP	Modular Accident Analysis Program
MACCS2	MELCOR Accident Consequence Code System
MDC	minimum detection concentration
mg/l	milligrams per liter
mgd	million gallons per day
MM	million
MSW	municipal solid waste
MW	megawatt
MWd/MTU	megawatt-days per metric ton uranium
MMBtu	million British thermal unit
MWe	megawatts-electric
MWh	megawatt-hour
MWt	megawatts-thermal
NAAQS	national ambient air quality standards
NEI	Nuclear Energy Institute
NEPA	National Environmental Policy Act
NESC	National Electrical Safety Code
NGCC	natural gas-fired combined cycle
NMFS	National Marine Fisheries Service
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPDES	national pollutant discharge elimination system
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NRR	Office of Nuclear Reactor Regulation
OAC	Ohio Administrative Code
OCMP	Ohio Coastal Management Program
ODCM	offsite dose calculation manual
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
ONWR	Ottawa National Wildlife Refuge
OPSB	Ohio Power Siting Board
pCi/L	picocuries per liter
PDS	plant damage state
PEIS	programmatic environment impact statement
PCBs	polychlorinated byphenyls
PM	particulate matter
PM_{10}	particulates with diameters less than 10 microns
$PM_{2.5}$	particulates with diameters less than 2.5 microns
ppb	parts per billion
ppm	parts per million

ppt	parts per thousand
PRA	probabilistic risk assessment
Psig	pounds per square inch gauge
rms	root mean square
RC	release category
RCS	reactor coolant system
REC	renewable energy credits
ROW	right of way
RPS	renewable portfolio standards
SAMA	severe accident mitigation alternative
scf	standard cubic feet
SEIS	supplemental environmental impact statement
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SO_x	sulfur oxides
SU	standard units
SWS	service water system
USACE	U.S. Army Corps of Engineers
USAR	updated safety analysis report
USCB	U.S. Census Bureau
USDOD	U.S. Department of Defense
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USOSHA	U.S. Occupational Safety and Health Administration
wt%	percent by weight
yr	year

1.0 PURPOSE AND NEED FOR ACTION

Under the U.S. Nuclear Regulatory Commission's (NRC's) environmental protection regulations in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR 51), which implement the National Environmental Policy Act (NEPA), issuance of a new nuclear power plant operating license requires the preparation of an environmental impact statement (EIS).

The Atomic Energy Act of 1954 originally specified that licenses for commercial power reactors be granted for up to 40 years with an option to renew. The 40-year licensing period was based on economic and antitrust considerations rather than on technical limitations of the nuclear facility (AEA 1954).

The decision to seek a license renewal rests entirely with nuclear power facility owners and, typically, is based on the facility's economic viability and the investment necessary to continue to meet NRC safety and environmental requirements. The NRC makes the decision to grant or deny a license renewal based on whether the applicant has demonstrated that the environmental and safety requirements in the NRC's regulations can be met during the period of extended operation.

1.1 Proposed Federal Action

FirstEnergy Nuclear Operating Company (FENOC) initiated the proposed Federal action by submitting an application for license renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse) for which the existing license, NPF-3, expires April 22, 2017 (FENOC 2010a). NRC's Federal action is the decision whether to renew the license for an additional 20 years. In accordance with 10 CFR 2.109, if a licensee of a nuclear power plant files an application to renew an operating license at least 5 years before the expiration date of that license, the existing license will not be deemed to have expired until the safety and environmental reviews are completed and the NRC has made the final decision to either deny the application or issue a renewed operating license for the 20 additional years.

1.2 Purpose and Need for Proposed Federal Action

The purpose and need for the proposed action (issuance of a renewed license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by other energy-planning decisionmakers. This definition of purpose and need reflects the Commission's recognition that, unless there are findings in the safety review required by the Atomic Energy Act or findings in the NEPA environmental analysis that would lead the NRC to reject a license renewal application (LRA), the NRC does not have a role in the energy-planning decisions of State regulators and utility officials as to whether a particular nuclear power plant should continue to operate.

If the renewed license is issued, State regulatory agencies and FENOC will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. If the operating license is not renewed, then the facility must be shut down on or before the expiration date of the current operating license—April 22, 2017.

1.3 Major Environmental Review Milestones

FENOC submitted an Environmental Report (ER) (FENOC 2010a) as part of its LRA (FENOC 2010) in August 2010. After reviewing the LRA and ER for sufficiency, the NRC staff published a *Federal Register* Notice of Acceptability and Opportunity for Hearing (75 FR 65528) on October 25, 2010. Then, on October 28, 2010, NRC published another notice in the *Federal Register* (75 FR 66399) on the intent to conduct scoping, thereby beginning the 60-day scoping period.

Two public scoping meetings were held on November 4, 2010, in Port Clinton, OH. The comments received during the scoping process are presented in their entirety in the "Environmental Impact Statement Scoping Process, Summary Report, Davis-Besse Nuclear Power Station, Oak Harbor, OH," published in November 2013 (NRC 2013b). The comments considered being within the scope of the environmental license renewal review and the NRC responses are presented in Appendix A of this supplemental environmental impact statement (SEIS).

To independently verify information provided in the ER, NRC staff conducted a site audit at Davis-Besse in March 2011. During the site audit, staff met with plant personnel, reviewed specific documentation, toured the facility, and met with interested Federal, State, and local agencies. A summary of that site audit and the attendees is contained in the "Summary of Site Audit Related to the Review of the License Renewal Application for Davis-Besse Nuclear Power Station, Unit 1," published June 2, 2011 (NRC 2011a).

Upon completion of the scoping period and site audit, the NRC staff compiled its findings in a draft SEIS (Figure 1.3-1). This document is available for public comment for 45 days. During this time, the NRC staff will host public meetings and collect public comments. Members of the public can also submit written comments. Based on the information gathered, the NRC staff may amend the draft SEIS findings as necessary and publish the final SEIS. The NRC has established a license renewal process that can be completed in a reasonable period of time with clear requirements to assure safe plant operation for up to an additional 20 years of plant life. The safety review, which documents its finding in a safety evaluation report (SER), is conducted concurrently with the environmental review. The findings in the SEIS and the SER are both factors in the Commission's decision to either grant or deny the issuance of a new license.

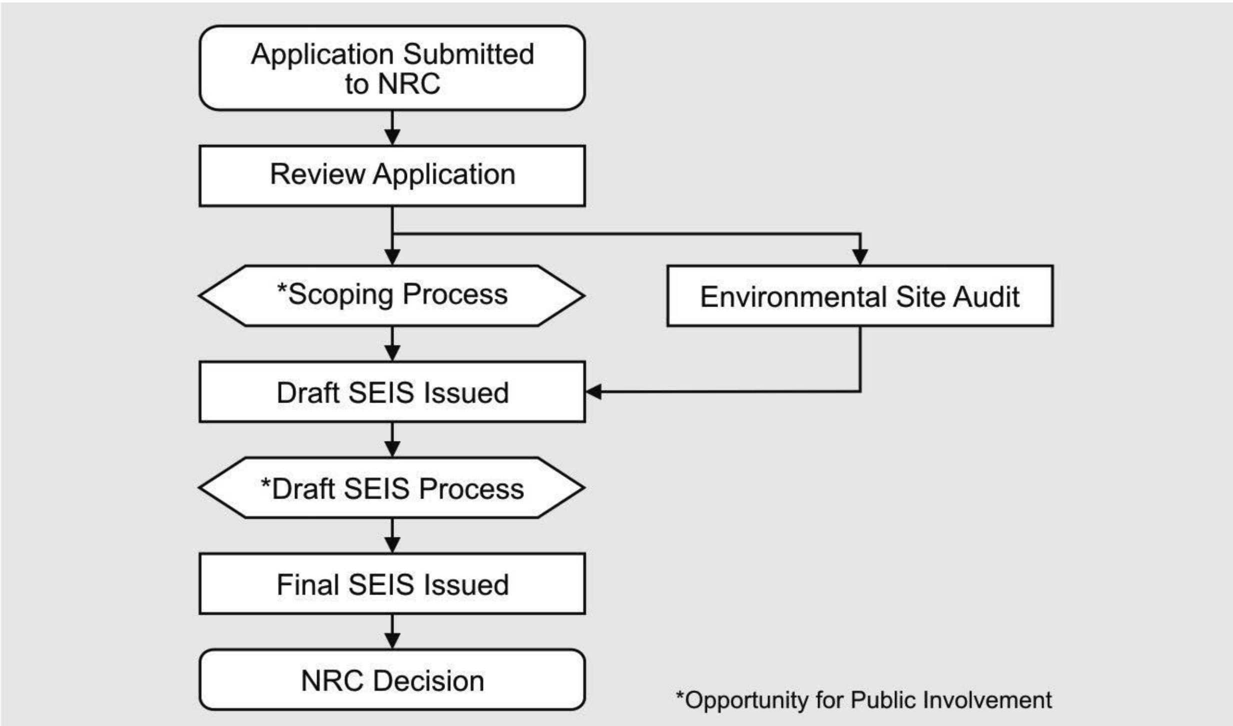

Figure 1.3-1. Environmental Review Process

The process provides opportunities for public involvement.

1.4 Generic Environmental Impact Statement

The NRC performed a generic assessment of the environmental impacts associated with license renewal to improve the efficiency of the license renewal review process. *The Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants (GEIS)*, NUREG-1437, (NRC 1996, 1999) documented the results of the NRC staff's systematic approach to evaluate the environmental consequences of renewing the licenses of individual nuclear power plants and operating them for an additional 20 years. The NRC staff analyzed in detail and resolved those environmental issues that could be resolved generically in the GEIS. The GEIS was originally issued in 1996, and Addendum 1 to the GEIS was issued in 1999.

The GEIS established 92 separate issues for NRC staff to independently verify. Of these issues, the staff determined that 69 are generic to all plants (Category 1), and 21 issues do not lend themselves to generic consideration (Category 2). Two other issues remained uncategorized; environmental justice and chronic effects of electromagnetic fields must be evaluated on a site-specific basis. A list of all 92 issues is contained in Appendix B of this SEIS.

On June 20, 2013, the NRC published a final rule (78 FR 37282) revising its environmental protection regulation, Title 10 of the Code of Federal Regulations (10 CFR) Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." Specifically, the final rule updates the potential environmental impacts associated with the renewal of an operating license for a nuclear power reactor for an additional 20 years. A revised GEIS (NRC 2013b), which updates the 1996 GEIS, provides the technical basis for the final rule. The revised GEIS specifically supports the revised list of NEPA issues and associated environmental impact findings for license renewal contained in Table B-1 in Appendix B to Subpart A of the revised 10 CFR Part 51. The revised GEIS and final rule reflect lessons learned and knowledge gained during previous license renewal environmental reviews. In addition, public comments received on the draft revised GEIS and rule and during previous license renewal environmental reviews were reexamined to validate existing environmental issues and identify new ones.

The final rule identifies 78 environmental impact issues, of which 17 will require plant-specific analysis. The final rule consolidates similar Category 1 and 2 issues, changes some Category 2 issues into Category 1 issues, and consolidates some of those issues with existing Category 1 issues. The final rule also adds new Category 1 and 2 issues. The new Category 1 issues include geology and soils, exposure of terrestrial organisms to radionuclides, exposure of aquatic organisms to radionuclides, human health impact from chemicals, and physical occupational hazards. Radionuclides released to groundwater, effects on terrestrial resources (non-cooling system impacts), minority and low-income populations (i.e., environmental justice), and cumulative impacts were added as new Category 2 issues.

The final rule became effective 30 days after publication in the *Federal Register*. Compliance by license renewal applicants is not required until 1 year from the date of publication (i.e., license renewal environmental reports submitted later than 1 year after publication must be compliant with the new rule). Nevertheless, under NEPA, the NRC must now consider and analyze, in its license renewal SEISs, the potential significant impacts described by the final rule's new Category 2 issues and, to the extent there is any new and significant information, the potential significant impacts described by the final rule's new Category 1 issues.

For each potential environmental issue, the GEIS does the following:

- describes the activity that affects the environment,
- identifies the population or resource that is affected,
- assesses the nature and magnitude of the impact on the affected population or resource,
- characterizes the significance of the effect for both beneficial and adverse effects,
- determines whether the results of the analysis apply to all plants, and
- considers whether additional mitigation measures would be warranted for impacts that would have the same significance level for all plants.

The NRC's standard of significance for impacts was established using the Council on Environmental Quality (CEQ) terminology for "significant." The NRC established three levels of significance for potential impacts—SMALL, MODERATE, and LARGE—as defined below.

SMALL—Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

MODERATE—Environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

> ***Significance*** indicates the importance of likely environmental impacts and is determined by considering two variables: **context** and **intensity**.
>
> ***Context*** is the geographic, biophysical, and social context in which the effects will occur.
>
> ***Intensity*** refers to the severity of the impact, in whatever context it occurs.

LARGE—Environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

The GEIS includes a determination of whether the analysis of the environmental issue could be applied to all plants and whether additional mitigation measures would be warranted (NRC 1996, 1999). Issues are assigned a Category 1 or a Category 2 designation. As set forth in the GEIS, Category 1 issues are those that meet the following criteria.

- The environmental impacts associated with the issue have been determined to apply either to all plants or, for some issues, to plants having a specific type of cooling system or other specified plant or site characteristics.
- A single significance level (i.e., SMALL, MODERATE, or LARGE) has been assigned to the impacts (except for collective offsite radiological impacts from the fuel cycle and from high-level waste and spent fuel disposal).
- Mitigation of adverse impacts associated with the issue has been considered in the analysis, and it has been determined that additional plant-specific mitigation measures are likely not to be sufficiently beneficial to warrant implementation.

For generic issues (Category 1), no additional site-specific analysis is required in this SEIS unless new and significant information is identified. The process for identifying new and significant information is presented in Chapter 4. Site-specific issues (Category 2) are those that do not meet one or more of the criteria of Category 1 issues; therefore, additional site-specific review for these issues is required. The results of that site-specific review are documented in the SEIS.

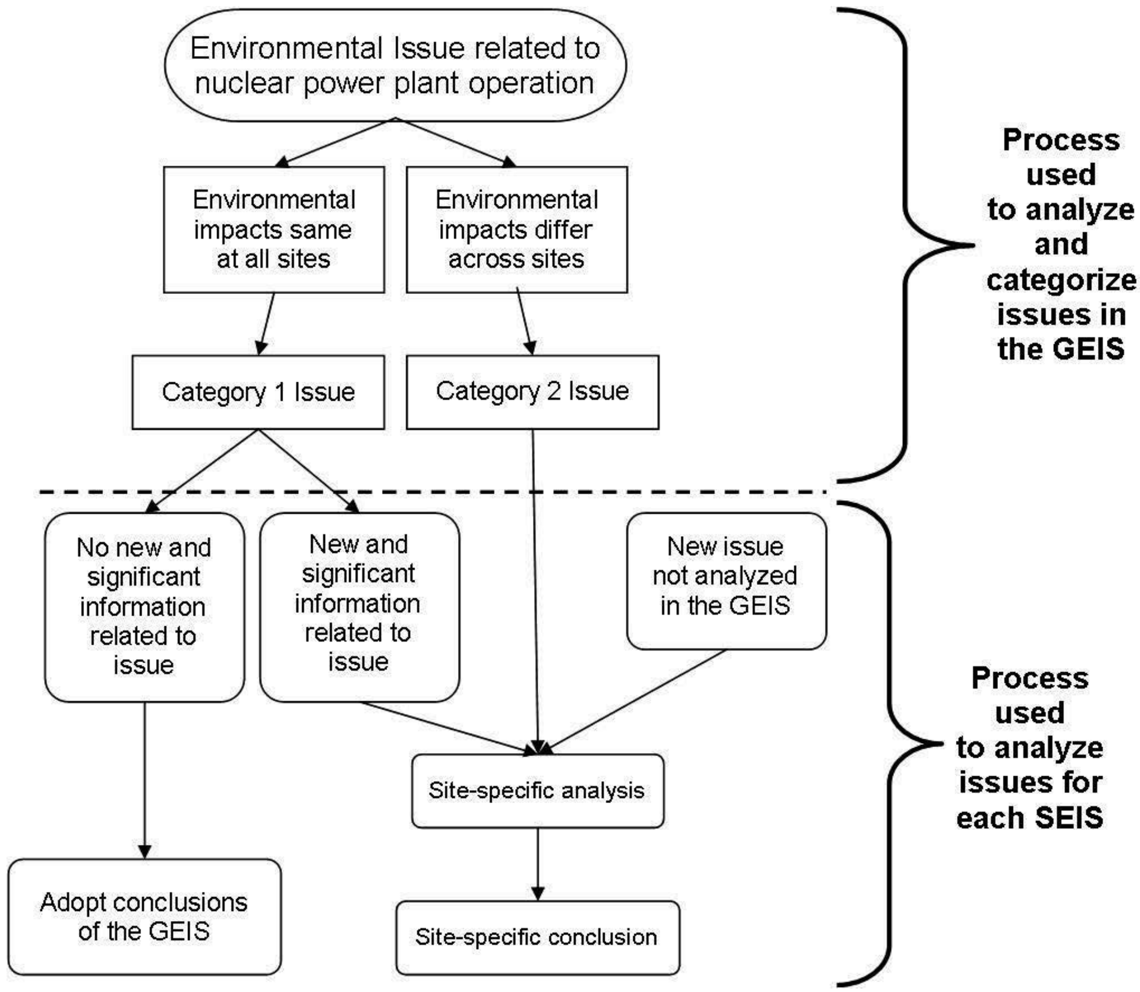

Figure 1.4-1. Environmental Issues Evaluated During License Renewal

Initially, 92 issues were evaluated in the GEIS.
A site-specific analysis is required for 23 of those 92 issues.

1.5 Supplemental Environmental Impact Statement

The SEIS presents an analysis that considers the environmental effects of the continued operation of Davis-Besse, alternatives to license renewal, and mitigation measures for minimizing adverse environmental impacts. Chapter 8 contains analysis and comparison of the potential environmental impacts from alternatives while Chapter 9 presents the preliminary recommendation to the Commission on that the environmental impacts of license renewal are so great that preserving the option of license renewal would be unreasonable. The final recommendation will be made after consideration of comments received during the public scoping period and on the draft SEIS.

In the preparation of this draft SEIS for Davis-Besse, the NRC staff did the following:

- reviewed the information provided in the FENOC ER,
- consulted with other Federal, state, and local agencies,
- conducted an independent review of the issues during site audit, and
- considered the public comments received during the scoping process.

New information can be identified from many sources, including the applicant, NRC, other agencies, or public comments. If a new issue is identified, it is first analyzed to determine if it is within the scope of the license renewal evaluation. If it is not addressed in the GEIS, the NRC determines its significance and documents its analysis in the SEIS.

New and significant information either: (1) identifies a significant environmental issue not covered in the GEIS, or (2) was not considered in the analysis in the GEIS and leads to an impact finding that is different from the finding presented in the GEIS.

FENOC submitted its ER under NRC's 1996 rule governing license renewal environmental reviews (61 FR 28467, June 5, 1996, as amended), as codified in NRC's environmental protection regulation, 10 CFR 51. The 1996 GEIS (NRC 1996) and Addendum 1 to the GEIS (NRC 1999) provided the technical basis for the list of NEPA issues and associated environmental impact findings for license renewal contained in Table B–1 in Appendix B to Subpart A of 10 CFR Part 51. For Davis-Besse, the NRC staff initiated its environmental review in accordance with the 1996 rule and GEIS (NRC 1996, 1999) and documented its findings in Chapter 4 of this SEIS.

As described in Section 1.4, the NRC published a final rule (78 FR 37282, June 20, 2013) revising 10 CFR 51 including the list of NEPA issues and findings in Table B–1 of 10 CFR 51. Under NEPA, the NRC must now consider and analyze in this SEIS the potential significant impacts described by the final rule's new Category 2 issues, and to the extent there is any new and significant information, the potential significant impacts described by the final rule's new Category 1 issues. The new Category 1 issues include geology and soils, exposure of terrestrial organisms to radionuclides, exposure of aquatic organisms to radionuclides, human health impact from chemicals, and physical occupational hazards. Radionuclides released to groundwater, effects on terrestrial resources (non-cooling system impacts), minority and low-income populations (i.e., environmental justice), and cumulative impacts were added as new Category 2 issues. These new issues are also analyzed in Chapter 4 of this SEIS. Hereafter in this SEIS, general references to the "GEIS" without stipulation are inclusive of the 1996 GEIS and 1999 Addendum (NRC 1996, 1999). Information and findings specific to the June 2013 final rule (78 FR 37282) or the June 2013 GEIS (NRC 2013) or both are appropriately referenced as such.

1.6 Cooperating Agencies

During the scoping process, no Federal, State, or local agencies were identified as cooperating agencies in the preparation of this SEIS.

1.7 Consultations

The Endangered Species Act of 1973, as amended (ESA 1973); the Magnuson–Stevens Fisheries Management Act of 1996, as amended (MSFMA 1996); and the National Historic Preservation Act of 1966 (NHPA 1966) require that Federal agencies consult with applicable State and Federal agencies and groups prior to taking action that may affect endangered species, fisheries, or historic and archaeological resources, respectively.

Listed below are the agencies and groups with whom the NRC consulted.

- Advisory Council on Historic Preservation,
- Ohio Historic Preservation Office,

- U.S. Fish and Wildlife Service,
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service,
- Ohio Department of Natural Resources,
- Delaware Nation,
- Forest County Potawatomi Community,
- Hannahville Indian Community Council,
- Miami Tribe of Oklahoma,
- Shawnee Tribe,
- Wyandotte Nation,
- Peoria Tribe of Indians of Oklahoma, and
- Ottawa Tribe of Oklahoma.

1.8 Correspondence

During the course of the environmental review, the NRC staff contacted Federal, State, regional, local, and Tribal agencies listed in Section 1.7. Appendix E contains a chronological list of all the documents sent and received during the environmental review

A list of persons who received a copy of this draft SEIS is provided in Chapter 12.

1.9 Status of Compliance

FENOC is responsible for complying with all NRC regulations and other applicable Federal, State, and local requirements. A description of some of the major Federal statutes can be found in the Appendix H of the GEIS. Appendix C of this SEIS includes a list of the permits and licenses issued by Federal, State, and local authorities for activities at Davis-Besse.

1.10 References

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, “Environmental protection regulations for domestic licensing and related regulatory functions.”

61 FR 28467. U.S. Nuclear Regulatory Commission. “Environmental Review for Renewal of Nuclear Power Plant Operating Licenses.” Federal Register 61 (109): 28467-28497. June 5, 1996.

75 FR 65528. U.S. Nuclear Regulatory Commission. “Notice of Acceptance for Docketing of the Application, Notice for Opportunity for Hearing for Facility Operating License No. NPF-003 for an Additional 20-year Period: FirstEnergy Nuclear Operating Company, Davis-Besse Nuclear Power Station, Unit 1” *Federal Register*. Volume 75(130): 65528-65531. October 25, 2010.

75 FR 66399. U.S. Nuclear Regulatory Commission. “FirstEnergy Nuclear Operating Company; Notice of Intent to Prepare an Environmental Impact Statement and Conduct the Scoping Process for Davis-Besse Nuclear Power Station, Unit 1,” *Federal Register.* Volume 75(208): 66399-66401. October 28, 2010.

78 FR 37282. U.S. Nuclear Regulatory Commission. "Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses." Federal Register Volume 78(119): 37282-37324. June 20, 2013.

Atomic Energy Act, 42 U.S.C. §2011 (1954).

Endangered Species Act, 16 U.S.C. §1531, et seq. (1973).

[FENOC] FirstEnergy Nuclear Operating Company (FENOC), "Davis-Besse Nuclear Power Station License Renewal Application," Toledo, OH, August 2010, Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML102450572

Magnuson–Stevens Fishery Conservation and Management Act, 16 U.S.C. §1855, et seq. (as amended by the Sustainable Fisheries Act of 1996).

National Environmental Policy Act, 42 U.S.C. §4321, et seq. (1969).

National Historic Preservation Act, 16 U.S.C. §470, et seq.

[NRC] U.S. Nuclear Regulatory Commission. 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. Washington, DC: NRC. NUREG-1437. May 1996. ADAMS Accession Nos. ML040690705 and ML040690738.

[NRC] U.S. Nuclear Regulatory Commission. 1999. Section 6.3—Transportation, Table 9.1, Summary of findings on NEPA issues for license renewal of nuclear power plants. In: *Generic Environmental Impact Statement for License Renewal of Nuclear Plants.* Washington, DC: NRC. NUREG-1437, Volume 1, Addendum 1. August 1999. ADAMS Accession No. ML04069720.

[NRC] U.S. Nuclear Regulatory Commission. 2011. *Summary of Site Audit Related to the Review of the License Renewal Application for Davis-Besse Nuclear Power Station*, NRC. June 3, 2011, ADAMS Accession No. ML110820276.

[NRC] U.S. Nuclear Regulatory Commission. 2012. Staff Requirements, SECY-12-0063—Final Rule: Revisions to Environmental Review for Renewal of Nuclear Power Plant Operating Licenses (10 CFR Part 51; RIN 3150–AI42). December 6, 2012. ADAMS Accession No. ML12341A134.

[NRC] U.S. Nuclear Regulatory Commission. 2013a. *Environmental Impact Statement Scoping Process, Summary Report, Davis-Besse Nuclear Power Station, Oak Harbor*, OH. Rockville, MD: NRC. October 2013, ADAMS Accession No. ML11168A197.

[NRC] U.S. Nuclear Regulatory Commission. 2013b. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. Washington, DC: Office of Nuclear Reactor Regulation. NUREG-1437, Revision 1, Volumes 1, 2, and 3. June 2013. ADAMS Accession Nos. ML13106A241, ML13106A242, and ML13106A244.

2.0 AFFECTED ENVIRONMENT

Davis-Besse Nuclear Power Station, Unit No. 1, (Davis-Besse) is located 25 mi (40 km) east of Toledo, OH. It is situated on the southwest coastline of Lake Erie. The 954-acre (ac) (386-hectare (ha)) site is located in Caroll Township, Ottawa County, just north of the Toussaint River with approximately 7,500 ft (2,300 m) of Lake Erie frontage. Approximately 700 ac (300 ha) are marshland that is leased to the U.S. Government as a national wildlife refuge. Figure 2.1-1 and Figure 2.1-2 present the 50-mi (80- km) and 6-mi (10-km) vicinity maps, respectively (FENOC 2010c).

For purposes of the evaluation in this report, the "affected environment" is the environment that currently exists at and around Davis-Besse. Because existing conditions are at least partially the result of past construction and operation at the plant, the impacts of these past and ongoing actions and how they have shaped the environment are presented here. The facility and its operation are described in Section 2.1 and the affected environment is presented in Section 2.2.

2.1 Facility Description

This assessment of the affected environment begins with a description of Davis-Besse, which is the source of potential environmental effects. Davis-Besse is a single-unit pressurized water reactor (PWR) plant that uses closed-cycle cooling (using cooling towers to recirculate up to 95 percent of the cooling water). The plant is licensed for an electrical output of 2,817 megawatts-thermal (MWt) and 913 megawatt-electric (MWe).

The most visible structures on the Davis-Besse site include the cooling tower, switchyard, forebay and intake canal, and the plant structures. Figure 2.1-3 shows the site layout referencing these features. The plant structures include structures such as the containment building, turbine building, and auxiliary building. A more detailed layout of these structures can be seen on Figure 2.1-4. On this figure, additional structure locations such as the meteorological tower can also be located. Davis-Besse's used (or spent) fuel is stored in a pool inside the plant until it is cooled and transferred to dry storage containers located onsite called the independent spent fuel storage installation (ISFSI). Spent fuel will be stored there until the Federal Government removes it to be reprocessed or stored at a Government facility.

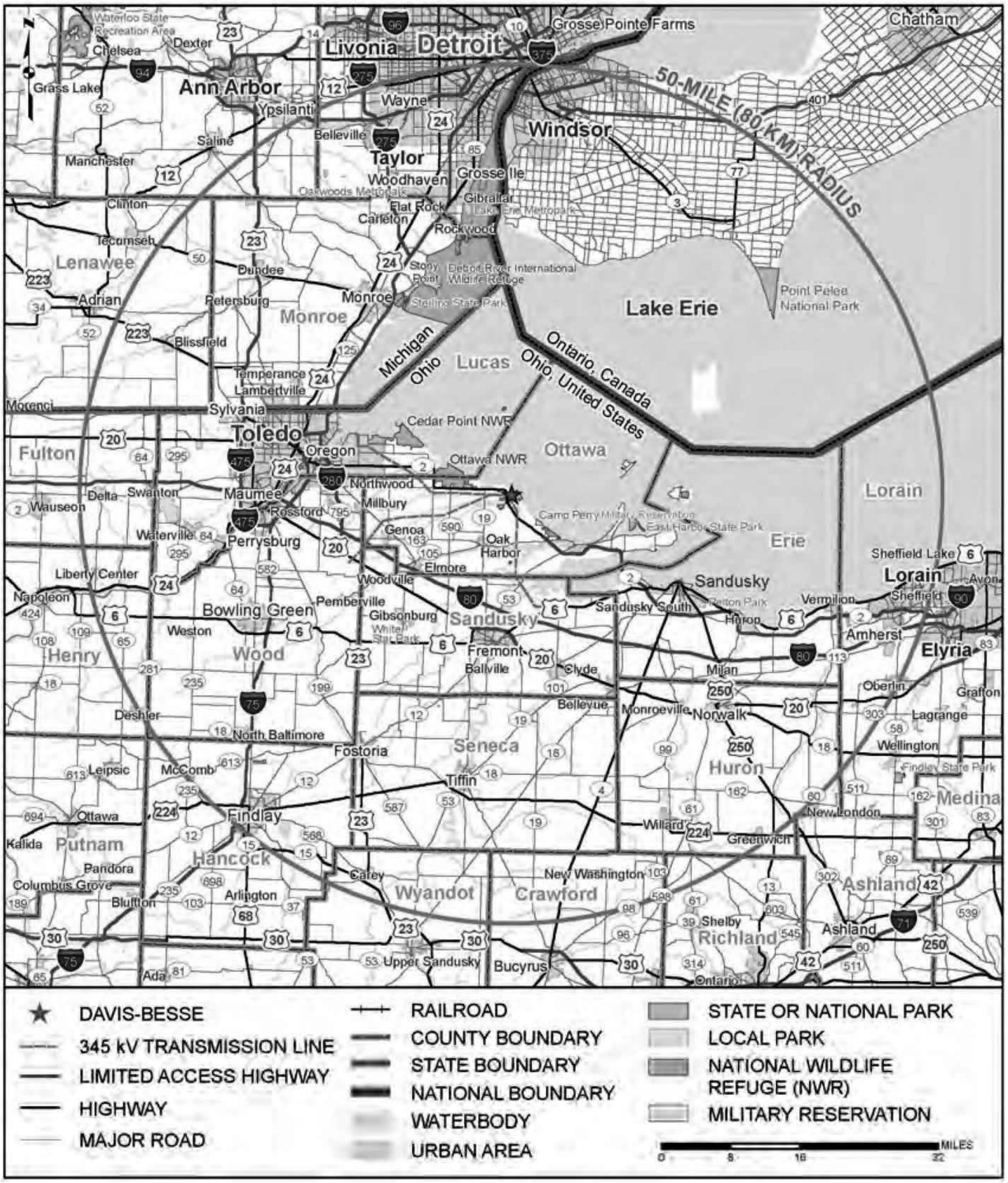

Figure 2.1-1. Location of Davis-Besse, 50 mi (80 km) Region

Source: FENOC 2010c

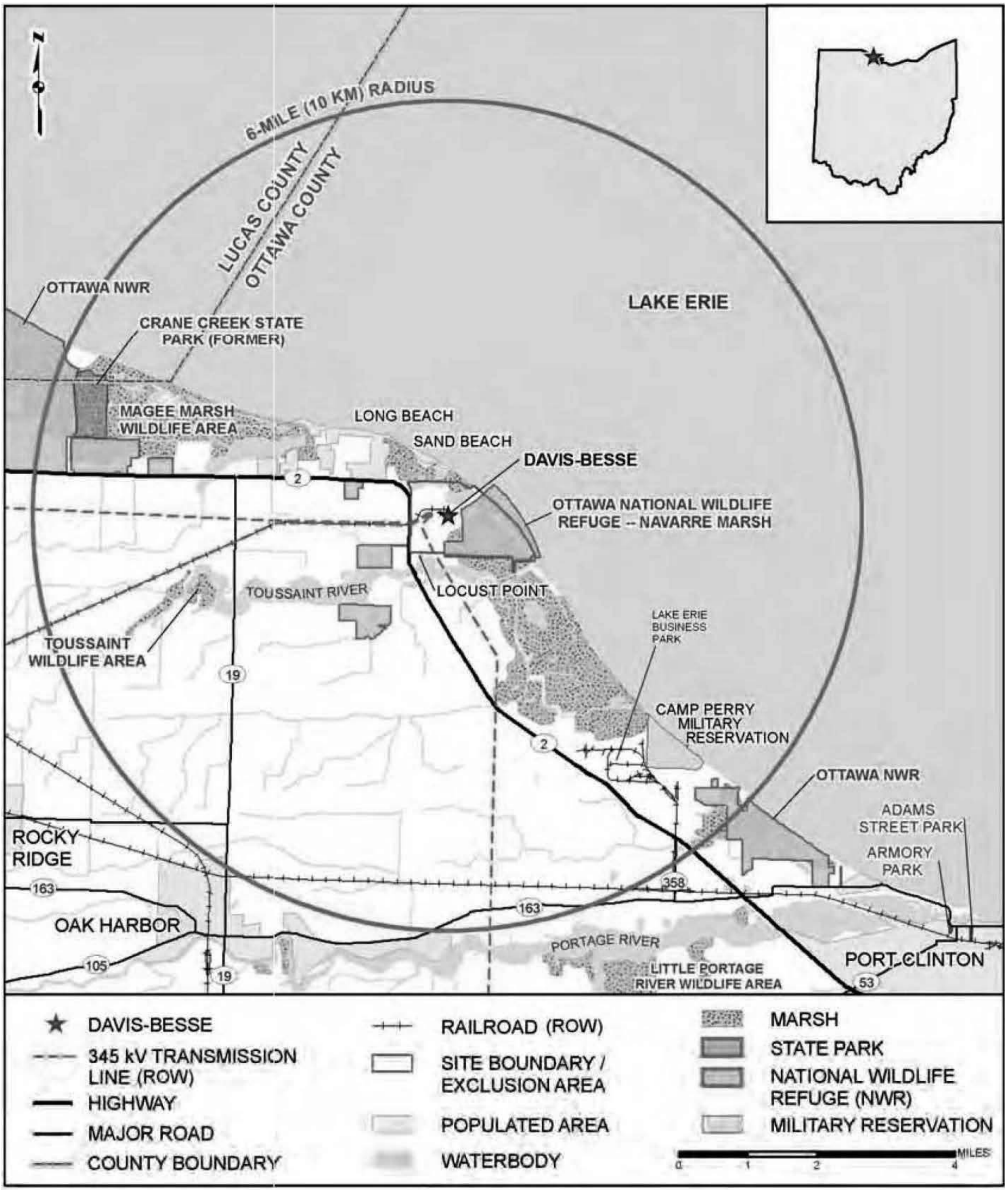

Figure 2.1-2. Location of Davis-Besse, 6 mi (10 km) Region

Source: FENOC 2010c

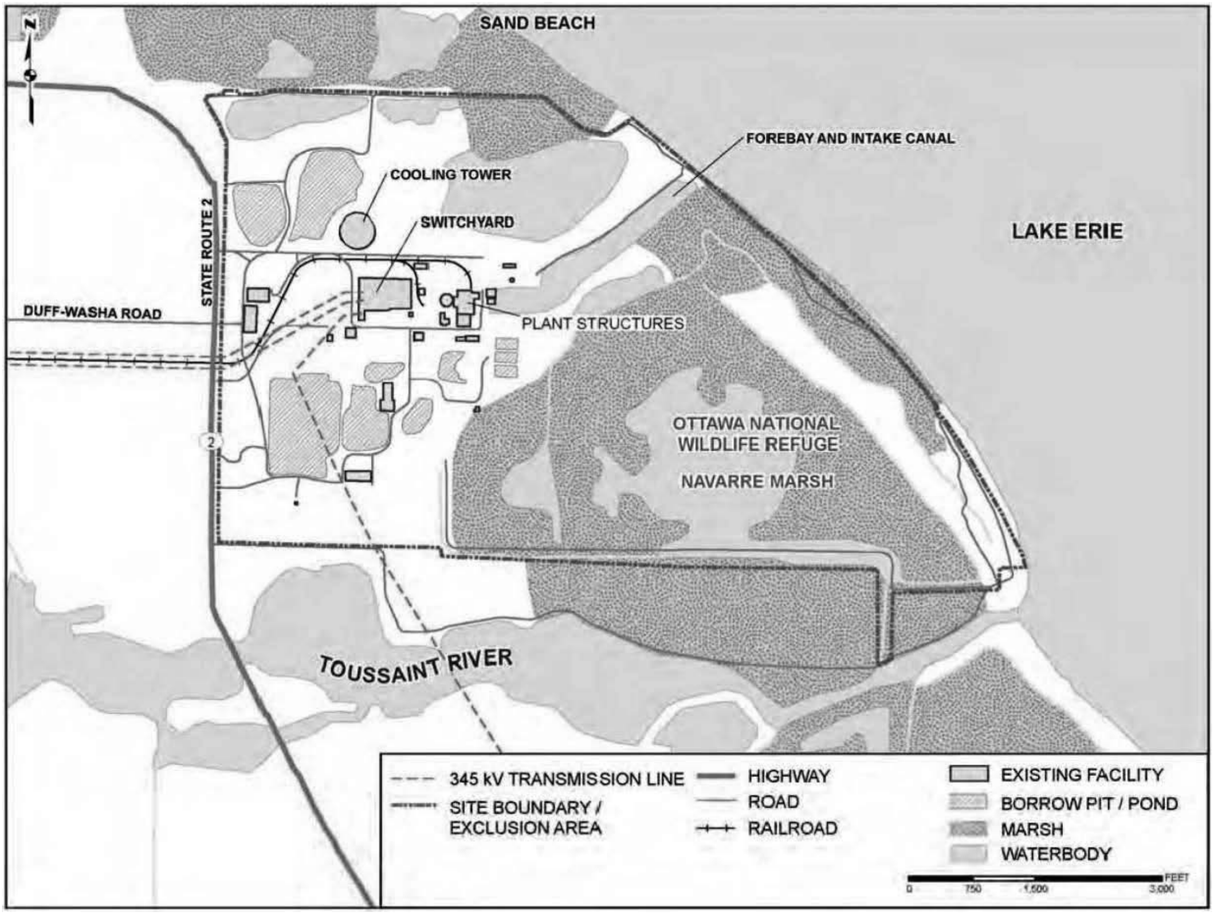

Figure 2.1-3. Davis-Besse Site Boundary and Facility Layout

Source: FENOC 2010c

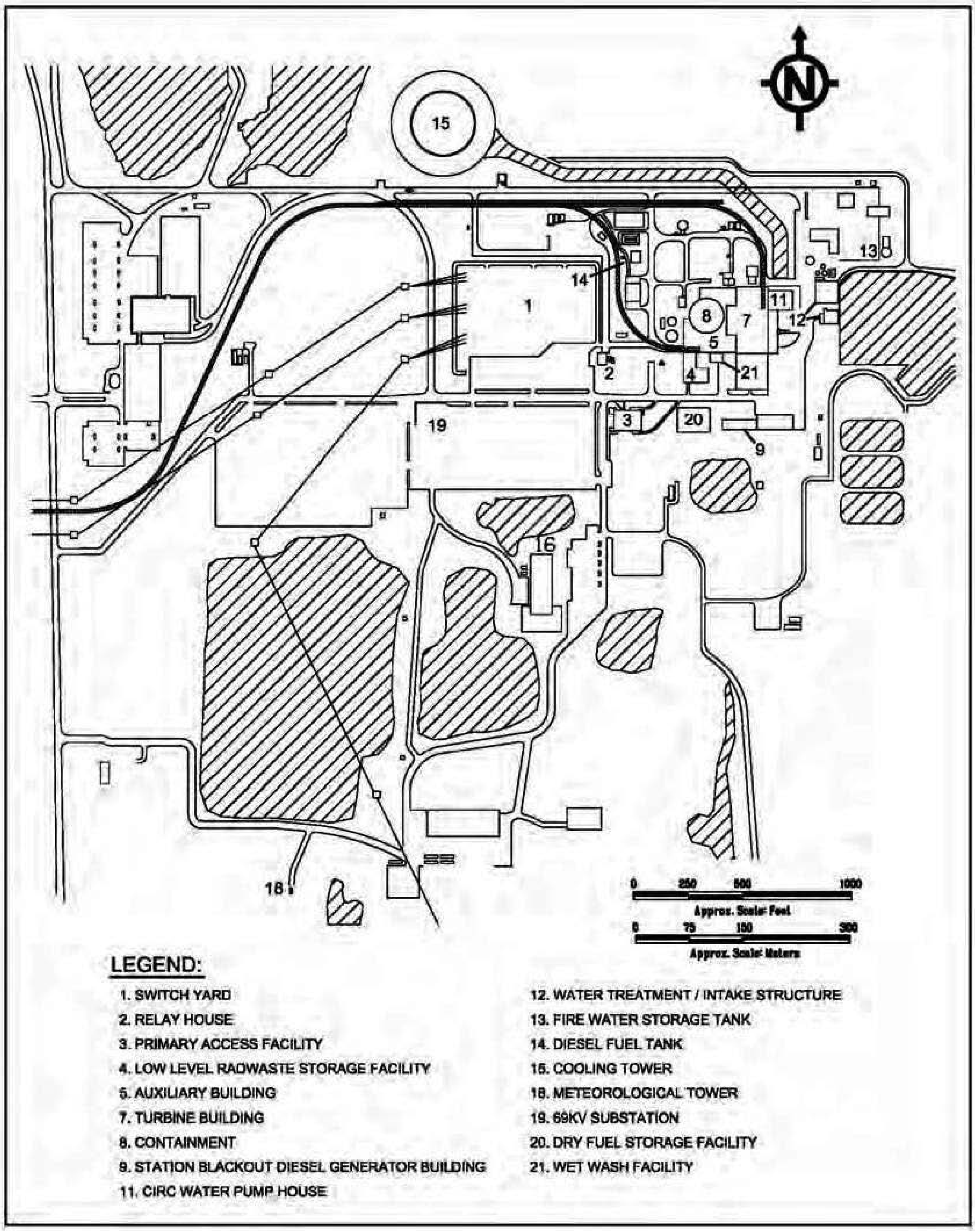

Figure 2.1-4. Davis-Besse Site Boundary and Facility Layout

Source: FENOC 2010c

2.1.1 Reactor and Containment Systems

Davis-Besse is single unit nuclear power plant that began commercial operation on April 22, 1977. Davis-Besse is equipped with a Babcock and Wilcox-designed PWR. Davis-Besse includes a nuclear steam supply system supplied by Babcock and Wilcox Company and a turbine generator designed and manufactured by General Electric Company.

Davis-Besse was initially licensed to operate at a maximum steady-state core power level of 2,772 MWt. In 2008, amendments of the operating license and technical specifications allowed an increase in the rated thermal power of 1.63 percent. The reactor has a current electrical output of 2,817 MWt and 913 MWe gross. An additional 17 MWt is contributed to the cycle by the reactor coolant pumps, resulting in a net electrical output of about 925 MWe (FENOC 2010c).

Davis-Besse's fuel for the reactor core consists of slightly enriched (less than 5 percent by weight) uranium dioxide pellets sealed in Zircaloy-4 or M5 tubes. The complete core has 177 fuel assemblies arranged in a square lattice to approximate a cylinder.

In a PWR power generation system, reactor heat is transferred from the primary coolant to a lower pressure secondary coolant loop, allowing steam to be generated in the steam supply system. Each of the primary coolant loops contains one steam generator, one reactor coolant pump, and interconnected piping. Reactor coolant is pumped from the reactor through the steam generators and back to the reactor. Each steam generator has a heat exchanger that produces superheated steam at a constant pressure over the reactor's operating power range. Coolant flows through the tubes as steam is generated on the lower pressure shell side. The steam then flows from the steam generator to the turbine unit that turns the electrical generator.

Figure 2.1-5 presents a typical PWR.

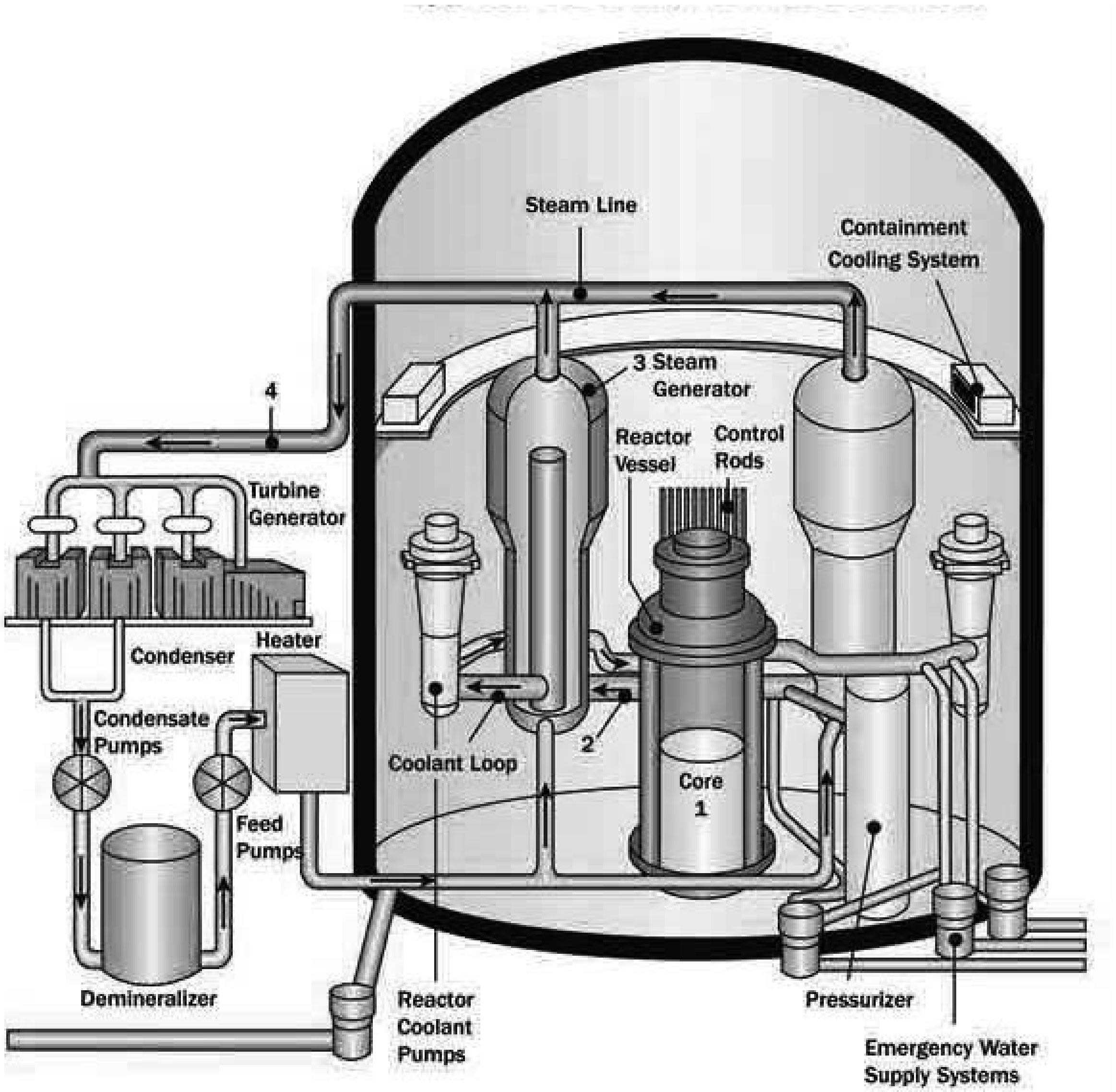

Figure 2.1-5. Typical Pressurized-Water Reactor

The containment system for the station uses a free-standing containment vessel surrounded by a reinforced concrete shield building. The shield building is a reinforced concrete structure of right cylinder configuration with a shallow dome roof. The shield building has a height of 279.5 ft (85 m) measured from the top of the foundation ring to the top of the dome. The structure is designed to withstand an internal pressure of 40 pounds per square inch gage (psig) and design-basis accidents (DBAs) (FENOC 2010c). DBAs include, but are not limited to, wind and tornado events, water level (floods), and seismic events, where the systems are required to avoid or mitigate the consequences of abnormal operational transients or accidents.

2.1.2 Radioactive Waste

The radioactive waste systems collect, treat, and dispose of radioactive and potentially radioactive wastes that are byproducts of operations. The byproducts are activation products resulting from the irradiation of reactor water and impurities therein (principally metallic corrosion products) and fission products resulting from defective fuel cladding or uranium contamination within the reactor coolant system (RCS). Operating procedures for the radioactive waste system ensure that radioactive wastes are safely processed and discharged from Davis-Besse. The systems are designed and operated to assure that the quantities of radioactive materials released from Davis-Besse are as low as is reasonably achievable (ALARA). They also comply with the dose standards set forth in Title 10 of the *Code of Federal Regulations* (CFR) Part 20, “Standards for Protection against Radiation,” and Appendix I to 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities.” The Davis-Besse offsite dose calculation manual (ODCM) contains the methodology and parameters used to calculate offsite doses resulting from radioactive effluents. The methodology is used to ensure that radioactive material discharged from Davis-Besse meets regulatory dose standards.

Radioactive wastes resulting from Davis-Besse operations are classified as liquid, gaseous, and solid. Radioactive wastes generated by Davis-Besse operations are collected and processed to meet applicable regulations. The design and operational objectives of the radioactive waste management systems are to limit the release of radioactive effluents from Davis-Besse during normal operation and anticipated operational occurrences (FENOC 2010c).

Reactor fuel that has exhausted a certain percentage of its fissile uranium content is referred to as spent fuel. Spent fuel assemblies are removed from the reactor core and replaced with fresh fuel assemblies during routine refueling outages. Spent fuel assemblies are stored in a spent fuel pool located in the auxiliary building and in the dry fuel storage facility located south of the containment building (FENOC 2010c).

2.1.2.1 Radioactive Liquid Waste

The liquid radioactive waste system is designed so that effluents released by the system, when mixed with the cooling tower blowdown, meet the requirements in Appendix B of 10 CFR Part 20 and 10 CFR Part 50. The design is based on receiving, segregating, and batch-storing two categories of solutions—clean liquid radwaste and miscellaneous liquid radwaste. The major source of clean liquid radwaste for this system is reactor coolant letdown resulting from boron dilution operations or from coolant expansion during reactor startups. Other sources include leakage, drainage, and relief flows from valves and equipment containing reactor-grade liquid. The major sources of miscellaneous liquid radwaste are further categorized as non-detergent and detergent wastes. Non-detergent wastes are categorized as miscellaneous system leakage, drainage from area washdown, sampling and laboratory operations, and condensate polishing demineralizer backwash (if there is a significant primary-secondary leak). Detergent waste comes from the hot showers (used to decontaminate personnel) and drains in the laboratory.

The liquid radioactive waste system can accommodate the full range of volumes and activities delivered to it. Suitability for discharge is determined not only by comparison of waste samples with applicable limits but also by the opportunity afforded the station to further reduce activity with existing equipment. Before processed water is released to the environment, it is mixed in a collection box with the discharge from the service water system (SWS), the dilution pump, a cooling tower make up pump, or the cooling tower blowdown. Processed liquid waste enters Lake Erie. The ODCM provides the day-to-day methods for determining release rates and cumulative releases and for calculating the corresponding dose rates and cumulative quarterly and yearly doses (FENOC 2010c).

2.1.2.2 Radioactive Gaseous Waste

The gaseous radioactive waste disposal system is designed to process effluents to meet the requirements of 10 CFR Part 20, 10 CFR Part 50, Appendix I, and 40 CFR Part 40. The system provides selective holdup such that the short-lived isotopes sufficiently decay prior to release. It also provides a 30-day holdup of these gases when refueling cold shutdown degassing is required.

When a decay tank is full, (i.e., contains gas at 150 psig) or when the operator decides, it is valved out-of-service and another is put in its place. A sample is then taken from the isolated tank and analyzed. If it shows a sufficiently low activity level, the stored gas can be released in a controlled manner through waste gas charcoal and high efficiency particulate air filters to the station vent. If the analysis indicates significant radioactivity, the gases are allowed to decay until future sampling shows that they are suitable for release to the environment. Using two of the decay tanks, gases can be held for at least 60 days with release spread out over the next 30 days.

Gaseous wastes that contain little or no radioactivity or may contain oxygen are handled separately. These gases are collected, passed through a charcoal filter, and then released through the station vent.

The ODCM provides the day-to-day methods for determining release rates and cumulative releases and for calculating the corresponding dose rates and cumulative quarterly and yearly doses (FENOC 2010c).

2.1.2.3 Radioactive Solid Waste

The solid waste management system collects, processes, and packages solid radioactive wastes for storage and offsite shipment and burial. The system is located in the low-level radioactive waste storage facility (LLRWSF). The system is designed to process waste while maintaining occupational exposure ALARA. To ensure compliance with applicable regulations in 10 CFR Part 20, 10 CFR Part 61, and 10 CFR Part 71, characterization, classification, processing, waste storage, handling and transportation of solid wastes are controlled by the Davis-Besse Process Control Program.

The materials handled by the solid waste system include bead-type resins, spent filter cartridges, powdered resins, and miscellaneous solid waste such as paper, rags, contaminated clothing, gloves and shoe coverings. The solid waste system area was designed to provide the necessary shielding to prevent the overexposure of operating personnel to radioactive sources. This is accomplished through the use of lead shielding, concrete shielding, and safe operating procedures.

The LLRWSF provides interim onsite storage for dry active waste (DAW) boxes and liners/high-integrity containers (HIC) and also provides DAW compaction and segregation areas. The following activities are also permitted, with administrative controls in place, in the LLRWSFs:

- opening of DAW containers in the cell area for inventory,
- sorting, re-packaging, or both,
- loading a sea land container with DAW and preparing the container for offsite shipment in the truck bay,

- opening of radioactive material (RAM) containers in the cell area for retrieval of tools and equipment, and
- refurbishing, minor repair, or both, of tools and equipment in the cell area.

Approximately 5 years of storage area is available in the LLRWSF. The facility has separate radiation monitoring and floor drain collection systems.

Solid radioactive wastes are packaged and shipped from Davis-Besse in containers that meet the requirements established by the Department of Transportation (DOT) and by the U.S. Nuclear Regulatory Commission (NRC). All Class A radioactive waste is sent out for processing and ultimately transported to Clive, Utah, for disposal at a commercial low-level radioactive waste disposal facility. Class B and Class C resins and filters are shipped in HICs to Studsvic, Inc., in Erwin, Tennessee, for thermal oxidation and reduction processing to reduce the volume for burial (FENOC 2011).

Class A LLRW waste is shipped to processing facilities as shipping containers are filled. As a result, there is no need for storage of Class A waste. The contract with Studsvic, Inc., for processing Class B and Class C LLRW has resulted in the processing of all Class B and Class C LLRW; consequently, there is no Class B or Class C LLRW in long-term storage onsite (FENOCb 2011).

The LLRWSF has the capability to store 108 HICs of LLRW. Since Class A waste is not stored at the LLRWSF, the space is available for Class B and Class C LLRW storage. FirstEnergy Nuclear Operating Company (FENOC) is currently generating approximately three Class B and Class C HICs during a 2-year operating cycle. Assuming that Davis-Besse had to store Class B and Class C LLRW and not ship it offsite for processing, and assuming that Davis-Besse continued to generate three Class B and Class C HICs during each 2-year operating cycle from 2011 through the period of extended operation (i.e., conservatively, 14 cycles), there would be 14x3=42 HICs that would require long-term storage in the LLRWSF. With storage capacity for 108 HICs in the LLRWSF, Davis-Besse would have sufficient storage space for LLRW for the period of extended operation (FENOCb 2011).

2.1.3 Nonradioactive Waste Management

Davis-Besse generates nonradioactive wastes as part of routine plant maintenance, cleaning activities, and plant operations. The Resource Conservation and Recovery Act of 1976 (RCRA) waste regulations governing the disposal of solid and hazardous waste are contained in 40 CFR Parts 239 through 299. In addition, 40 CFR Parts 239 through 259 contain regulations for solid (nonhazardous) waste, and 40 CFR Parts 260 through 279 contain regulations for hazardous waste. RCRA Subtitle C establishes a system for controlling hazardous waste from "cradle to grave," and RCRA Subtitle D encourages states to develop comprehensive plans to manage nonhazardous solid waste and mandates minimum technological standards for municipal solid waste landfills. Ohio State RCRA regulations are administered by the Ohio Environmental Protection Agency (OEPA) and address the identification, generation, minimization, transportation, and final treatment, storage, or disposal of hazardous and nonhazardous waste.

Nonradioactive Waste Streams

Davis-Besse generates solid waste, defined by the RCRA, as part of routine plant maintenance, cleaning activities, and plant operations. Ohio administers the RCRA Program in Ohio Administrative Code (OAC) 3745-50.

The U.S. Environmental Protection Agency (EPA) classifies certain nonradioactive wastes as hazardous based on characteristics including ignitability, corrosivity, reactivity, or toxicity (hazardous wastes are listed in 40 CFR Part 261). State-level regulators may add wastes to the EPA's list of hazardous wastes. RCRA supplies standards for the treatment, storage, and disposal of hazardous waste for hazardous waste generators (regulations are available in 40 CFR Part 262).

The EPA recognizes the following main types of the hazardous waste generators (40 CFR 260.10) based on the quantity of the hazardous waste produced:

- large quantity generators that generate 2,200 lb (1,000 kg) per month or more of hazardous waste, more than 2.2 lb (1 kg) per month of acutely hazardous waste, or more than 220 lb (100 kg) per month of acute spill residue or soil,
- small quantity generators that generate more than 220 lb (100 kg) but less than 2,200 lb (1,000 kg) of hazardous waste per month, and
- conditionally exempt small quantity generators that generate 220 lb (100 kg) or less per month of hazardous waste, 2.2 lb (1 kg) or less per month of acutely hazardous waste, or less than 220 lb (100 kg) per month of acute spill residue or soil.

OEPA recognizes Davis-Besse as a small quantity generator of hazardous wastes under OAC 3745-52. However, during refueling outage years, hazardous waste generation may exceed 2,200 lb in a month, requiring Davis-Besse to file a report with the OEPA for a temporary large quantity generator status in accordance with the OAC, Rule 3745-52-41. Davis-Besse hazardous wastes include spent and off-specification (e.g., shelf-life expired) chemicals, laboratory chemical wastes, and occasional project-specific wastes (FENOC 2010).

The EPA classifies several hazardous wastes as universal wastes. These universal wastes include batteries, pesticides, mercury-containing items, and fluorescent lamps. OEPA has incorporated EPA's regulations (40 CFR Part 273) regarding universal wastes in OAC 3745-51. Universal wastes produced by Davis-Besse are disposed of or recycled in accordance with OEPA regulations.

Conditions and limitations for wastewater discharge by Davis-Besse are specified in National Pollution Discharge Elimination System (NPDES) Permit No. 2IB00011*ID. Radioactive liquid waste is addressed in Section 2.1.2 of this supplemental environmental impact statement (SEIS). Section 2.2.4 gives more information about the Davis-Besse NPDES permit and permitted discharges.

The Emergency Planning and Community Right-to-Know Act (EPCRA) requires applicable facilities to supply information about hazardous and toxic chemicals to local emergency planning authorities and the EPA (42 USC 11001). On October 17, 2008, the EPA finalized several changes to the Emergency Planning (Section 302), Emergency Release Notification (Section 304), and Hazardous Chemical Reporting (Sections 311 and 312) regulations that were proposed on June 8, 1998 (63 FR 31268). Davis-Besse is subject to Federal EPCRA reporting requirements; thus, Davis-Besse submits an annual Section 312 (Tier II) report on hazardous substances to local emergency response agencies.

Pollution Prevention and Waste Minimization

Currently, Davis-Besse has waste minimization measures in place, which were verified by the NRC during the Davis-Besse site visit conducted in March 2011. In support of nonradiological waste-minimization efforts, the EPA's Office of Prevention and Toxics has established a clearinghouse that supplies information about waste management and technical and operational approaches to pollution prevention (EPA 2010a). The EPA clearinghouse can be used as a source for additional opportunities for waste minimization and pollution prevention at Davis-Besse, as appropriate.

The EPA also encourages the use of environmental management systems (EMSs) for organizations to assess and manage the environmental impacts associated with their activities, products, and services in an efficient and cost-effective manner. The EPA defines an EMS as "a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency." EMSs help organizations fully integrate a wide range of environmental initiatives, establish environmental goals, and create a continuous monitoring process to help meet those goals. The EPA Office of Solid Waste especially advocates the use of EMSs at RCRA-regulated facilities to improve environmental performance, compliance, and pollution prevention (EPA 2010b).

2.1.4 Plant Operation and Maintenance

Maintenance activities conducted at Davis-Besse include inspection, testing, and surveillance to maintain the current licensing basis of the facility and to ensure compliance with environmental and safety requirements. Various programs and activities currently exist at Davis-Besse to maintain, inspect, test, and monitor the performance of facility equipment. These maintenance activities include inspection requirements for reactor vessel materials and pressure vessel inservice inspection and testing, the structures monitoring program, and maintenance of water chemistry.

Additional programs include those implemented to meet technical specification surveillance requirements, those implemented in response to NRC generic communications, and various periodic maintenance, testing, and inspection procedures. Certain program activities are performed during the operation of the unit, while others are performed during scheduled refueling outages. Nuclear power plants must periodically discontinue the production of electricity for refueling, periodic inservice inspection, and scheduled maintenance. Davis-Besse refuels on an approximate 24-month interval (FENOC 2010c).

2.1.5 Power Transmission System

Three 345-kilovolt (kV) transmission lines connect Davis-Besse to the regional electric grid, all three of which are owned and operated by FirstEnergy Corporation (FirstEnergy). The transmission line description in this section discusses the entire length of the transmission lines that were constructed to connect the Davis-Besse facility with the existing transmission system. At Davis-Besse, an onsite switchyard lies just east of the containment building and south of the cooling tower. Lines beyond this switchyard have been integrated into the regional electric grid and would stay in service regardless of Davis-Besse license renewal. Each of these lines is owned and operated by FirstEnergy and not the applicant, FENOC, and are, therefore, outside of NRC's regulatory purview.

2.1.5.1 Transmission Line Descriptions

The three transmission lines are as follows (FENOC 2010c):

- *Bay Shore Line*: From the site, this line extends 21 mi west and then northwest to the Bay Shore substation in Lucas County.
- *Lemoyne Line*: From the site, this line extends 21 mi west and then southwest to the Lemoyne Substation in Wood County.
- *Beaver Line*: From the site, this line extends 15 mi south and then southeast to a tie point between Toledo Edison and Ohio Edison's line ownership in Sandusky County.

> A transmission line right-of-way (ROW) is a strip of land used to construct, operate, maintain and repair transmission line facilities. The transmission line is usually centered in the ROW. The width of a ROW depends on the voltage of the line and the height of the structures. ROWs must typically be clear of tall-growing trees and structures that could interfere with a power line.

Figure 2.1-6 is a map of the Davis-Besse transmission system.

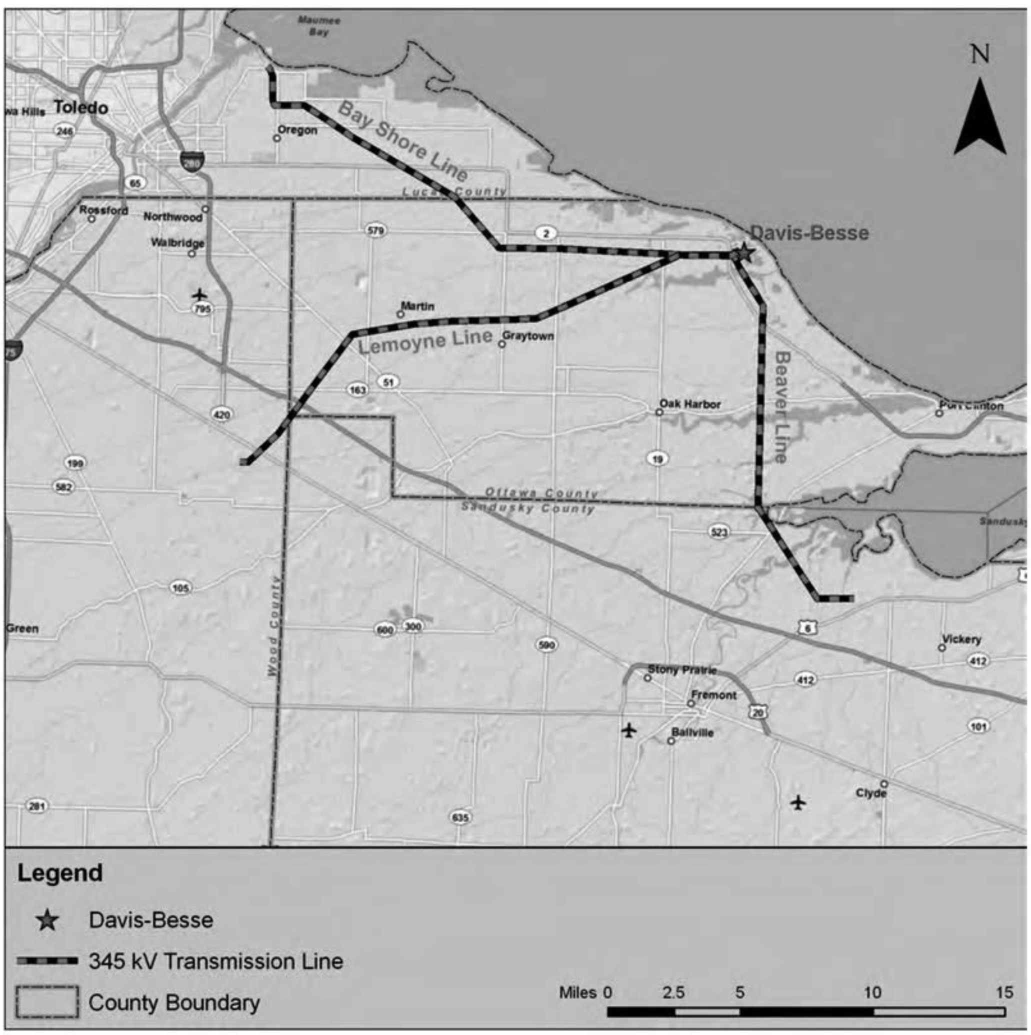

Figure 2.1-6. Davis-Besse Transmission System

Source: FENOC 2010c

All three transmission lines have 150-ft-wide ROWs that encompass approximately 1,000 ac (405 ha), most of which is comprised of flat to gently rolling agricultural land. In order to ensure power system reliability and to comply with applicable Federal and State regulations, FirstEnergy maintains transmission line ROWs to prevent physical interference that could result in short-circuiting. This maintenance generally consists of removing or cutting tall-growing vegetation under the lines and removing or trimming of any trees near the edge of the ROWs that could fall on the lines. Table 2.1-1 lists the Davis-Besse transmission lines, and a more detailed discussion of transmission line maintenance appears in the following section.

Table 2.1-1. Davis-Besse Transmission Lines

			Approximate Distance	ROW Width	ROW Area
Substation	Number of Lines	kV	mi (km)	ft (km)	ac (ha)
Bay Shore Line	1	345	21 (34)	150 (0.05)[b]	381 (154)
Lemoyne Line	1	345	21 (34)	150 (0.05)	381 (154)
Beaver Line[a]	1	345	15 (24)[c]	150 (0.05)[d]	273 (110)

[a] This is also referred to as the Ohio Edison-Beaver substation.

[b] ROW width is 150 ft except where it parallels the existing Bay Shore to Ottawa 138-kV line. In this region, the ROW is 145 ft, contiguous to the existing 100 ft for the 138 kV line.

[c] The Beaver line has an approximate length of 59 mi. Only 15 mi were constructed for Davis-Besse, the remaining 44 miles were constructed for a separate project.

[d] ROW width was not specifically referenced in the applicants Environmental Report (ER).

Source: FENOC 2010c

2.1.5.2 Transmission Line Maintenance

FirstEnergy uses an Integrated Vegetative Management Program that combines manual, mechanical, biological, and chemical control techniques to maintain proper clearance from transmission lines and structures. The degree and type of clearance varies by line voltage and the type, growth rate, and branching characteristics of trees and vegetation. The majority of the in-scope transmission lines traverse agricultural land and wetland habitat. Those areas that are not already cultivated or developed in some other way are maintained to promote herbaceous vegetation, which includes shrubs, bushes, and other low-growing groundcover.

FirstEnergy maintains a “clearance zone” of 15 to 30 ft (4.6 to 9.2 meters (m)) on either side of transmission lines (FENOC 2011c). Within this clearance zone, FirstEnergy cuts back all incompatible vegetation (woody, tall-growing species) as low as practical or treats areas with herbicides on a 4-year cycle. Workers follow the current American National Standards Institute (ANSI) guideline document, “A300 Standards for Tree Care Operations,” which contains requirements and recommendations for tree care practices including pruning, lightning protection, and integrated vegetation management. In areas where herbicides are applied, FirstEnergy’s vegetative management protocol (FirstEnergy 2007) requires all herbicide applicators to hold a current and appropriate pesticide application license from the State. Transmission line maintenance workers and contractors must follow FirstEnergy’s established procedures, *FirstEnergy Vegetative Management Specifications*, and *FirstEnergy Guide to Vegetation Control with Herbicides*, to ensure compliance with all applicable State and Federal regulations.

2.1.6 Cooling and Auxiliary Water Systems

Davis-Besse uses a closed-cycle heat-dissipation system that withdraws water from, and discharges cooling tower blowdown to, Lake Erie. Davis-Besse has one natural draft hyperbolic cooling tower that dissipates heat from the plant's steam cycle to the atmosphere. Unless otherwise noted, information contained in this section was gathered from FENOC's ER, the final environmental statement (FES) related to the construction of Davis-Besse (AEC 1973), and the FES related to the operation of Davis-Besse (NRC 1975). Figure 2.1-7 illustrates Davis-Besse's cooling water system.

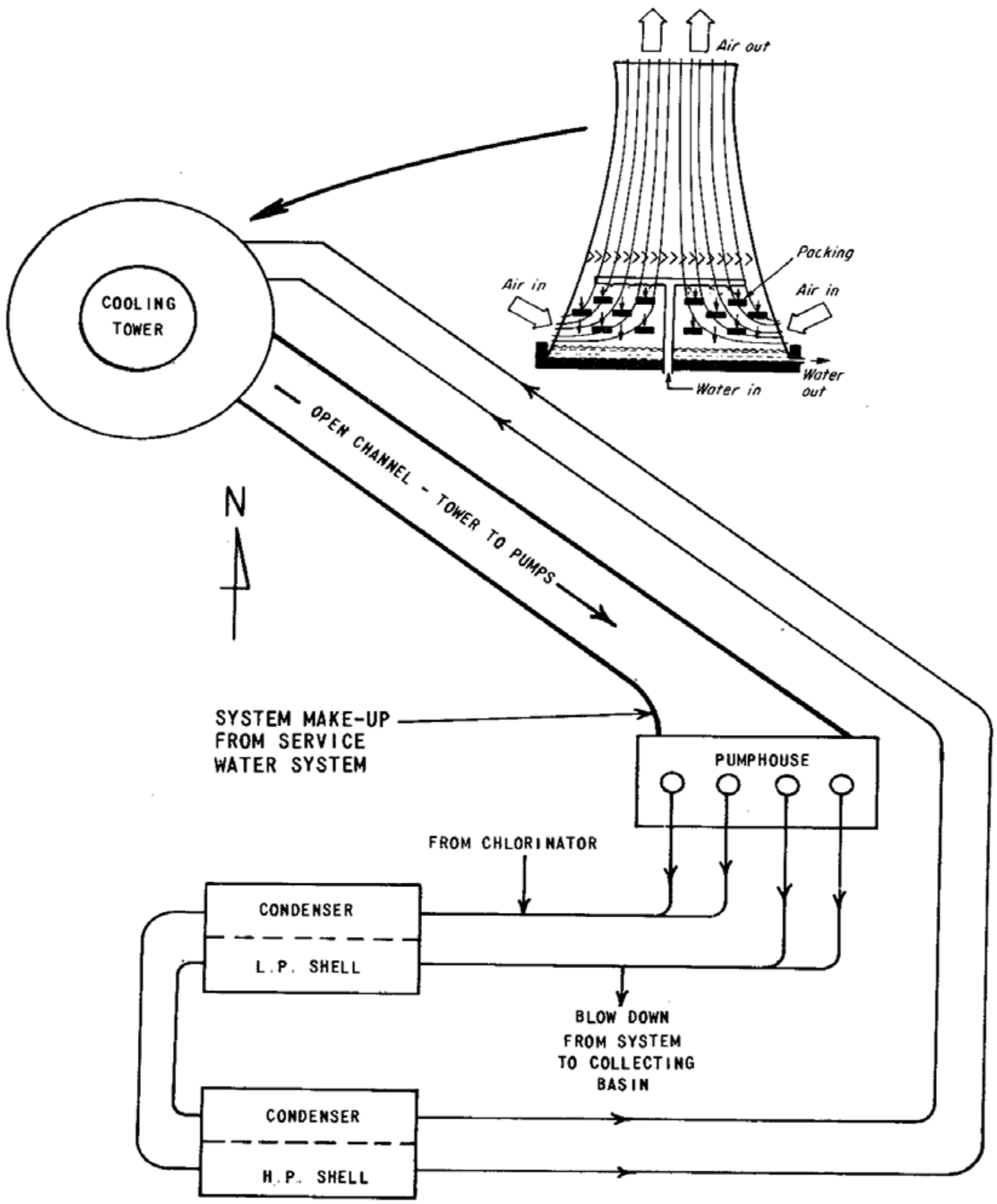

Figure 2.1-7. Davis-Besse Cooling Water System

Source: AEC 1973

2.1.6.1 Water Intake

When withdrawn, water from Lake Erie first enters a submerged intake crib located approximately 3,000 ft (900 m) offshore at a water depth of 14 ft (4.3 m). The intake crib is octagonal in shape, and water enters the intake crib via slots in the top of the structure. At its design capacity, the intake crib can withdraw a maximum of 42,000 gallons per minute (gpm) (160 cubic meters per minute (m3/min)). However, during normal operations, the intake crib withdraws 21,000 gpm (80 m3/min). Water flows into the intake crib at about 0.25 feet per second (fps) (0.08 meters per second (m/s)).

After water enters the intake crib, it travels through an 8-ft (2.4-m) diameter intake pipe buried beneath Lake Erie's bottom at a maximum rate of 1.8 fps (0.55 m/s). Once through the intake pipe, water flows into the intake canal, which is separated from the lake by a beach and beachfront dike. The intake canal functions as a reservoir for station water use. Water flows through the intake canal at about 0.11 fps (0.03 m/s).

The intake canal widens into a forebay as it reaches the intake structure. Before entering the intake structure, water in the intake canal flows through trash racks with 4 in. x 26 in. (10 cm x 66 cm) openings and then through traveling screens with $^{1}/_{4}$-in. (0.635-cm) openings and backwash sprays. These features prevent debris and aquatic organisms from entering the intake structure. Debris and aquatic organisms washed off the screens are deposited in a holding basin and disposed of onsite. Once water passes through the traveling screens, it enters one of three pumps that then circulate the water through the condenser for use as cooling water.

2.1.6.2 Cooing Tower Blowdown and Water Discharge

Four pumps carry heated cooling water from Davis-Besse's condenser at a rate of 480,000 gpm (1,800 m^3/min)—120,000 gpm (450 m^3/min) per pump. Heated cooling water that is pumped into the cooling tower is either lost to evaporation, drift, blowdown, or flows back to the circulating pumps. The cooling tower dissipates 98 percent of the total heat that the condenser adds to the cooling water. The remaining 2 percent of heat is discharged to Lake Erie as cooling water blowdown.

FENOC monitors and controls the cooling tower blowdown's dissolved solids concentration and periodically chlorinates water that is returned to the circulating water system with sodium hypochlorite and sodium bromide to prevent algae growth within the system.

Before cooling tower blowdown returns to Lake Erie, it is routed to an open-air settling basin. In the settling basin, the cooling tower blowdown mixes with dilution water, which dissipates some of the heat load remaining in the cooling tower blowdown. From the settling basin, water travels 1,300 ft (400 m) eastward through a 6-ft (1.8-m) diameter buried pipe and discharges into Lake Erie 9 ft (2.7 m) below the lake's surface through a jet discharge. Water flows out of the discharge at about 3.6 fps (1.1 m/s), and an average of 11,000 gpm (42 m^3/min) of water discharges to Lake Erie during normal operations—9,225 gpm [35 m^3/min] of blowdown water plus 1,775 gpm [7 m^3/min] of dilution water.

2.1.6.3 Makeup Water

The service water system supplies makeup water to the cooling system to account for cooling tower blowdown loss. The service water system supplies approximately 18,450 gpm (70 m^3/min) to account for the 9,225 gpm (35 m^3/min) in evaporative loss and 9,225 gpm

(35 m^3/min) in blowdown loss. The service water system draws water from Lake Erie as previously described under the subsection "Water Intake."

2.1.7 Facility Water Use and Quality

The dominant water usage at the Davis-Besse plant is the makeup water, obtained from Lake Erie, for the plant's cooling system. Groundwater is not used as a resource at the site. The following sections describe water use by the facility.

2.1.7.1 Surface Water Use

As discussed in Section 2.1.6, the intake system is comprised of an intake crib, a pipeline, and an intake canal. The crib is a wooden structure about 3,000 ft offshore in Lake Erie, in water that is 11 ft below the lake's low water datum (AEC 1973). Water entering the crib flows through an 8-ft diameter pipe buried beneath the lake bottom and then enters the intake canal. The canal is separated from the lake by a beach and a beachfront dike.

The intake flow rate averages 21,000 gpm (or 30 million gallons per day (mgd)) according to the applicant's ER (FENOC 2010c).The facility has a state registration to withdraw water at a rate up to 50 mgd (Toledo Edison 1990).

Closed-system cooling at Davis-Besse is provided by the circulating water system (CWS). This system includes the condenser, natural draft cooling tower, circulating water pumps, makeup pumps, and water chlorination and chemical feed systems (FENOC 2010c). Four pumps withdraw water from the discharge channel of the cooling tower basin and deliver it to the condenser.

The Davis-Besse service water system (SWS) supplies cooling water to components in the turbine building during normal power-generating operation. Water for the SWS is obtained from Lake Erie. Three pumps are present at the intake structure, although only two are needed for normal operation (FENOC 2010c). The SWS also is the main source of makeup water for the CWS. Water is taken from the intake structure for use in the makeup water treatment system to supply high-quality water for primary and secondary plant makeup following a vendor's treatment process to create demineralized water (FENOC 2010c). According to FENOC staff during the site audit, the vendor is Ecolochem, and reverse osmosis is used to produce the demineralized water. Pumps at the intake structure can also use lake water directly as makeup water (FENOC 2010c).

Discharge of blowdown, other effluents, and dilution water to Lake Erie occurs via a submerged discharge structure 1,300 ft offshore (AEC 1973), as discussed in Section 2.2.4.

Domestic water for the facility is supplied by the offsite Carroll Township water system (FENOC 2010c). The source for this system is an intake on Lake Erie northwest of Davis-Besse. This water is filtered and treated to meet the requirements of the OEPA. The Carroll Township system pressure is maintained by an elevated 500,000-gallon storage tank (FENOC 2010b).

2.1.7.2 Groundwater Use

The Davis-Besse facility does not use groundwater for plant operations. There are no plans to use groundwater from the site for current operations or during the period of extended operation (FENOC 2010b).

No drinking water wells are known to be within 5 mi of the site (ERM 2007). The groundwater is unsuitable as a drinking water source because of strong hydrogen sulfide odor and high levels of carbonate and total dissolved solids (ERM 2007). Private wells within 2 to 3 mi of the site are not used for drinking water but rather for irrigation and sanitary purposes (FENOC 2010c).

During site construction, a grout curtain was installed, and dewatering wells were operated to remove groundwater from the excavation area. Dewatering no longer takes place.

2.2 Affected Environment

2.2.1 Land Use

Davis-Besse is located on the southwestern shore of Lake Erie in Ottawa County, Ohio. The site is comprised of 954 ac (386 ha), of which approximately 733 ac (297 ha) is undisturbed marshland and additional maintained lands. The Ottawa National Wildlife Refuge encompasses much of the marshland area (see Figure 2.1-1). The developed portion of the station, containing the power block and associated plant structures, is located approximately in the center of the site, 3,000 ft (914.4 m) from the shoreline, which provides a minimum exclusion distance of 2,400 ft (731.5 m) from any point on the site boundary (FENOC 2010c).

To the west is the main unit of the Ottawa National Wildlife Refuge and the State of Ohio Magee Marsh Wildlife Area. On the southern boundary is the Toussaint River, which empties into Lake Erie. The entrance to the Magee Marsh Wildlife Area is less than 1 mi east of the power station. The land area surrounding the site is generally agricultural with no major industry in the vicinity.

Motor vehicle access to the site is by a two-lane road off State Highway 2, which is a two-lane artery located west of the station. U.S. Highway 80 is about 14 mi south of the site.

Oak Harbor is the nearest community to Davis-Besse at approximately 8 mi (13 km) southeast, Fremont 16 mi (26 km) south, and Toledo 25 mi (40 km) west northwest (FENOC 2010c). Features within a 6-mi radius of Davis-Besse are shown on Figure 2.1-2. Prominent features within 50 mi of the Davis-Besse plant site are shown in Figure 2.1-1.

2.2.2 Air and Meteorology

The climate of Ohio is humid continental, characterized by a relatively wide range of seasonal variability, from warm and humid summers to cold winters (NCDC 2011a). Due to equal exposure to air from Canada and the Tropics, Ohio experiences drastic changes in daily weather and a wide range of extremes. Warm maritime tropical air masses bring summer heat and humidity into the State, but can also produce occasional mild winter days. Ohio also experiences cold and dry continental arctic air masses, which bring cool and bright summer days and very cold winter days. Northern counties in Ohio along Lake Erie experience moderating effects resulting from lake and land breezes, water’s higher heat capacity, and wintertime lake ice cover.

Davis-Besse is located 0.5 mi (0.8 km) west off the southwestern shore of Lake Erie in Ottawa County, Ohio. The topography of the site and vicinity is flat with marsh areas bordering the lake. The upland area rises 10 to 15 ft (3.0 to 4.6 m) above the lake low-water datum level in the general surrounding area (FENOC 2010c). Davis-Besse’s topography has no special influence on local climate. Due to its proximity to Lake Erie, the site location experiences milder climate, smaller diurnal and seasonal temperature ranges, higher cloudiness, and more precipitation than a site located further inland of comparable latitude.

The wind can blow from any direction in Ohio, depending on the relative location of high-pressure systems and storm systems that are continually alternating across the country. However, the primary wind direction over much of Ohio is from the southwest (NCDC 2011a). Meteorological data—wind speed, temperature, and precipitation—collected at the Toledo Express Airport, located about 37 mi (60 km) west of the Davis-Besse, is presented below.

From 1955 through 2012, annual average temperature at the airport was 49.4 °Fahrenheit (F) (9.7 °Celsius (C)) (NCDC 2013a). January is the coldest month with an average minimum of 16.5 °F (–8.6 °C), and July is the warmest month with an average maximum of 84.1 °F (28.9 °C). As mentioned above, the proximity to Lake Erie and other Great Lakes has a moderating effect on the temperature, and extremes seldom occur. In warm months, onshore breezes from the relatively cool lake make the site cooler than more inland areas. From 1955-2012 the highest temperature, 104 °F (40.0 °C), was reached in July 1995. The lowest, -20 °F (-28.9 °C), was reached in January 1984.

In Ohio, precipitation from October through March occurs due to mid-latitude wave cyclones traversing the country, while the remainder of the year experiences varying amounts of convective thunderstorm rainfall (NCDC 2011a). From 1955 through 2012, annual precipitation at the airport averaged about 33.28 in. (84.5 cm) (NCDC 2013a). Precipitation is rather uniformly distributed throughout the year, with monthly precipitation ranging between 2.0 and 3.5 in. (5.0 and 8.9 cm). At the airport, precipitation tends to be the highest in summer and lowest in winter. Heavy snowstorms typically occur once or twice a winter, but light snows are common (NOAA 2009). Snow in this area starts as early as October and continues as late as May. Most of the snow falls from November through March. The annual average snowfall at the airport is about 36.8 in. (93.5 cm).

Wind data collected at the airport indicates that wind blows predominantly from the west-southwest or southwest throughout the year, with the exception of March and April, when the winds blow from the east or east-northeast (NCDC 2013a). From 2008 through 2012, average wind speed was about 7.7 miles per hour (mph). Average wind speeds were the highest in winter and lowest in summer.

The prominence of convective weather during the warm season causes Ohio to be subjected to thunderstorm-induced severe weather (NCDC 2011a). Severe weather events—such as floods, hail, high winds, thunderstorm winds, winter storms, and tornadoes, have been reported for Ottawa County (NCDC 2013b). From January 2000 through October 2012, the following severe weather events were reported for Ottawa County:

- Floods: 4,
- Hail events: 74,
- Thunderstorm winds: 89,
- High wind events: 27,
- Tornadoes: 4, and
- Winter storms: 17.

Hurricanes and tropical storms were not reported from 2000 through 2012 in the area.

Recent research on global climate change impacts in the U.S. developed by the U.S. Global Change Research Program (USGCRP), a Federal Advisory Committee (USGCRP 2009), has been considered in preparation of this SEIS. In the near term (2010 through 2029), the temperatures around Davis-Besse are projected to rise an additional 2 to 3 °F (1.1 to 1.7 °C), compared to the recent past (1961 through 1979). Model projections indicate that, due to the northward shift of storm tracks in winter and spring, northern areas will become wetter, while southern areas, particularly in the west, will become drier (USGCRP 2009). Higher temperatures and reduced lake ice in winter, due to the rise in temperatures, will cause more evaporation and will likely result in reductions of lake water levels (USGCRP 2009). Average lake water levels depend on the balance between precipitation (and corresponding runoff) in the Lake Erie Basin and evaporation and outflow. Based on NOAA's Great Lakes model, water level changes in Lake Erie were projected to lower by about 0.2 ft (0.06 m) under a higher emissions scenario from 2010 through 2039, which encompasses the license renewal period (USGCRP 2009).

The onsite meteorological observation system at Davis-Besse has been in place since October 1968. This monitoring system will continue to serve in that capacity for the period of extended operations with no major changes or upgrades anticipated. The current meteorological monitoring system consists of primary and auxiliary towers and equipment shelters that collect meteorological data and process the information into usable data. The primary 328-ft (100-m) meteorological tower is located about 2,950 ft (900 m) southwest of the reactor building, and the 33-ft (10-m) auxiliary tower is located near the primary tower. The primary tower has instruments at three levels (33 ft (10 m), 246 ft (75 m), and 328 ft (100 m)). The base of the tower is 574 ft (175 m) above MSL (FENOC 2005). Wind speed and wind direction are collected at 33 ft (10 m) on the auxiliary tower and 246 ft (75 m) and 328 ft (100 m) on the primary tower. Temperature differences are measured between 328 and 33 ft levels and between the 246 and 33 ft levels on the primary tower to determine the atmospheric stability. Ambient temperature, barometric pressure, dew point, and solar insolation is collected at the 33 ft (10 m) level on the primary tower. Precipitation is collected near the base of the auxiliary tower.

Each sensor is wired to environmentally controlled shelters located near the base of the towers, which house the recording and signal-conditioning equipment. Signals from tower-mounted instruments are converted from analog to digital at the meteorological data processing system (MDPS), which collects all real-time data and yields 15-minute and hourly averages. These outputs are transmitted on a continuous basis directly to the control room and emergency control room via data acquisition display system (DADS) to display and record meteorological data. Most of these signals are also fed to strip-chart recorders.

2.2.2.1 Air Quality Impacts

The Division of Air Pollution Control (DAPC) of the OEPA is the regulatory agency whose primary responsibility is to achieve and maintain air quality that is protective of public health and the natural environment. In doing so, DAPC reviews, issues, and enforces permits for installation and operation of sources of air pollution and operates an extensive ambient air monitoring network. DAPC also oversees an Automobile Emission Testing Program to minimize mobile source emissions.

A facility is defined as a "major" source if it has the potential to emit 100 tons (90.7 metric tons) or more per year of one or more of the criteria pollutants, 10 tons (9.07 metric tons) or more per year of any of the listed hazardous air pollutants (HAPs), or 25 tons (22.7 metric tons) or more per year of an aggregate total of HAPs. Under the CAA, the U.S. EPA has set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment (40 CFR Part 50). NAAQS are established for criteria pollutants—carbon monoxide (CO); lead (Pb); nitrogen dioxide (NO_2); particulate matter with an aerodynamic diameter of 10 microns or less and 2.5 microns or less (PM_{10} and $PM_{2.5}$, respectively); ozone (O_3); and sulfur dioxide (SO_2), as shown in Table 2.2-2 (EPA 2012a). A HAP is defined as any pollutant listed under Section 112(b) of the Federal Clean Air Act.

Major sources are subject to Title V of the Clean Air Act (CAA) (42 U.S.C. 7401 et seq.), which standardizes air quality permits and the permitting process across the U.S. Permit stipulations include regulating source-specific emission limits, monitoring, operational requirements, recordkeeping, and reporting. A "synthetic minor" (or "conditional major") source has the potential to exceed major source emission thresholds but is the one that avoids major source requirements by accepting permit conditions limiting emissions below major source thresholds. The "small" (or "minor") source has no potential to exceed major source emission thresholds.

Davis-Besse has many sources of criteria pollutants and HAPs to include the following:

- combustion sources, such as auxiliary boiler, station blackout diesel generators, emergency diesel generators, and fire pump engines;
- bulk material storage, such as diesel, gasoline, and lube oil storage tanks;
- other sources, such as natural draft cooling towers and sandblasting and painting operations; and
- miscellaneous sources, such as small diesel generators, welding, and laboratory hoods.

No OEPA air permits have been issued to Davis-Besse for emissions to the atmosphere during normal operations (OEPA 2011a). The only conventional air pollution sources at Davis-Besse are the emergency diesel generators and startup boilers, which are not used during normal operations. Davis-Besse currently has one operation permit for an auxiliary boiler (Permit Application No. 0362000091B001) (FENOC 2010c). Davis-Besse applied to OEPA for a "synthetic minor" permit to encompass all site-wide emission sources on July 9, 2012 (FENOC 2013).

Air emission sources at Davis-Besse emit criteria pollutants, volatile organic compounds (VOCs), and HAPs into the atmosphere. Emissions inventory data reported to the OEPA for calendar years 2006 through 2010 are presented in Table 2.2-1, which includes air emissions from all stationary sources at the site (FENOC 2011c). During the period from 2006 through 2010, emissions of criteria pollutants, VOCs, and HAPs varied from year to year, but all reported annual emissions were well below the emission thresholds for a major source. In recent years, Davis-Besse has not received a notice of violation (NOV) associated with site operations from the OEPA.

On February 25, 2010, NRC issued an NOV to Davis-Besse associated with the failure to implement the emergency classification and action level scheme during an actual event for an explosion in the switchyard on June 25, 2009 (NRC 2010). During the event, the transformers caught on fire. During fires, polychlorinated biphenyls (PCBs) and chlorinated benzenes in the transformers can produce polychlorinated dibenzofurans (PCDFs) and polychlorinated dibenzo-p-dioxins (PCDDs), respectively (EPA 1987). EPA determined that the continued use of PCBs-contaminated transformers (50 to 500 ppm PCBs) and non-PCB transformers (less than 50 ppm PCBs) did not present unreasonable risks to public health. In 1992, Davis-Besse completed a program to eliminate PCB transformers onsite; electrical transformers were either changed out with non-PCB fluid or retrofilled with non PCB-liquid (FENOC 2011b). Hence, potential impacts of emissions from non-PCB transformers at the site would likely be minor.

As shown in Table 2.2-1, annual emissions for greenhouse gases (GHGs), which include those from stationary and mobile sources, are presented in terms of carbon dioxide equivalent (CO_{2e}).[1] Total annual GHG emissions from Davis-Besse was 4,693 metric tons CO_{2e} in 2010 (FENOC 2011c), which is well below the U.S. EPA's mandatory reporting threshold of 25,000 metric tons CO_{2e} per year (74 FR 56264).

Table 2.2-1. Annual Emissions Inventory Summaries for Sources at Davis-Besse, 2006–2010

Annual Emissions (tons/yr)[(a)]							
Year	**CO**	**NO_x**	**$PM_{10}/PM_{2.5}$**	**SO_x**	**VOCs**	**HAPs**	**CO_{2e}**
2006	2.31	9.72	0.54	7.35	0.17	0.8[(b)]	-[(c)]
2007	1.14	4.31	0.14	1.37	0.11	0.8	-
2008	2.42	10.16	0.56	2.35	0.18	0.8	-
2009	1.90	7.77	0.39	1.87	0.15	0.8	-
2010	2.31	9.75	0.56	2.09	0.17	0.8	5,173 (4,693)[(d)]

(a) CO = carbon monoxide; CO_{2e} = carbon dioxide equivalent; HAPs = hazardous air pollutants; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter ≤2.5 μm; PM_{10} = particulate matter ≤10 μm; SO_x = sulfur oxides; and VOCs = volatile organic compounds.

(b) Maximum HAP emissions are estimated based on maximum potential operating hours (500 hours per year for diesel generators and fire pumps and 8,760 hours per year for auxiliary boilers). Actual emissions are substantially lower than these maximum emissions.

(c) A hyphen denotes that the data are not available.

(d) Values in parentheses are in metric tons carbon dioxide equivalent.

Source: FENOC 2011c

The CAA established two types of NAAQS—primary standards to protect public health, including sensitive populations, such as asthmatics, children, and the elderly and secondary standards to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Any individual state can have its own State Ambient Air Quality Standards (SAAQS), but SAAQS must be at least as stringent as the NAAQS. If a state has no standard corresponding to one of the NAAQS or the SAAQS is not as stringent as the NAAQS, then the NAAQS apply. The State of Ohio has its own SAAQS (OEPA 2011b), which are almost the same as the NAAQS presented in Table 2.2-2.

[1] A measure used to compare the emissions from various greenhouse gases (GHG) on the basis of their global warming potential (GWP), defined as the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas, CO_2. The carbon dioxide equivalent (CO_{2e}) for a gas is derived by multiplying the mass of the gas by the associated global warming potential GWP. The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP. For example, the GWP for CH_4 is estimated to be 21; thus, one 1 ton of CH_4 emission is equivalent to 21 tons of CO_2 emissions.

Table 2.2-2. National Ambient Air Quality Standards and Ohio State Ambient Air Quality Standards[(a)]

		NAAQS		
Pollutant[(b)]	**Averaging Time**	**Value**	**Type[(c)]**	**SAAQS**
CO	1-hour	35 ppm (40 mg/m^3)	P	35 ppm
	8-hour	9 ppm (10 mg/m^3)	P	9 ppm
Pb	Quarterly average	-[(d)]	-	1.5 μg/m^3
	Rolling 3-month average	0.15 μg/m^3 [(e)]	P, S	-
NO_2	1-hour	100 ppb	P	-
	Annual (arithmetic average)	53 ppb	P, S	53 ppb (100 μg/m^3)
PM_{10}	24-hour	150 μg/m^3	P, S	150 μg/m^3
$PM_{2.5}$	24-hour	35 μg/m^3	P, S	35 μg/m^3
	Annual (arithmetic average)	12.0 μg/m^3	P	15 μg/m^3
	Annual (arithmetic average)	15 μg/m^3	S	15 μg/m^3
O_3	1-hour	0.12 ppm[(f)]	P, S	-
	8-hour	0.08 ppm (1997 standard)	P, S	0.08 ppm
	8-hour	0.075 ppm (2008 standard)	P, S	-
SO_2	1-hour	75 ppb	P	-
	3-hour	0.5 ppm	S	1,300 μg/m3 (0.5 ppm)
	24-hour			365 μg/m3 (0.14 ppm)
	Annual (arithmetic average)			80 μg/m3 (0.03 ppm)

[(a)] Refer to 40 CFR Part 50 for detailed information on attainment determination and reference method for monitoring.

[(b)] CO = carbon monoxide; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter ≤2.5 μm; PM_{10} = particulate matter ≤10 μm; and SO_2 = sulfur dioxide.

[(c)] P = primary standards, which set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. S = secondary standards, which set limits to protect public welfare including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

[(d)] A hyphen denotes that no standard exists.

[(e)] Final Rule signed October 15, 2008. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[(f)] EPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").

[(g)] OEPA references this value as 0.053 ppm

Source: EPA 2013b; OEPA 2011b

Areas considered to have air quality as good as or better than NAAQS are designated by EPA as “attainment areas.” Areas in which air quality is worse than NAAQS are designated as “non-attainment areas.” Areas that previously were non-attainment areas but where air quality has since improved to meet the NAAQS are redesignated “maintenance areas,” subject to an air quality maintenance plan. Ottawa County, which encompasses Davis-Besse, is located in the Sandusky Intrastate Air Quality Control Region (AQCR) (40 CFR 81.203), including north-central counties in Ohio, such as Erie, Huron, Sandusky, and Seneca Counties. Ottawa County is designated as an attainment area for carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter less than 2.5 μm ($PM_{2.5}$), for particulate matter less than 10 μm (PM_{10}), and is not designated for sulfur dioxide (SO_2) (OEPA 2013). Lucas and Wood Counties abutting Ottawa County to the north and west, respectively, are designated as maintenance areas for 1997 ozone 8-hour NAAQS (EPA 2013a). The nearest non-attainment area is Monroe County, Michigan, for $PM_{2.5}$ NAAQS (EPA 2013a).

Through operation of a network of air monitoring stations, OEPA has determined that the area complies with the NAAQS and SAAQS. Only PM_{10} was collected in Ottawa County until 2001 and in other counties in the Sandusky Intrastate AQCR until 2004 (EPA 2011h). However, PM_{10} monitoring was discontinued due to consistently low concentrations in the Sandusky Intrastate AQCR. The nearest monitoring station around Davis-Besse is located about 13 mi (21 km) west-northwest in Lucas County, where ozone is measured. There are five monitoring stations in the city of Toledo, Lucas County. These stations are located within a range of about 21 mi (34 km) to 29 mi (47 km) west or west-northwest of Davis-Besse. Pollutants monitored at these stations include PM_{10}, $PM_{2.5}$, O_3, and SO_2. Two additional monitoring stations can be found in Waterville, Lucas County and Bowling Green, Wood County. These stations are located 33 mi (53 km) and 31 mi (50 km), respectively, west-southwest of Davis-Besse. Ozone is the pollutant measured at these stations.

While the NAAQS place upper limits on the levels of air pollution, prevention of significant deterioration (PSD) regulations (40 CFR 52.21) place limits on the total increase in ambient pollution levels above established baseline levels for SO_2, NO_2, PM_{10}, and $PM_{2.5}$, thus preventing “polluting up to the NAAQS.” These allowable increments are smallest in Class I areas, such as national parks and wilderness areas, and less limiting in other areas. A major new or modification of an existing major source located in an attainment or unclassified area must meet stringent control technology requirements. As a matter of policy, EPA recommends that the permitting authority notify the Federal Land Managers (FLMs) when a proposed PSD source will be located within 62 mi (100 km) of a Class I area. If the source’s emissions are considerably large, EPA recommends that sources beyond 62 mi (100 km) be brought to the attention of the FLMs. The FLMs then become responsible for demonstrating that the source’s emissions could have an adverse effect on air quality-related values (AQRVs), such as scenic, cultural, biological, and recreational resources. There are no Class I areas in Ohio, and none of the Class I areas in other states are situated within the aforementioned 62-mi (100-km) range. The nearest Class I area is Otter Creek Wilderness Area in West Virginia managed by the U.S. Forest Service (40 CFR 81.435), which is located about 253 mi (407 km) southeast of Davis-Besse. Considering the locations and elevations of any Class I areas around Davis-Besse, prevailing southwesterly wind directions, distances from Davis-Besse, and the minor nature of air emissions from Davis-Besse, there is little likelihood that activities at Davis-Besse would adversely impact air quality and AQRVs in any of these Class I areas.

2.2.3 Geologic Environment

Davis-Besse Station is situated in the eastern lake section of the central lowland physiographic province (USGS 2011). The topography is characterized as being very flat, resulting from fine-grained sediment deposition in a glacial lake. The marsh bottom is slightly below lake level, while the upland areas are about 6 ft above lake level (FENOC 2010c).

Soil unit mapping by the National Resources Conservation Service (NRCS) (NRCS 2011) identifies the majority of the Davis-Besse site as gently sloping fill soils. Adjacent areas are Toledo silty clay, derived from glaciolacustrine sediments. The Toledo silty clay is very poorly drained, has a slope of 0 to 2 percent, and is ponded in the nearby marsh areas.

The surface material is comprised of glaciolacustrine sediments (cohesive brown silt with some sand and clay) and till (brown to dark gray silty clay), along with fill (ERM 2008). Below the unconsolidated material, at a depth of about 13 ft, is the Silurian age Tymechtee-Greenfield Formation (AEC 1973). The uppermost portion of the bedrock is about 10 ft of laminated dolomite (thin layers of interbedded dolomite, gypsum, anhydrite, and shale) (ERM 2008). Below this is about 10 ft of massive dolomite, underlain by laminated dolomite (ERM 2008).

Foundations for Seismic Class I station facilities are mat or strip footings on bedrock, glacial till, or compacted granular fill, or pier footings into bedrock (FENOC 2010b). The nearest fault is the Bowling Green Fault, located 35 mi west of the site (FENOC 2010b). No evidence of fault traces, offset geomorphologic features, shear zones, faults, sand boils, soil flows, or any other direct or indirect physical effects of prior earthquakes have been observed in site investigations (FENOC 2010b). The U.S. Geological Survey (USGS) Earthquake Hazards Program designates the Davis-Besse region as having a 0.02 g peak horizontal acceleration with a 10 percent probability in 50 years, and a 0.06 g peak horizontal acceleration with a 2 percent probability in 50 years (USGS 2008).

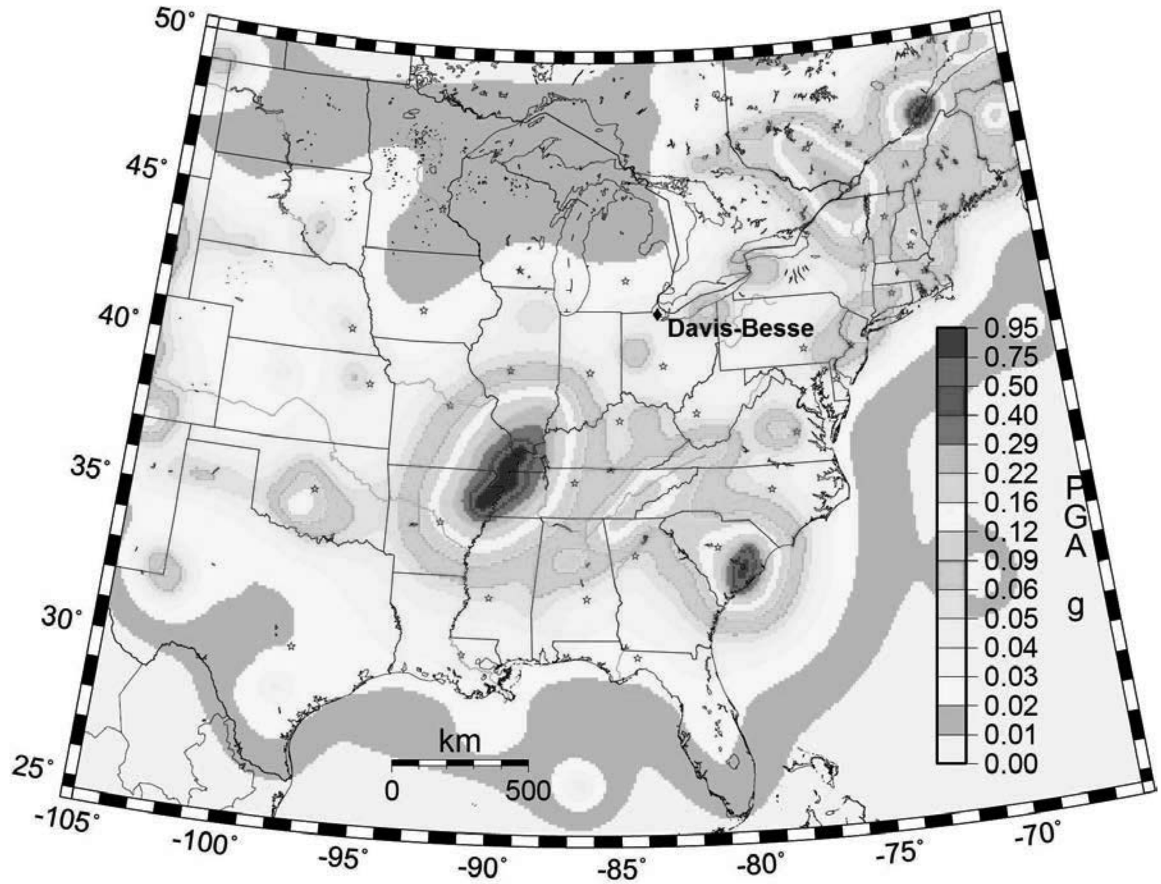

Figure 2.2-1. Seismic Hazard Map

Peak Ground Acceleration - 2% Probability in 50 years

Source: USGS 2008

The Ohio Department of Natural Resources, Division of Geologic Survey, as part of the Ohio seismic network, compiles and updates the occurrences of seismic events. The database includes information such as the epicenter location, magnitude, time and date, and whether the earthquake was measured with an instrument or if the information is reliant on historical information and reports. The database reflects over 220 earthquakes that have occurred in Ohio since 1804. The mapping software shows four earthquakes that had an epicenter within approximately 20 mi of the Davis-Besse site (ODNR 2008). Figure 2.2-2 shows the locations of the epicenters.

On January 1, 1984, at 8:14 pm, a 2.6 magnitude earthquake (as measured on the Richter scale) occurred approximately 20 mi west of Davis-Besse. The earthquake occurred in Lucas County, east of Toledo, Ohio. Four historical and one instrumental earthquake, ranging from a magnitude of 2 to 3.5 have been recorded within 2 to 8 mi in this general vicinity (ODNR 2008).

On April 12, 2007, at 10:03 pm, a 2.5 magnitude earthquake occurred approximately 11 mi northeast of Davis-Besse. The earthquake occurred in western Lake Erie approximately 5 km below the calculated surface. This occurrence did not have any reports of being felt. Prior to this incident, no previous records of seismic activity were recorded or historically reported in this general area of Lake Erie (ODNR 2008).

On April 24, 2007, at 1:09 am, a 2.3 magnitude earthquake occurred approximately 14 mi northeast of Davis-Besse. The earthquake occurred in western Lake Erie approximately 5 km below the calculated surface. This occurrence did not have any reports of being felt. Prior to this incident; the Geological Survey of Canada recorded microearthquakes in this approximate location at their station on Pelee Island on April 15 and two on April 17 (ODNR 2008).

On May 13, 2010, at 1:02 pm, a 2.6 magnitude earthquake occurred approximately 18 mi southwest of Davis-Besse. The earthquake occurred approximately 3 mi west of Hessville, Ohio. Approximately 8 mi from this epicenter, a historical earthquake of Magnitude 3.3 was recorded (ODNR 2008).

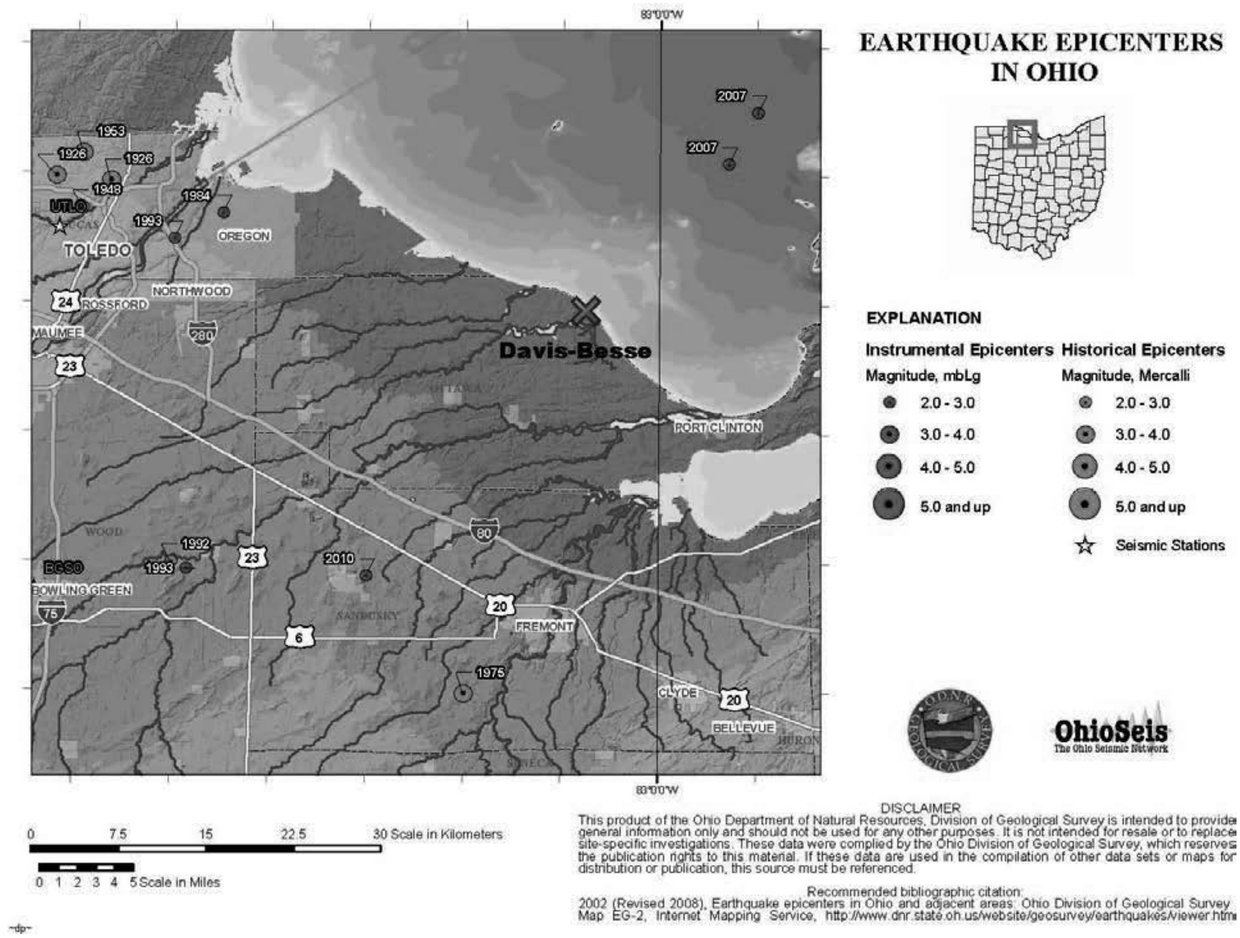

Figure 2.2-2. Earthquake Epicenters Near Davis-Besse

Source: ODNR 2008

2.2.4 Surface Water Resources

Davis-Besse's discharge to surface water is permitted under an NPDES permit (OEPA 2006b), which was issued on August 14, 2006. The permit specifies discharge limits and sampling frequency at the main station outfall (Outfall 001) for dissolved oxygen, pH (acidity and alkalinity), total residual oxidants (TRO), total residual chlorine (TRC), and chlorination and bromination duration. It also calls for the sampling frequency for water temperature and copper concentration, and for the 24-hour estimate of flow rate. Permit requirements regarding TRO and TRC specify that these cannot be discharged from any single generating unit for more than

2 hours per day. A modification to the permit (OEPA 2006a) that was proposed by the state and accepted by FENOC, allowed such discharges to be greater than 2 hours in duration, provided the discharge is dosed with a dehalogenating agent to achieve specified limits of TRC and TRO.

NPDES permits require the monitoring of TRO and TRC due to chlorines toxicity on aquatic species.

Outfall 001 is downstream of the “collection box,” which receives discharges from the cooling tower blowdown, settling basins, stormwater runoff, and radwaste systems. These discharges are combined, within the collection box, with dilution water (FENOC 2010d). The dilution water is pumped directly from the intake to the collection box to reduce concentrations in the discharge water. Water flows by gravity from the collection box, through a 6-ft diameter underground pipe, to the discharge structure about 1,300 ft offshore (AEC 1973). The combined average flow rate at Outfall 001 is 29.0 mgd (FENOC 2010d). Average flow rates of contributions are 13.50 mgd of blowdown, 9.00 mgd of dilution water, 7.05 mgd from the primary and secondary heat exchangers, and small amounts from water treatment and radwaste systems (FENOC 2010d).

Several internal outfalls supply discharge to the collection box. These include outfalls receiving water from turbine building drains, boiler drains, pump house sumps, the wastewater treatment system, water treatment residues, condensate polishing resins, and stormwater runoff (Davis-Besse 2004a, 2009). In addition to the NPDES discharge requirements described for Outfall 001, these internal outfalls may have discharge limits or sampling frequencies or both for total suspended solids, oil and grease, and biochemical oxygen demand (OEPA 2006b). Some of the outfalls require the monitoring of flow, specific metals, asbestos, arsenic, color, odor, and turbidity.

The facility has a group of onsite basins for wastewater (Brown 2010). The southernmost is the sewage treatment plant pond. The central one is the No. 1 settling basin, which receives discharge from the sewage treatment plant pond along with demineralizer system discharge and building sumps and drains. The northernmost is the No. 2 settling basin, which receives discharge from a screen wash outfall and from the No. 1 settling basin.

The NPDES permit calls for an annual sewage sludge report to be filed with the OEPA, describing the amount of sludge, the method of disposal, and a summary of all analyses made on the sludge. During the site audit, FENOC staff stated that the sewage sludge is analyzed for radioactivity using gamma spectroscopy. The facility documented a procedure for this monitoring and calls for approval of the radiation protection supervisor for release of the sludge (Davis-Besse 2004b). This monitoring is performed in support of NRC guidance (NRC 1988), which encourages licensees to monitor their sewage sludge. Annual submittals to the OEPA for the last 5 years indicate that 30,000 to 129,700 gallons of sewage sludge have been removed each year and transferred to Sandusky Waste Water Treatment Plant (FENOC 2007, 2008, 2009, 2010a, 2011a).

The liquid radioactive waste system is one of the internal outfalls that discharge into the collection box. Its effluents, when mixed in the collection box with dilution water and other flows (as described above), meet the requirements in Appendix B of 10 CFR Part 20 and 10 CFR Part 50 (FENOC 2010c).

An EPA online database indicates that Davis-Besse has had no effluent exceedances in the last 3 years and no Clean Water Act NOVs, enforcement actions, or penalties in the last 5 years

(EPA 2011a, 2011b). In addition, detailed online discharge data from 2006 through 2010 (EPA 2011c) were inspected by NRC staff, and no infractions were noted. Infractions noted elsewhere by the state have been a pH violation of 0.1 standard units (S.U.) above the limit of 9.0 S.U. (OEPA 2010a) and a dissolved oxygen measurement frequency violation (OEPA 2010b).

An application for an NPDES permit renewal (FENOC 2010d) was made prior to the expiration of the 5-year permit, granted in 2006. The application includes a diagram of all site flows (intake, CWS, SWS, blowdown, process waters, sanitary effluent, stormwater, marsh discharge) along with the associated flow rates. It also includes outfall criteria for maximum daily concentration and, in some cases, maximum daily mass for numerous chemical and physical parameters. The permit application includes EPA Form 2F, "Application for Permit to Discharge Storm Water Discharges Associated with Industrial Activity." On the form, the applicant listed the stormwater treatment at specific outfalls, including floatation and sedimentation. The form also states that "there have been no significant leaks or spills of any toxic or hazardous pollutants at the Davis-Besse Plant in the last three years."

During the site audit, FENOC staff indicated there have been violations of the NPDES permit. These NOVs would not, however, appear in the OEPA online database unless the violations were ongoing, and changes were not made to correct the problem. They provided several examples. In December 2010, they failed to sample on a 2-week sampling frequency. In August 2010, they observed a high pH reading at the training center pond. Historically, they have received several NOVs due to overuse of chlorine in the SWS and CWS. A dechlorination system has, therefore, been in place for about 15 years with treatment occurring at the collection box.

FENOC staff explained, during the site audit, a change anticipated in their chemical usage in 2012. They plan to use zinc acetate, which is commonly used in PWRs to lower the risk of corrosion cracking during operations and outages. They intend to submit an application to make this change to the OEPA.

Blowdown from the cooling tower takes place in order to limit the dissolved solids concentration in the circulating water. Slime and algae control in the CWS is provided by addition of sodium hypochlorite (FENOC 2010c). Sodium bromide may also be added to increase the biocide treatment without increasing the level of chlorine (FENOC 2010c). A chemical feed system is used to control scaling and to disperse silt (FENOC 2010c).

The lake intake and pipe are monitored by divers for silt and debris, according to FENOC staff during the site audit. The discharge structure in Lake Erie is about 1,300 ft offshore where the lake is about 9 ft deep (AEC 1973). Beyond the discharge point, the lake bottom is covered with a riprap rock surface for about 200 ft (60 m) to minimize scouring and turbidity.

According to FENOC staff during the site audit, dredging does not take place in the intake canal's safety-related portion, which is the portion closest to the site structures and which satisfies NRC regulations (RG 1.27) by holding an appropriate volume of water for a safe shutdown. This portion of the canal has walls designed to satisfy seismic safety requirements. In the remaining portion of the canal, hydraulic dredging last took place in 2008 due to silt buildup. Along the southeast edge of the canal, settling pits were excavated in non-wetland areas to receive the hydraulic dredging discharge. The canal is monitored for silt every 3 years. In the past, spoils were placed at the Unit 2 site south of the operating Unit 1 site.

Stormwater at the site drains to the collection box or to the training center pond (FENOC 2010d). From the pond, stormwater flows via an outfall to Navarre Marsh Pool No. 3, where it may be pumped to the Toussaint River (FENOC 2010d). Several pools in the surrounding marsh are pumped by Davis-Besse to reduce their volume under the direction of the U.S. Fish and Wildlife Service (FWS). Discharge is to Lake Erie or the Toussaint River. Davis-Besse has a stormwater pollution prevention plan that includes procedures for inspections, best management practices, employee training, and spill response procedures (Davis-Besse 2009). Stormwater sampling does not normally take place, but it was performed for the NPDES application.

2.2.5 Groundwater Resources

The local shallow stratigraphy is described by ERM (2008) and summarized above in Section 2.2.3. Groundwater flow in the glacial drift, shallow dolomite, and deeper dolomite is generally to the east toward the marshes and Lake Erie; however, flow is complicated by the grout curtain, fractures in the bedrock, and excavated bedrock (ERM 2008).

The nearest aquifer designated as a sole source aquifer by the U.S. EPA is the Catawba Island aquifer (OEPA 2011). This aquifer is over 10 mi (16 km) east of the facility, across a portion of Lake Erie.

The site has had a total of 78 historical wells (in 39 locations with pairs of shallow and deep wells), including some installed for the purpose of dewatering the excavation during site construction (ERM 2008). Some of these wells are used as groundwater monitoring wells. However, 24 of these wells (12 shallow and deep pairs) cannot be located and are assumed to have been destroyed.

In response to the Nuclear Energy Institute’s (NEI’s) groundwater protection initiative, 16 new monitoring wells were installed based on the site hydrogeology (Figure 2.2-3). Groundwater sampling takes place at the new wells plus some of the historical wells. Tritium monitoring results from June through August of 2007 indicated that the highest tritium observed in the monitoring well network (up to 7,535 pCi/L in well 32S) is east of the containment and is higher in shallow dolomite than in deep dolomite (ERM 2008). The background level of tritium has been established to be 178 to 348 pCi/L (ERM 2008). The U.S. EPA drinking water limit is 20,000 pCi/l (40 CFR 141.66).

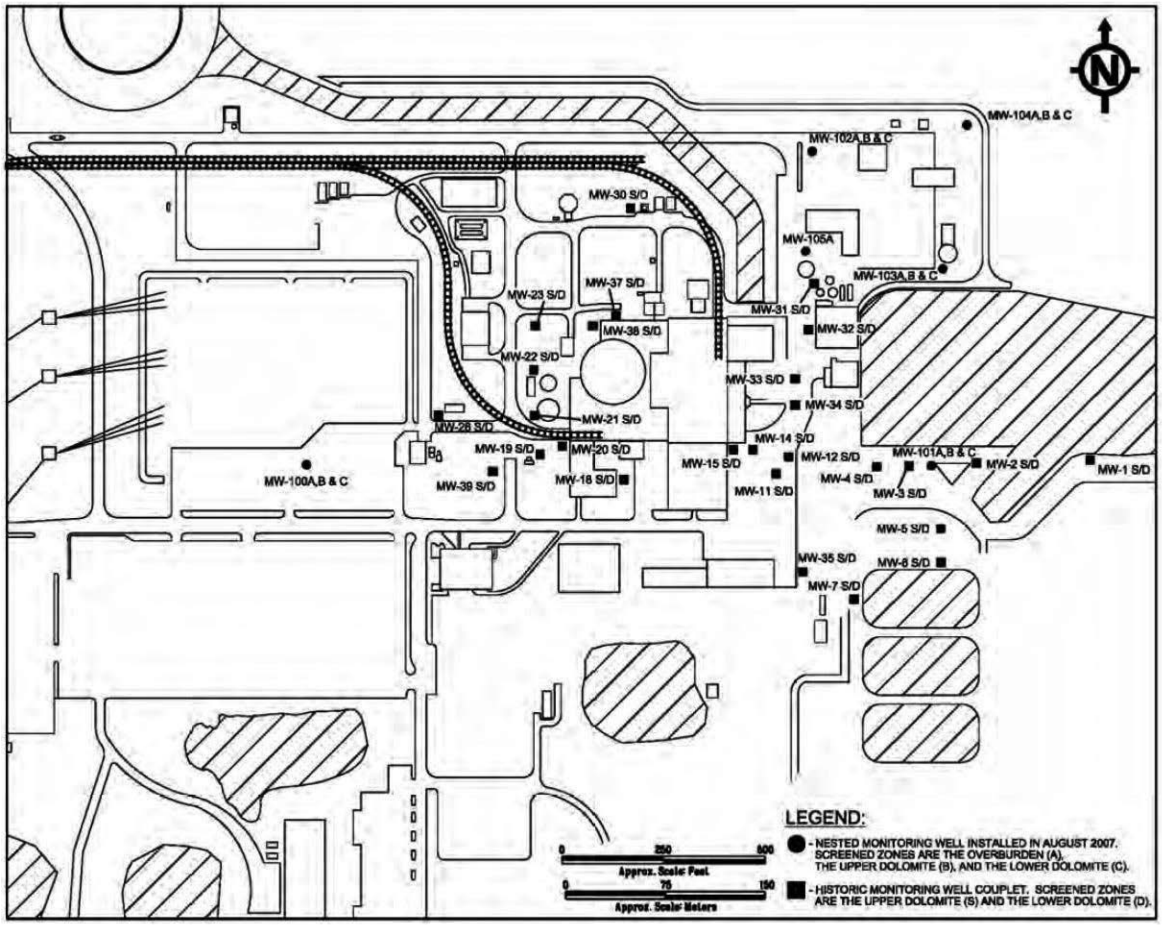

Figure 2.2-3. Groundwater Monitoring Well Locations

Source: FENOC 2011c

Graphs of tritium results at six wells with relatively high tritium levels were provided by FENOC staff for viewing during the site audit. The graphs of tritium concentrations are included as Figure 2.2-4 and Figure 2.2-5. The graphs covered the period of summer 2007 through December 2010 at wells 30S, 31S, 32S, 34S, 37S, and 105A. The activity concentrations in the wells showed erratic behavior from 2007 to the spring of 2010. The highest levels were at wells 32S and 31S, which were both above 7,000 pCi/L in summer 2007. Well 32S was above 6,000 pCi/L in spring 2007, but all other measurements in this 2007 to 2010 timeframe at the six wells were below 5,000 pCi/L. Beginning in spring 2010 and continuing to December 2010, tritium levels in all six wells showed a strong downward trend. All six wells have been below 2,000 pCi/L in the October through December 2010 timeframe. The tritium levels continued to trend downward through 2011, and, by the end of the year, tritium levels in all wells were below 1,000 pCi/L. The maximum value reported at the end of 2011 was 794 pCi/L in well 37s (FENOC 2011b).

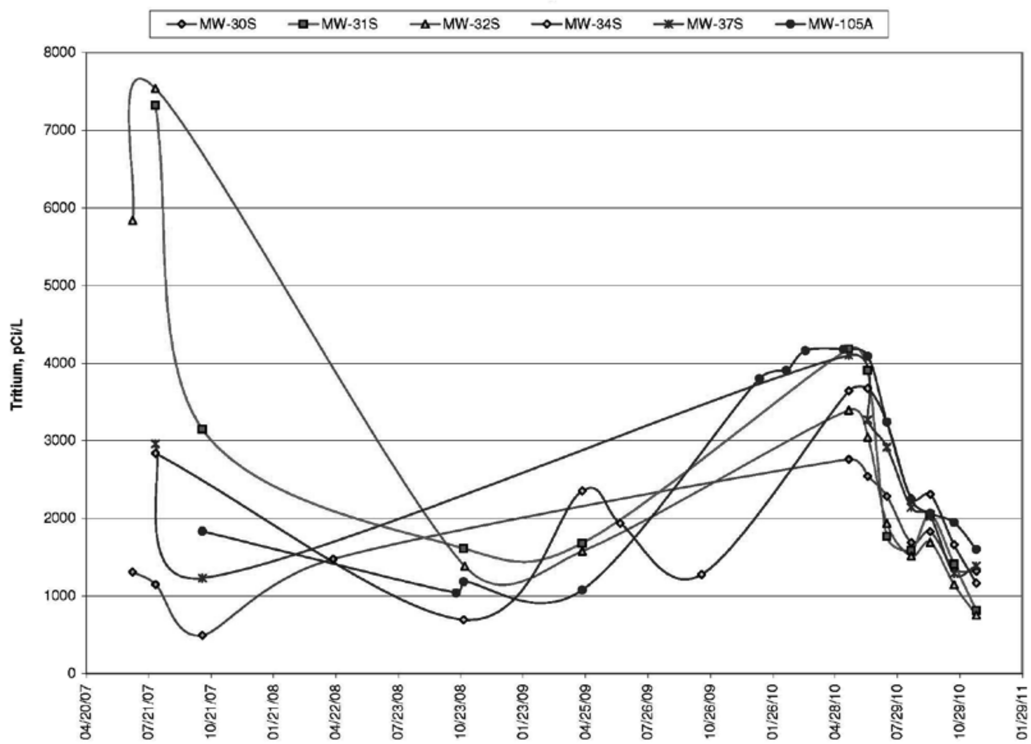

Figure 2.2-4. 2007–2011 Groundwater Monitoring Tritium Concentrations

Source: FENOC 2011c

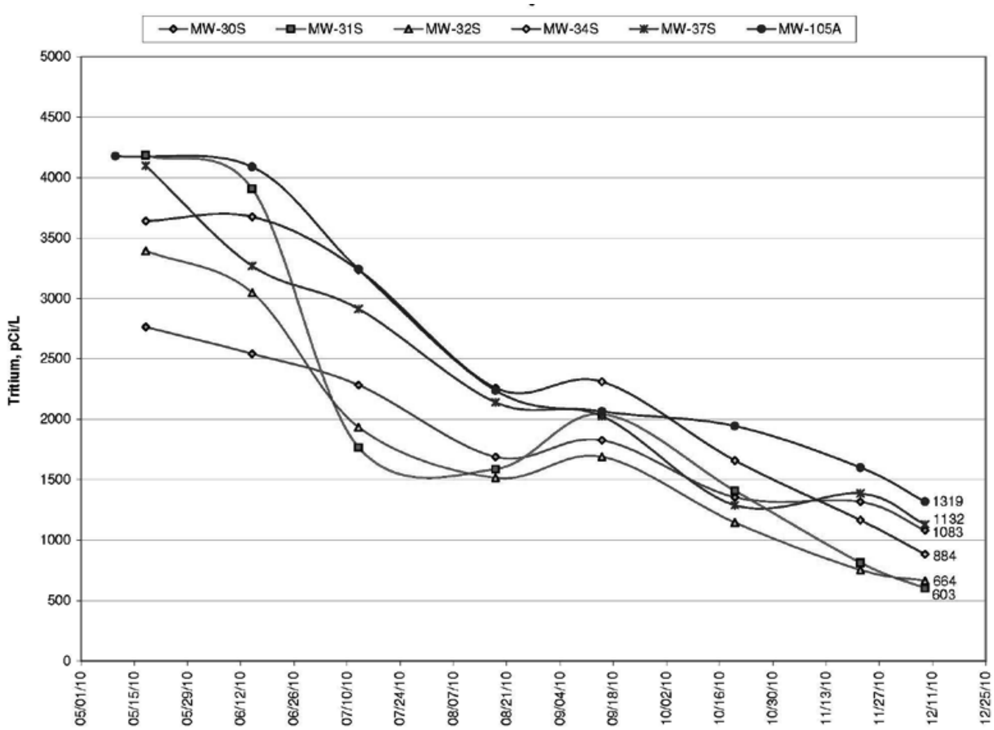

Figure 2.2-5. May 2010–December 2010 Groundwater Monitoring Tritium Concentrations

Source: FENOC 2011c

ERM (2008) provided a plausible explanation regarding tritium release and migration. It stated that "potential inadvertent releases from the power block, including the spent fuel pool, would migrate vertically down through the unsaturated zone to the water table. Potential releases from structures below ground could release tritium directly to the upper or lower dolomite unit." Potential tritium sources in the power block are the reactor containment, auxiliary building, circulating water pump house, turbine building, and borated water storage tank (ERM 2007), (ERM 2008). In addition, several spent fuel pool leaks have been documented (Davis-Besse Undated).

In May 1990, leaking piping from the east turbine building sump and condensate demineralizer backwash receiving tank resulted in low-level radioactivity in soil around the broken piping (NRC 1991). The licensee initiated Potential Condition Adverse to Quality (PCAQ) Report No. 90-0404 on May 11, 1990, and the leak was repaired September 12, 1990. Soil excavation to remediate took place in August 1990; sampling showed Ce-137 from 7×10^{-7} to 2×10^{-5} µCi/g, and Ce-134 from 8×10^{-8} to 9×10^{-6} µCi/g (NRC 1991).

The facility has had several spills of petroleum products, resulting in product retrieval wells and in situ bioremediation. In 1998, a diesel tank overfill resulted in a spill of over 50 gallons (FENOC 1998). This tank was an aboveground tank classified as an underground tank because of placement of an earthen cover for missile protection. Because there was no apparent release to the environment beyond the immediate vicinity of the spill, and because of the purpose of the earthen cover, contaminated soils were not removed. Davis-Besse intends to investigate and remediate soil as appropriate upon closure of the tank facility.

In 1994, a spill of about 1,300 gallons of gasoline occurred by Service Building 4 (Centerior Energy 1994). An equipment malfunction was repaired and, as of 5 weeks after the event, about 500 gallons of product had been recovered. The remaining gasoline was believed to be in the porous fill beneath a parking lot. It remained onsite and was not observed in the marsh area. Stormwater lines were plugged as a precaution (Centerior Energy 1994).

During the audit, another incident was described that involved an underground leak of fuel oil, which appeared in a stormwater catch basin and in the training center pond. Booms and an underflow weir were used to remediate the product, and there was no offsite release.

FENOC staff also described during the audit that the sodium hydroxide tank has leaked twice, but no release to the environment occurred because of the tank's secondary containment system.

2.2.6 Aquatic Resources

2.2.6.1 Lake Erie Overview

Davis-Besse is located on the southwestern shore of Lake Erie, the shallowest of the Great Lakes. The Detroit River accounts for 80 percent of freshwater inflow to Lake Erie. Precipitation accounts for 11 percent of inflow, and the remaining 9 percent comes from tributaries that flow into the lake from Michigan, Ohio, Pennsylvania, New York, and Ontario, Canada (EPA 2004). Lake Erie discharges into Lake Ontario through the Niagara River. Lake Erie is divided into three basins—the western basin, the central basin, and the eastern basin. Davis-Besse lies along the western basin, which has a mean depth of 24.1 ft (7.4 m) and a maximum depth of 62 ft (19 m) (EPA 2004). All waters in the western basin are classified as seasonally cool water (68 to 80 °F (20 to 28 °C)). Generally, Lake Erie is considered to be mesotrophic (having moderate levels of nutrients) (Tyson et al. 2009).

Because a third of the total Great Lakes population lives within the Lake Erie watershed, Lake Erie experiences the greatest impacts from residential and industrial development, agricultural production, and other human-caused stressors. Lake Erie was the first of the Great Lakes to develop problems with nutrient loading in the 1950s, which led to high levels of eutrophication and major algal blooms, oxygen depletion, and subsequent die-offs of fish and other biota (EPA 2004). Toxic contaminants from point and non-point sources have also threatened the water quality of Lake Erie. By the late 1970s, chemical bans, more stringent water quality standards, and the development of the Great Lakes Water Quality Agreement (GLWQA) in 1972 aided in lessening the threat of accelerated eutrophication. Under the GLWQA, the U.S. and Canada must develop and implement lakewide management plans (LaMPs) for lake waters and Remedial Action Plans for Areas of concern. The Lake Erie LaMP work group completed the most recent update to the Lake Erie LaMP in 2008. The 2008 LaMP highlighted that a large load of PCB-contaminated sediments have been removed from the Ashtabula River area of concern, numerous habitat improvement projects have begun in the Buffalo area of concern, and over 400 ac (160 ha) of forest and wetland habitat has been restored in southwest Ontario (EPA 2008).

In a study of the correlation between lake productivity (eutrophication level) and species richness, Ludsin et al. (2001) found that the decrease in phosphorus levels between 1969 and 1996 as a result of various phosphorus abatement programs was likely correlated with the increased species richness in the Lake Erie central basin over the same period. From 1969 through 1996, bottom anoxia stopped occurring in the summers; macroinvertebrate prey species, such as *Hexagenia* spp., recovered; and water clarity improved (Ludsin et al. 2001). All of these factors allowed many previously depleted fish populations to begin to recover.

Invasive species serve as another major stressor to Lake Erie and have caused drastic changes to the Lake Erie fish community over the past century. The first recorded invasive fish, the alewife (*Alosa pseudoharengus*), invaded the Great Lakes as early as 1819 (Emery 1985). As of 2008, 132 non-native invasive species have been discovered in the Lake Erie watershed, which include 23 fish, 12 mollusks, and 20 algae (EPA 2008). The International Joint Commission (IJC) estimates that a new invasive species enters the Great Lakes system every 8 months (IJC 2004). In 1993, the U.S. passed regulations that required ships entering the Great Lakes to exchange their ballast water with seawater. This regulation change has not slowed the rate of aquatic invasive introductions; however, the Great Lakes system has experienced a shift to smaller, open water non-native organisms such as zooplankton and phytoplankton beginning in the 1990s and 2000s (IJC 2004).

The sea lamprey (*Petromyzon marinus*), which invaded the Great Lakes in the early 1900s, and the zebra mussel (*Dreissena polymorpha*), which was introduced to Lake Erie in the 1980s, have caused the most noticeable changes to the biological community (EPA 2004). The sea lamprey is an aggressive predator that had been attributed to the collapse of lake trout (*Salvelinus namaycush*), lake whitefish (*Coregonus clupeaformis*), and lake herring (*Coregonus artedi*) populations beginning in the 1940s and 1950s (GLFC 2000). Zebra and quagga mussels (*D. rostriformis bugensis*) easily outcompete native mussel species and have significantly altered the Lake Erie food web and nutrient and contaminant cycling (EPA 2004). Prior to the introduction of these dreissenid mussels, amphipods, chironomids, annelids, ephemeropterans, and unionid clams dominated Lake Erie's shallow and nearshore waters (Conroy and Culver 2005). Once zebra and quagga mussel populations became established in Lake Erie, they changed the flow of energy through the lake's food web by adding an additional level between lower (pelagic) and higher (benthic) trophic levels, which ultimately slowed the energy transfer through the lake's biological system (Conroy and Culver 2005).

Because of the exotic species discussed above and other exotic predators, many native predators, such as the lake trout, sauger (*Sander canadensis*), and blue pike (*Sander vitreus glaucus*), have suffered population depletion or even disappeared from the lake. The lake herring, lake whitefish, and lake sturgeon (*Acipenser fulvescens*) are also species that have been severely reduced in number. Meanwhile, small, short-lived, exotic species, such as rainbow smelt (*Osmerus mordax*), white perch (*Morone americana*), and alewife, have increased in numbers and now maintain large and relatively stable populations (GLFC 2003).

In their *Twelfth Biennial Report* on Great Lakes water quality, the IJC (2004) focused on the Lake Erie watershed to illustrate the changes in the Lake Erie ecosystem and explain how these changes related to ecosystem integrity. The IJC (2004) noted that many trends in water and ecosystem quality have varied year-to-year, are not able to be linked to clear causes and effects, and are simultaneously positive and negative. For instance, the invasive zebra and quagga mussels have caused the decline of native mussel species and may be causing seasonal increases in phosphorus levels each spring (IJC 2004). However, zebra and quagga mussels have also been linked to increased water clarity, which, in turn, has allowed for a dramatic increase in established rooted aquatic plant populations (IJC 2004). Table 2.2-3 includes a summary of the positive and negative trends identified by the IJC in their *Twelfth Biennial Report*.

Table 2.2-3. Positive and Negative Trends in the Lake Erie Ecosystem Since the 1990s

Trend	Positive	Negative
Blue-green algae blooms		x
Burrowing mayfly recovery	x	
Cladophora shoreline accumulations		x
Diporeia decline		x
Establishment of invasive species		x
Fish & wildlife die-offs from botulism		x
Increased water clarity	x	
Lake whitefish decline (eastern basin)		x
Lake whitefish recovery (central basin)	x	
Phosphorus increase in water column		x
Phytoplankton decline in offshore waters		x
Re-establishment of rooted aquatic plant communities	x	
Walleye recovery	x	

Source: IJC 2004

In the 1990s, burrowing mayflies (*Hexagenia* spp.) began to recolonize Lake Erie's western basin after a 40-year absence (Bridgeman et al. 2006). Mayflies are an indicator of environmental health and are an important food source for commercially valuable species such as the yellow perch (*Perca flavescens*) (Bridgeman et al. 2006). Their return indicates that the pollution and eutrophication concerns in Lake Erie are lessening.

Aquatic Invertebrates

In the 1970s, the Center for Lake Erie Area Research (CLEAR) studied aquatic invertebrate abundance and composition as part of monitoring to determine the effects of Davis-Besse's thermal discharge on the aquatic environment (Reutter et al. 1980). Diatoms were the most abundant phytoplankton in the Locust Point region of Lake Erie and typically peaked in the spring and fall. Species of the genera *Melosira*, *Fragillaria*, *Asterionella*, *Stephanodiscus*, and *Synedra* were the most common diatoms. Green algae (class Chlorophyceae) densities were much lower than diatom densities and must less predictable over the study period. Cyanobacteria, or blue-green algae (class Myxophyceae), generally demonstrated sudden, large mid-summer increases.

Zooplankton in Lake Erie's western basin generally consist of protozoans, rotifers, and microcrustaceans. Reutter et al. (1980) found *Brachionus*, *Keratella*, *Polyarthra*, and *Synchaeta* species to be the dominant rotifers. Rotifers generally peaked in October. Copepods were most abundant in spring and fall and were dominated by calanoid and cyclopoid forms.

In addition to phytoplankton and zooplankton, Reutter et al. (1980) described many benthic macroinvertebrates typical of the area. Generally, benthic macroinvertebrate populations were highest in early summer and fall. Burrowing oligochaetes and chironomid midge larvae were the dominant annelids. Freshwater mussels and fingernail clams were the dominant mollusks. Crustaceans typical of the area included the amphipod *Gammarus fasciatus*, water fleas, isopods, seed shrimp, and crayfish.

Fish

Lake Erie's fish community has changed drastically during the past century due to the environmental factors already mentioned. Before 1900, lake trout highly influenced the fish community because it was the dominant predator. Walleye (*Sander vitreus*) and burbot (*Lota lota*) were also major predators at that time. Prey species included emerald shiner (*Notropis atherinoides*), spottail shiner (*N. hudsonius*), gizzard shad (*Dorosoma cepedianum*), and cisco (*Coregonus* spp.) (Tyson et al. 2009). The lake trout was extirpated from Lake Erie in the early 1900s (Tyson et al. 2009). From 1900 to 1950, walleye and blue pike became the major predators in the lake (Tyson et al. 2009). By the 1960s, many invasive species, including sea lamprey, alewife, white perch, and rainbow smelt established stable populations and began to outcompete native predators. The blue pike's population dipped and eventually became extinct by the late 1950s to early 1960s after the last reported spawning in 1954 (Niskanen 2008). The cisco, lake whitefish, and walleye populations severely declined during that time as well. Beginning in the 1980s, the lake's fish community stabilized and only natural annual fluctuations in abundance are now observed (Tyson et al. 2009).

Of the estimated 143 fish species in Lake Erie, 19 are commercially or recreationally harvested or both. Lake Erie fisheries are unique in that they (unlike other Great Lakes fisheries) are sustained by naturally reproducing fish (Tyson et al. 2009). The lake trout is the exception to this because natural resource agencies are working together to recover the population. Overall, sport fishing yields more landings annually than commercial fishing within the lake and its tributaries. The Ohio Department of Natural Resources (ODNR) manages Lake Erie fisheries and publishes yearly status reports on yellow perch, walleye, smallmouth bass (*Micropterus dolomieu*), steelhead trout (*Oncorhynchus mykiss*), lake whitefish, temperate basses (*Morone* spp.), and other major species. A summary of sport and commercial harvests of major species for 2008 appears in Table 2.2-4. In 2008, 9.6 million pounds of fish were harvested from Lake Erie and its tributaries (ODNR 2009a). Commercial and sport fishing accounted for

43.4 percent and 56.6 percent of landings, respectively (ODNR 2009a). Yellow perch accounted for the majority of commercial landings (36 percent of commercial landings; about 1.5 million pounds), while walleye dominated the sport harvest (69 percent of sport landings; about 3.8 million pounds) (ODNR 2009a).

Table 2.2-4. Sport and Commercial Harvests of Major Species in Ohio Waters of Lake Erie and its Tributaries, 2008

Scientific Name	Common Name	Sport Harvest	Commercial Harvest	Total Combined Harvest
Aplodinotus grunniens	freshwater drum	14,939	423,705	438,644
Ictalurus punctatus	channel catfish	7,014	447,232	454,246
Micropterus dolomieu	smallmouth bass	3,406	0	3,406
Morone americana	white perch	15,379	545,138	560,517
Morone chrysops	white bass	91,406	424,225	515,631
Oncorhynchus mykiss	steelhead trout	19,605	0	19,605
Perca flavescens	yellow perch	1,528,460	1,515,666	3,044,126
Sander vitreus	walleye	3,779,130	0	3,779,130
Other species[a]		-	827,551	827,551
TOTAL		**5,459,339**	**4,183,517**	**9,642,856**

[a] Data is not available for sport harvest of species other than those listed. Commercial harvest of "other species" include buffalo (*Ictiobus* spp.), bullhead (*Ameiurus* spp.), burbot, carp (family Cyprinidae), gizzard shad, goldfish (*Carassius auratus auratus*), quillback (*Carpiodes cyprinus*), suckers (family Catostomidae), and lake whitefish.

Source: ODNR 2009a

2.2.6.2 Impingement Studies at Davis-Besse

In 1980, CLEAR published a report that summarized an impingement study conducted jointly by CLEAR and the Toledo Edison Company at Davis-Besse (Reutter 1981b). The impingement study ran from January 1 through December 31. Toledo Edison personnel checked the traveling screens regularly, collected impinged fish from the screens, and froze the collected fish for sampling. CLEAR identified, measured, and weighed each sample. During the study year, Reutter (1981b) estimated that 9,056 fish within 23 taxa were impinged on the Davis-Besse traveling screens. Goldfish and gizzard shad accounted for the overwhelming majority of impinged individuals during the sample year at an estimated 47.2 percent and 28.8 percent, respectively. Yellow perch, emerald shiner, and white crappie (*Pomoxis annularis*) accounted for a combined estimate of 15.3 percent. The remaining 18 taxa accounted for an estimated 8.7 percent.

Table 2.2-5 summarizes the 23 taxa that appeared in the impingement sampling and each taxa's relative abundance.

Table 2.2-5. Relative Abundance of Species in Impingement Sampling, 1980

Scientific Name	Common Name	Estimated Impingement (%)
Carassius auratus auratus	goldfish	47.2
Dorosoma cepedianum	gizzard shad	28.7
Perca flavescens	yellow perch	8.3
Notropis atherinoides	emerald shiner	3.8
Pomoxis annularis	white crappie	3.3
Pomoxis nigromaculatus	black crappie	2.0
Aplodinotus grunniens	freshwater drum	2.0
Osmerus mordax	rainbow smelt	1.3
Percina caprodes	logperch darter	0.7
Percopsis omiscomaycus	trout-perch	0.6
Morone chrysops	white bass	0.5
Alosa pseudoharengus	alewife	0.3
Umbra limi	mudminnow	0.3
family Centrarchidae	unidentified sunfish	0.3
Lepomis macrochirus	bluegill	0.2
Ameiurus nebulosus	brown bull head	0.1
Notropis hudsonius	spottail shiner	0.1
Pomoxis spp.	unidentified crappie	0.1
Lepomis gibbosus	pumpkinseed sunfish	<0.1
Lepomis cyanellus	green sunfish	<0.1
Ameiurus spp.	unidentified bullhead	<0.1
family Cyprinidae	carp	<0.1
Noturus flavus	stonecat madtom	<0.1

Source: Reutter 1981b

The relative number of individuals lost to impingement correlated with lake populations for all but five species—goldfish, black bullhead (*Ameiurus melas*), brown bullhead (*A. nebulosus*), black crappie (*Pomoxis nigromaculatus*), and white crappie. These species' relative abundance was higher in impingement samples than in Lake Erie, which indicated that these species most likely use the intake canal as a permanent residence (Reutter 1981b). Reutter (1981b) also concluded that these five species likely spawn within the intake canal due to the high proportion of impinged young-of-the-year.

2.2.6.3 Entrainment Studies at Davis-Besse

In addition to the 1980 impingement sampling conducted at Davis-Besse (Reutter 1981b), CLEAR and the Toledo Edison Company conducted entrainment sampling from April through August 1980 (Reutter 1981a). During 13 samples days, CLEAR took four 3-minute bottom-to-surface tows at the intake with a 0.75-m diameter plankton net and then computed entrainment density by comparing the samples to the volume of water taken into the plant. Table 2.2-6 summarizes the estimated entrainment densities of eggs and larvae by taxa. Gizzard shad, freshwater drum (*Aplodinotus grunniens*), yellow perch and white bass (*Morone chrysops*) were entrained at the highest densities (Reutter 1981a). Reutter (1981a) concluded that the entrainment losses at Davis-Besse were relatively small when compared to lake-wide populations and that the loss of gizzard shad, walleye, and perch eggs and larvae accounted for a loss of fecundity of less than 0.2 percent of the number captured in sport fishery in 1980.

Table 2.2-6. Entrainment Densities in Entrainment Sampling, 1980

Scientific Name	Common Name	Estimated Entrainment Density (larvae/100 m^3)
Dorosoma cepedianum	gizzard shad	189.18
Aplodinotus grunniens	freshwater drum	130.67
Perca flavescens	yellow perch	91.00
Morone chrysops	white bass	23.80
Sander vitreus	walleye	2.76
Notropis hudsonius	spottail shiner	1.75
family Cyprinidae	carp	1.67
Osmerus mordax	rainbow smelt	0.97
Notropis atherinoides	emerald shiner	0.86
Percina caprodes	logperch darter	0.85
Coregonus spp.	whitefish	0.49
unidentified spp.	unidentified spp.	0.34
family Cottidae	unidentified sculpin	0.30
*Cottus bairdi*i	mottled sculpin	0.20

Source: Reutter 1981a

2.2.6.4 Thermal Studies at Davis-Besse

From 1972 to 1979, CLEAR gathered data on the aquatic environment surrounding Davis-Besse to determine the thermal impacts of Davis-Besse's operation, which began in 1977. The results of this study were summarized in a report prepared for the ODNR (Reutter et al. 1980). CLEAR collected phytoplankton, zooplankton, benthic macroinvertebrate, fish, and icythyoplankton samples from 25 stations in Lake Erie—18 on the open lake, 2 in the intake canal, 2 in the marshes, and 3 along the shoreline—plus several control stations. The species composition and abundances observed during this study are discussed previously in this section under the heading "Aquatic Invertebrates." Reutter et al. (1980) concluded that no clear correlation existed between any aquatic populations and Davis-Besse's thermal discharge.

2.2.7 Terrestrial Resources

2.2.7.1 Davis-Besse Ecoregion and Surrounding Vicinity

Davis-Besse lies in the Marblehead Drift/Limestone Plain Level IV subecoregion within the larger Huron/Erie Lake Plains Level III ecoregion. The Marblehead Drift/Limestone Plain subecoregion lies along the southern shore of Lake Erie from Ottawa National Wildlife Refuge east to Huron, Ohio. It encompasses Sandusky Bay and spreads inland to Tiffin, Ohio. Broad, flat plains with thin glacial drifts and limestone-dolomite ridges characterize the area. Historically, beech forests, elm-ash swamp forests, mixed oak forests, wetland, and fen habitats were prevalent. Today, the area has been largely converted to farmland for hay, soybeans, and corn (EPA 2009)

The ODNR characterizes the State's geographic profile by dividing it into five physiographic regions. Davis-Besse lies within the Lake Plains region, a narrow strip of land along the southern shore of Lake Erie that broadens west of Cleveland, Ohio (ODNR 2011e). Effectively, this physiographic region covers the U.S. EPA's Marblehead Drift/Limestone Plain subecoregion as well as the adjacent Erie Lake Plain subecoregion. ODNR (2011e) notes that the northwestern area of the Lake Plains physiographic region (where Davis-Besse is located) was historically called the Great Black Swamp and is characterized by rich, black soils, and poor drainage. The Great Black Swamp originally encompassed about an area 120 mi (190 km) in length and an average of 40 mi (60 km) in width (ODNR and OEPA 1999). Between the mid-1700s and 1980s, residential and commercial development and associated wetland draining reduced the Great Black Swamp to about 5 percent of its historic size, and much of what remains of the swamp consists of isolated wetlands on uncultivated farmland (ODNR and OEPA 1999).

In the immediate vicinity of the Davis-Besse site, the majority of the undeveloped or uncultivated land is wetlands. Within Ottawa County, wetlands account for about 14 percent of the land use type (ODNR and OEPA 1999). The major wetland types present in Ottawa County, as classified by ODNR and OEPA (1999), are hydric woods, open water, shallow marsh, and shrub scrub. Originally, the majority of wetlands were naturally seasonal with some permanent wetlands lying behind barrier beaches along the Lake Erie coast (FWS 2001). Lakefront development and wetland draining has drastically reduced the amount of wetlands and changed the water regimes of those remaining wetland areas. The majority of remaining wetlands in the region are in Federal refuges, state management areas, and private hunting clubs and are surrounded by man-made dikes, which protect the wetlands from wave damage during high water storm events (FWS 2001). American elm (*Ulmus americana*), red maple (*Acer rubrum*), and black ash (*Fraxinus nigra*) make up the majority of climax vegetation (FENOC 2010).

The Ottawa National Wildlife Refuge lies adjacent to and to the west of the Davis-Besse site and encompasses 4,755 ac (1,924 ha). This refuge was established in 1961 and contains two discontinuous sections—the Darby Marsh and the Navarre Marsh. The Darby Marsh contains a combined FWS office and visitor's center and limited access public hiking trails. The Navarre Marsh portion is owned by FENOC and leased to the FWS for management as part of the wildlife refuge. The Navarre Marsh is discussed in more detail below under "Davis-Besse Site." According to the FWS's (2011g) national wetlands inventory, the majority of the refuge consists of freshwater emergent wetland and freshwater forested and shrub wetland.

The Ottawa National Wildlife Refuge is part of a larger complex of three national wildlife refuges (Ottawa, Cedar Point, and West Sister Island) that comprise approximately 9,000 ac (3,600 ha) in total. Cedar Point National Wildlife Refuge lies along the coast of Lake Erie about 15 mi

(24 km) to the west of the Davis-Besse site. It was established in 1965 and comprises 2,445 ac (989 ha) of contiguous marsh—the largest stretch of contiguous marsh along Lake Erie (ONWRA 2011). West Sister Island National Wildlife Refuge lies to the north of Davis-Besse about 10 mi (16 km) offshore of Lake Erie. The 82-ac (33-m) island is home to the largest wading bird colony in the U.S. Great Lakes and was designated as part of the National Wilderness Preservation System in 1975 (ONWRA 2011). The island is 35 ft (11 m) above Mean Sea Level (MSL) at its highest point and is covered by an almost pure stand of hackberry (*Celtis* spp.) (OWL 2011). Thick mats of poison ivy (*Toxicodendron radicans*), ferns, wildflowers, and mushrooms make up the understory (FWS 2011h).

<u>Birds</u>

A vast diversity of birds inhabit and migrate through the natural habitats surrounding Davis-Besse. The Ottawa National Wildlife Refuge complex and surrounding region provides habitat for over 325 species of birds (FWS 2001). The National Audubon Society recognizes 600,000 ac (240,000 ha) on the Lake Erie western basin (including the Davis-Besse site and surrounding vicinity) as an important bird area because it provides essential wintering, breeding, and migrating habitat for many species of birds to include the following (Audubon 2011):

- ruddy duck (*Oxyura jamaicensis*),
- American black duck (*Anas rubripes*),
- red-breasted merganser (*Mergus serrator*),
- ring-billed gull (*L. delawarensis*),
- great black-backed gull (*Larus marinus*),
- herring gull (*L. smithsonianus*),
- common tern (*Sterna hirundo), and*
- bald eagle (*Haliaeetus leucocephalus*).

Though the Mississippi Flyway lies to the west of the Great Lakes, many major branches of the flyway follow the southwestern shore of Lake Erie. The Black Swamp Bird Observatory (BSBO), located just to the west of Davis-Besse, conducts long-term research projects on bird migration and breeding in the area. In 2009, the BSBO recorded 152 species of migrating passerines, 30 species of migrating shorebirds, and 22 species of migrating raptors in Lake Erie marshes alone (BSBO 2009a, 2009b, 2009c).

Table 2.2-7 lists the passerine, shorebird, and raptor species that the BSBO most commonly reported as occurring during migrations in Lake Erie marshes. Note that, for passerines, the bird species provided are specific to Navarre Station, which is located within Navarre Marsh on the Davis-Besse property.

The region also provides wintering habitat for dabbling ducks (subfamily Anatinae), diving ducks (subfamily Aythyinae), geese, and other waterfowl (Herndendorf 1987). Gulls (family Laridae), terns (family Sternidae), and cormorants (family Phalacrocoracidae) nest along the coast of Lake Erie and on the islands off the coast of the lake. Raptors, including the bald eagle, turkey vulture (*Cathartes aura*), osprey (*Pandion haliaetus*), American kestrel (*Falco sparverius*), and many hawk species also nest in the area (Herndendorf 1987).

Table 2.2-7. Most Common Migrating Bird Species Near the Davis-Besse Site

Spring Migration	Fall Migration
Passerines at the Navarre Station	
• eastern screech owl (*Megascops asio*)	• blackpoll warbler (*Dendroica striata*)
• hairy woodpecker (*Picoides villosus*)	• Swainson's thrush (*Catharus ustulatus*)
• red-headed woodpecker (*Melanerpes erythrocephalus*)	• white-throated sparrow (*Zonotrichia albicollis*)
• Gambel's white-crowned sparrow (*Zonotrichia leucophrys* ssp. *gambelii*)	• golden-crowned kinglet (*Regulus satrapa*)
• yellow palm warbler (*Dendroica palmarum* ssp. *hypochrysea*)	• hermit thrush (*Catharus guttatus*)
Shorebirds in Lake Erie Marshes	
• common snipe (*Gallinago gallinago*)	• killdeer (*Charadrius vociferous*)
• pectoral sandpiper (*Calidris melanotos*)	• short-billed dowitcher (*Limnodromus griseus*)
• American golden plover (*Pluvialis dominica*)	• least sandpiper (*Calidris minutilla*)
• lesser yellowlegs (*Tringa flavipes*)	• solitary sandpiper (*Tringa solitaria*)
• greater yellowlegs (*Tringa melanoleuca*)	• semipalmated sandpiper (*Calidris pusilla*)
Raptors in Lake Erie Marshes	
• turkey vulture (*Cathartes aura*)	• cooper's hawk (*A. cooperii*)
• red-tailed hawk (*Buteo jamaicensis*)	• bald eagle (*Haliaeetus leucocephalus*)
• sharp-shinned hawk (*Accipiter striatus*)	• northern harrier (*Circus cyaneus*)
• broad-winged hawk (*B. platypterus*)	• osprey (*Pandion haliaetus*)
• red-shouldered hawk (*B. lineatus*)	• American kestrel (*Falco sparverius*)

Source: BSBO 2009a, 2009b, 2009c

On West Sister Island, the FWS estimates that a colony of great blue herons (*Ardea herodias*), great egrets (*Ardea alba*), double-crested cormorants (*Phalacrocorax auritus*), and black-crowned night herons (*Nycticorax nycticorax*) totals 3,500 nesting pairs (FWS 2001). This colony contains the largest black-crowned night heron rookery in the Great Lakes (FWS 2001). Because the shores of West Sister Island do not provide any wading habitat, birds that nest on West Sister Island fly to the Lake Erie shore to feed multiple times per day.

Despite the vast array of birds that make use of habitat within the Davis-Besse region, the Ohio Audubon Society reports that many common species are in decline due to urban sprawl, non-native invasive species, and the expansion of industrialized agriculture.

The Ohio Audubon Society (2007) summarized the most vulnerable common species in decline and their percent decline since 1967 as follows:

- green heron (*Butorides virescens*)—82 percent decline,
- red-headed woodpecker (*Melanerpes erythrocephalus*)—78 percent decline,
- eastern meadowlark (*Sturnella magna*)—75 percent decline,

- northern flicker (*Colaptes auratus*)—67 percent decline, and
- yellow-breasted chat (*Icteria virens*)—63 percent decline.

In addition to these five common species in decline, the Ohio Audubon Society's (2009) watch list identifies five species of birds that are the most critically imperiled birds in the U.S. and at greatest risk of regional extirpation. These five species are the red-headed woodpecker (also included above on the "most vulnerable" list), Henslow's sparrow (*Ammodramus henslowii*), prothonotary warbler (*Protonotaria citrea*), prairie warbler (*Dendroica discolor*), and cerulean warbler (*Dendroica cerulean*).

Mammals

Northwestern Ohio's mammal population is dominated by rodents, smaller predators, and deer. About 30 species in total occur in the Ottawa Refuge Complex (FWS 2001). Common mammals in the region include muskrat (*Ondatra zebethicus*), raccoon (*Procyon lotor*), and white-tailed deer (*Odocoileus virginianus*), all of which inhabit or use wetland habitats. Numerous muskrat houses are visible within inundated areas of Darby Marsh. Eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Marmota monax*), fox squirrels (*Sciurus niger*), and striped skunk (*Mephitis mephitis*) occupy meadows, dikes, and forest edges. Small predators in the western Lake Erie marshes include long-tailed weasels (*Mustela frenata*), mink (*M. vison*), and red fox (*Vulpes fulva*). The majority of larger predators were extirpated from the area when northwestern Ohio was first settled. These include the wolverine (*Gulo gulo*), panther (*Felis concolor*), lynx (*F. lynx*), bobcat (*F. rufus*), gray wolf (*Canis lupus*), and black bear (*Ursus americanus*) (Hendendorf 1987).

Amphibians and Reptiles

A variety of amphibians and reptiles inhabit the area, including salamanders, newts, toads, and frogs. One lizard (the five-lined skink (*Eumeces fasciatus*)) and 16 species of turtles and snakes occur in the Ottawa Refuge Complex (FWS 2001). Mudpuppies (*Necturus maculosus*)—a species of aquatic salamander—inhabit wetlands and small streams with soft bottoms (Hendendorf 1987). Spotted salamanders (*Ambystoma maculatum*), tiger salamanders (*A. tigrinum*), Jefferson salamanders (*A. jeffersonianum*), and smallmouth salamanders (*A. texanum*) hatch and develop in wetlands, move to moist woodlands at adulthood, and return to wetlands annually to breed and lay eggs. The dusky salamander (*Desmognathus fuscus*) and red back salamander (*Plethodon cinereus*) inhabit the Lake Erie coast. Toads and frogs use both wetland waters, ponds, streams, and a variety of land habitats. Common species in the region include the American toad (*Bufo americanus*), spring peepers (*Pseudacris crucifer*), western chorus frog (*Pseudacris triseriata*), cricket frogs (*Acris* spp.), pickerel frog (*Rana palustris*), and northern leopard frog (*R. pipiens*). The snapping turtle (*Chelydra* spp.) is the largest reptile in western Lake Erie. Members of the water and box turtle family—map turtles (*Graptemys* spp.), spotted turtle (*Clemmys guttata*), midland painted turtle (*Chrysemys picta* ssp. *marginata*), box turtles (*Terrapene* spp.), and Blanding's turtle (*Emys blandingii*)—inhabit ponds and wetlands with standing water and thick aquatic vegetation. The Lake Erie water snake is the most common snake species in the region. Gartner snakes (*Thamnophis* spp.), black rat snakes (*Elaphe obsolete*), Dekay's snakes (*Storeria dekayi*), and hog-nosed snakes (family Colubridae) also inhabit the area (Hendendorf 1987).

Vegetation

The Lake Erie western basin has the greatest diversity of wetland plant species. The majority (over 700 of the estimated 800 vascular plant species) of vegetation in the region are grasses, reeds, aquatic plants, and other non-tree or shrub species (Bolsenga and Herdendorf 1993). Dominant wetland species include cattail (*Typha* spp.), bur reed (*Sparganium* spp.), grasses (*Echinochloa* spp., *Leersia oryzoides*, *Calamagrostis Canadensis*), spatterdock (*Nuphar advena*), water lily (*Nymphaea* spp.), and water smartweed (*Polygonum coccineum*) (Bolsenga and Herdendorf 1993). Within dikes, common greenbriar (*Smilax rotundifolia*), thistles, coneflower, common milkweed (*Asclepias syriaca*), asters (*Aster* spp.), river bank grape (*Vitis riparia*), and burdock (*Arctium* spp.) dominate (FENOC 2010c). Within swamps, riparian, and forested areas, eastern cottonwood (*Populus deltoides*), hackberry, sycamore (*Platanus occidentalis*), riverbank grape, black willow (*Salix nigra*), and staghorn sumac (*Rhus typhina*) constitute the climax vegetation assemblage (FENOC 2010c).

Many invasive species are present in the region, including purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), and flowering rush (*Butomus umbellatus*). FENOC does not manage these species on its site. However, the FWS uses a variety of techniques (hand-pulling, burning, and mowing; herbicides; and loosestrife-controlling weevils and beetles) to control invasive plants within the Ottawa National Wildlife Refuge, which includes Navarre Marsh on the Davis-Besse site (FWS 2001).

2.2.7.2 Davis-Besse Site

The Davis-Besse site consists of 954 ac (386 ha), of which 733 ac (297 ha) is the Navarre Marsh. As previously mentioned, the FWS leases the Navarre Marsh for management as part of the Ottawa National Wildlife Refuge. The remaining 221 ac (89 ha) of the site is composed of developed areas containing facility buildings, structures, and parking lots; woodlands; low grasslands; and marginal agricultural land (FENOC 2010c).

The Navarre Marsh lies on the southeast end of the Davis-Besse site and is composed of freshwater marsh, swamp forest, wet meadow, and small areas of deciduous forest (FENOC 2010c). A beach ridge separates the Navarre Marsh from the southern shore of Lake Erie. Sandbar willow (*Salix interior*), staghorn sumac, and elderberry (*Sambucus* spp.) dominate this beach ridge (FENOC 2010c). A hardwood swamp—part of Navarre Marsh—lies directly behind the beach ridge. As discussed previously, the BSBO has a research station within the Navarre Marsh where it conducts migration surveys.

2.2.7.3 Transmission Line Corridors

FENOC manages approximately 1,800 ac (730 ha) of transmission line corridors as part of its transmission line maintenance, the majority of which is flat agricultural land (FENOC 2010c). The transmission lines also traverse a combination of wetlands, forests, streams, and developed land, and the Beaver Line crosses the Toussaint and Portage rivers to the south of the Davis-Besse site. Management of these corridors is discussed in Section 2.1.5.

2.2.8 Protected Species and Habitats

This section discusses species and habitats that are: (1) Federally protected under the Endangered Species Act of 1973, as amended (ESA); (2) Federally protected under the Bald and Golden Eagles Protection Act of 1940, as amended; (3) Federally protected under the Migratory Bird Treaty Act of 1918, as amended (MBTA); and (4) State-protected species under Chapter 1518, *Endangered* Species, of the Ohio Revised Code.

No essential fish habitat exists in the vicinity of the Davis-Besse site; therefore, species protected under the Magnuson–Stevens Fishery Conservation and Management Act, as amended, are not considered in this section. Additionally, no marine waters are affected by the proposed license renewal; therefore, species protected under the Marine Mammal Protection Act of 1972, as amended, are not considered in this section.

2.2.8.1 Species and Habitats Protected Under the Endangered Species Act

The FWS and the National Marine Fisheries Service (NMFS) jointly administer the ESA of 1973 (16 USC 1531 et seq.). The FWS manages the protection of and recovery effort for listed terrestrial and freshwater species, while the NMFS manages the protection of and recovery effort for listed marine and anadromous species.

Action Area

The implementing regulations for section 7(a)(2) of the ESA define "action area" as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area effectively bounds the analysis of ESA-protected species and habitats because only species that occur within the action area may be affected by the Federal action. The action area includes the lands and waters described below. The NRC staff expects all direct and indirect effects of the proposed action to be contained within these areas.

The Davis-Besse site lies on the southwestern shore of Lake Erie in Ottawa County, Ohio. The site encompasses 954 ac (386 ha), of which FENOC leases approximately 733 ac (297 ha)—designated as "Navarre Marsh"—to the FWS for management as part of the Ottawa National Wildlife Refuge. The remaining 221 ac (89 ha) of the site are composed of developed areas containing facility buildings, structures, and parking lots; woodlands; low grasslands; and marginal agricultural land. The proposed license renewal would include continued operation of the site and continued lease of Navarre Marsh to the FWS. License renewal would not involve any new construction or refurbishment activities on either the developed or the undeveloped portions of the site. The proposed license renewal would continue to use the existing onsite switchyard and transmission facilities and would not require the construction or modification of the existing transmission system.[2]

Davis-Besse withdraws water from, and discharges cooling tower blowdown to, Lake Erie. Water is withdrawn approximately 3,000 ft (900 m) offshore. During normal operations,

[2] The GEIS (NRC 1996) does not define the scope of transmission lines that should be considered for the site-specific (Category 2) issue, "Threatened or Endangered Species." In 1999, the NRC staff made a policy decision to consider the scope of transmission lines for its "Threatened or Endangered Species" analyses to be that defined at 10 CFR 51.53(c)(3)(ii)(H), which states that "If the applicant's transmission lines that were constructed for the specific purpose of connecting the plant to the transmission line system do not meet the recommendations of the National Electric Safety Code for preventing electric shock from induced currents, an assessment of the impact of the proposed action on the potential shock hazard from the transmission lines must be provided." (NRC 1999b). The NRC has consistently applied this scope to its "Threatened or Endangered Species" license renewal analyses since that time. In preparing the GEIS, Revision 1 (NRC 2013), the NRC staff reviewed and incorporated lessons learned and knowledge gained from license renewal environmental reviews conducted by the NRC since 1996. The 2013 GEIS recognizes that since construction, many transmission lines have been incorporated into the regional power grid and that, in many cases, lines are no longer owned or managed by NRC licensees, and would, thus, remain energized regardless of license renewal. The 2013 GEIS concludes that "only those transmission lines that connect the power plant to the switchyard where electricity is fed into the regional distribution system (encompassing those lines that connect the nuclear plant to the first substation of the regional electric power grid) and power lines that feed the plant from the grid during outages are considered within the regulatory scope of license renewal environmental review[s]." In the case of Davis-Besse, an onsite switchyard lies just east of the containment building and south of the cooling tower. This switchyard is the first substation of the Toledo Edison grid, at which point electricity is fed into the regional distribution system. Lines beyond this switchyard are owned and operated by FirstEnergy and not the NRC applicant, FENOC. These lines would stay in service regardless of Davis-Besse license renewal because they are interconnected with other utilities (FENOC 2010c) and, thus, would not be affected by the proposed action. For these reasons, the NRC staff will consider the scope of the transmission lines for its "Threatened or Endangered Species" analysis to be that defined in the 2013 GEIS. Under this definition, all in-scope transmission lines are contained within the footprint of the Davis-Besse site.

21,000 gpm (80 m^3/min) of water is withdrawn at a rate of about 0.25 fps (0.08 m/s). Water is returned to the lake via a 6-ft (1.8-m) diameter buried pipe located about 9 ft (2.7 m) below the lake's surface. During normal operations, an average of 11,000 gpm (42 m^3/min) of water is discharged at a rate of 3.6 fps (1.1 m/s). The proposed license renewal would involve the continued use of Lake Erie as a source of cooling water. Section 2.2.6 describes the ecology of Lake Erie.

Within the action area, Federally listed terrestrial species could experience impacts such as habitat disturbance associated with refurbishment or other ground-disturbing activities, cooling tower drift, collisions with cooling towers and transmission lines, exposure to radionuclides, and other direct and indirect impacts associated with station, cooling system, and in-scope transmission line operation and maintenance. The proposed action has the potential to affect Federally listed aquatic species in several ways: impingement or entrainment of individuals into the cooling system; alteration of the riverine environment through water level reductions, changes in dissolved oxygen, gas supersaturation, eutrophication, and thermal discharges from cooling system operation; habitat loss or alteration from dredging; and exposure to radionuclides.

Species and Habitats Under NMFS's Jurisdiction

No Federally listed species or critical habitats under NMFS's jurisdiction exist in the action area. The NMFS confirmed this by letter dated December 21, 2010 (NMFS 2010).

Species and Habitats Under FWS's Jurisdiction

Table 2.2-8 identifies species under the FWS's jurisdiction within Ottawa County. The NRC created this list based on the FWS's Endangered Species Program online database (FWS 2013); ODNR's online Natural Heritage Database (ODNR 2013); and correspondence between the NRC and FWS (FWS 2010c).

Table 2.2-8. ESA Species Under FWS's Jurisdiction That Occur in Ottawa County

Species	Common Name	Federal Status[a]
Birds		
Charadrius melodus[b]	piping plover	LE
Mammals		
Myotis sodalis	Indiana bat	LE
Plants		
Platanthera leucophaea	eastern prairie fringed orchid	LT
Tetraneuris herbacea	lakeside daisy	LT

[a] LE=Federally listed as endangered; LT=Federally listed as threatened

[b] Great Lakes watershed population

Source: FWS 2010c, 2013; ODNR 2013

Piping Plover (*Charadrius melodus*)—Great Lakes Watershed Population. The FWS listed the Great Lakes watershed population of piping plover as endangered in 1985 (50 FR 50726). The species occurs through much of the northern Great Plains, Great Lakes region, Atlantic coast, and Gulf Coast region. A recent study of the taxonomy of the species (Miller et al. 2009) confirmed genetic uniqueness of only two subspecies—Atlantic (*C.m. melodus*) and Interior (*C.m. circumcinctus*), though the FWS recognizes three distinct population segments in its ESA rulemakings—the Atlantic Coast, the Great Lakes, and the Northern Great Plains populations (FWS 2009a). The Atlantic Coast population is *C.m. melodus*, while the Great Lakes and Northern Great Plains populations are *C.m. circumcinctus*.

Piping plovers inhabit open, sandy, sparsely vegetated beaches and barrier islands along the Great Lakes' shorelines. They avoid high bluffs or areas where the beach has been severely eroded. Historically, the Great Lakes watershed population bred throughout the Great Lakes' shorelines in within eight states, including Ohio, as well as Ontario (Haig 1992). Currently, breeding is restricted to several beaches along Lake Superior and Lake Michigan in northern Michigan (Haig 1992). The population winters along the Gulf coasts of Texas, Lousiana, Alabama, and Florida.

Piping plovers have not nested on Lake Erie since 1942 (ODNR 2011d). Since the late 1970s, piping plovers have been considered extirpated from the Great Lakes beaches in Ohio, Illinois, Indiana, New York, Pennsylvania, and Ontario (FWS 2003). In its five-year review of the species, the FWS (2009b) noted that piping plovers are infrequently sited in Ohio during migration on Headlands Beach in Mentor and Sheldon Marsh in Huron, which lie about 150 mi (240 km) and 110 mi (180 km) west of Davis-Besse, respectively. In the available data years (2003-2010), the BSBO has recorded the piping plover in 4 years within the Lake Erie marsh region (see Table 2.2-9). Thus, shoreline within the Davis-Besse site may provide marginal habitat for migrating piping plovers, but the occurrence of this species within the action area would be rare.

Table 2.2-9. Piping Plovers Observed During BSBO's Lake Erie Marsh Migration Survey, 2003–2010

	Number of Individuals Observed	
Year	**Spring Migration**	**Fall Migration**
2003	0	0
2004	0	0
2005	0	1
2006	0	0
2007	1	0
2008	0	2
2009	0	0
2010	0	5

Source: BSBO 2003b, 2004b, 2005, 2006c, 2007a, 2008a, 2009b, 2010b

The FWS designated critical habitat for the Great Lakes breeding population in May 2001 (66 FR 22938). Two critical habitat units (OH-1 and OH-2) are located within Ohio. However, these units lie outside of the action area in Erie and Lake Counties.

<u>Indiana Bat (*Myotis sodalis*).</u> The FWS listed the Indiana bat as endangered wherever found in 1967 under the Endangered Species Preservation Act of 1966, the predecessor of the ESA (32 FR 4001). Indiana bats appear dark brown in color, but individual hairs are tricolored, which distinguishes the Indiana bat from the little brown bat (Myotis lucifugus) (ODNR 2011c).

Indiana bats inhabit Ohio seasonally during the spring and summer months, during which time they rear young. Menzel et al., (2005) concluded that habitat use is highly correlated with insect abundance, which means that Indiana bats often forage in riparian areas where insect densities are highest. Menzel et al., (2005) also found that Indiana bats were more closely associated with linear landscape features (forest corridors and roads) than open areas (agricultural land, grasslands, or meadows). The Davis-Besse site includes riparian areas that may provide habitat to the species. Thus, this species may occur in the action area.

FENOC's (2011) "Environmental Best Management Practices" include procedures for cutting trees in areas with suitable Indiana bat habitat. The procedure directs staff to cut trees between September 30 and April 1. If trees must be cut outside these months, FENOC must complete a net survey in May or June prior to cutting to ensure that the cutting will not result in disturbance of Indiana bat roosts. These specifications apply to the Davis-Besse site as well as the in-scope transmission line corridors. The FWS has not designated critical habitat for the species in Ohio (41 FR 41914).

<u>Eastern Prairie Fringed Orchid (*Platanthera leucophaea*).</u> The eastern prairie fringed orchid is a Federally threatened species. The species is an 8- to 40-in. (20- to 100-cm) tall perennial herb with lance shaped leaves and a single flower spike of small white flowers. The orchid grows in mesic prairie, sage meadows, marsh edges, bogs, and other wetland habitats with full sun (FWS 2011c). Eastern prairie fringed orchids form a mycorrhizal association with soil fungus and are pollinated by hawkmoths (FWS 2011c). Though suitable habitat exists in the action area, during the NRC's site audit (NRC 2011), the FWS noted that it was unable to find any eastern prairie fringed orchid populations during a 2010 survey within the Ottawa National Wildlife Refuge. Thus, the NRC staff concludes that the species does not occur in the action area. The FWS has not designated any critical habitat for this species.

<u>Lakeside Daisy (*Tetraneuris herbacea*).</u> The lakeside daisy is a Federally threatened species. It inhabits full sun areas of dry, rocky prairie grassland that contain limestone deposits (ODNR 2011f). Suitable habitat for this species does not exist within the action area. The FWS has not designated any critical habitat for this species.

2.2.8.2 Species Protected Under the Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act prohibits anyone from taking bald eagles (*Haliaeetus leucocephalus*) or golden eagles (*Aquila chrysaetos*), including their nests or eggs, without a FWS-issued permit. The term "take" in the Act is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" (50 CFR 22.3). "Disturb" means to take action that causes injury to an eagle; decreases its productivity by interfering with breeding, feeding, or sheltering behavior; or results in nest abandonment (50 CFR 22.3).

According to the ODNR, Ottawa County has one of the highest densities of bald eagle nests in Ohio (FWS 2010b). Many bald eagle nests are located on the Davis-Besse site and along each of the four transmission line corridors described in Section 2.1.5. Two bald eagle nests are specifically located on the Davis-Besse site—one within Navarre Marsh and one northwest of the cooling tower near the site boundary (FWS 2010b).

FENOC's (2011) "Environmental Best Management Practices" include procedures to ensure that bald eagles and their nests are not disturbed during ground disturbing activities, tree clearance, or other habitat modifications. The procedure directs FENOC staff and contractors to avoid any activities that could disturb eagles within 660 ft (200 m) of any known nest from January 1 through July 31. If activities that have the potential to disturb eagles must be conducted within these months, FENOC must coordinate with the FWS to discuss potential mitigation options that could reduce or minimize impacts to eagles. These specifications apply to the Davis-Besse site as well as the in-scope transmission line corridors.

2.2.8.3 Species Protected Under the Migratory Bird Treaty Act

The FWS administers the Migratory Bird Treaty Act (MBTA), which prohibits anyone from taking native migratory birds or their eggs, feathers, or nests. The MBTA definition of a "take" differs from that of the ESA and is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities" (50 CFR 10.12). Unlike a take under the ESA, a take under the MBTA does not include habitat alteration or destruction. The MBTA protects 1,007 migratory bird species (75 FR 9282). Of these 1,007 species, the FWS allows for the legal hunting of 58 species as game birds (FWS undated). Within Ohio, the ODNR manages migratory bird hunting seasons and associated hunting licenses. All Federally and State-listed bird species that appear in Tables 2.3-8 and 2.2-10 are protected under the MBTA. Additionally, all U.S.-native bird species that belong to the families, groups, or species listed at 50 CFR 10.13 are protected under the MBTA. Section 2.2.8.4 discusses occurrences of protected bird species on and near the Davis-Besse site in more detail.

2.2.8.4 Species Protected by the State of Ohio

Ohio adopted a Statewide Threatened and Endangered Species Program in 1974. The Ohio Revised Code prohibits the taking or possession of State-designated endangered wildlife or the willful uprooting, destruction, or removal of native and State-designated threatened or endangered plants from public highways, public property, or waters of the state (Ohio Revised Code §1518.02; Ohio Revised Code §1531.25). Table 2.2-10 lists the Ohio-protected species that occur in Ottawa County.

Table 2.2-10. State-listed Species That Occur in Ottawa County

Species	Common Name	State Status[a]
Birds		
Accipiter striatus[b]	sharp-shinned hawk	SC
Anas clypeata	northern shoveler	SI
Anas crecca	green-winged teal	SI
Anas strepera	gadwall	SI
Aythya americana	redhead	SI
Bartramia longicauda	upland sandpiper	T
Botaurus lentiginosus	american bittern	E
Casmerodius albus[b]	great egret	SC
Catharus guttatus[b]	hermit thrush	T
Chlidonias niger	black tern	E
Circus cyaneus[b]	northern harrier	E
Cistothorus platensis	sedge wren	SC
Cygnus buccinators[b]	trumpeter swan	E
Dendoica magnolia[b]	magnolia warbler	SI
Egretta thula[b]	snowy egret	E

Species	Common Name	State Status[(a)]
Empidonax minimus[(b)]	least flycatcher	T
Falco peregrinus[(b)]	peregrine falcon	T
Gallinago delicata[(b)]	Wilson's snipe	SI
Grus canadensis[(b)]	sandhill crane	E
Haliaeetus leucocephalus	bald eagle	T
Ixobrychus exilis	least bittern	T
Nycticorax nycticorax[(b)]	black-crowned night-heron	T
Oporornis Philadelphia[(b)]	mourning warbler	SI
Oxyura jamaicensis	ruddy duck	SI
Pandion haliatus(b)	osprey	T
Porzana carolina	sora	SC
Protonotaria citrea	prothonotary warbler	SC
Rallus elegans	king rail	E
Rallus limicola	Virginia rail	SC
Sphyrapicus varius[(b)]	yellow-bellied sapsucker	E
Sterna hirundo	common tern	E
Sturnella neglecta	western meadowlark	SI
Vermivora chrysoptera[(b)]	golden-winged warbler	E
Wilsonia Canadensis[(b)]	Canada warbler	SI
Fish		
Acipenser fulvescens	lake sturgeon	E
Fundulus diaphanus menona	western banded killifish	E
Percina copelandi	channel darter	T
Freshwater Mussels		
Cyclonaias tuberculata	purple wartyback	SC
Ligumia nasuta	eastern pondmussel	E
Ligumia recta[(c)]	black sandshell	T
Obliquaria reflexa	threehorn wartyback	T
Ptychobranchus fasciolaris	kidneyshell	SC
Truncilla donaciformis	fawnsfoot	T
Truncilla truncata	deertoe	SC
Insects		
Aeshna canadensis	Canada darner	E
Plants		
Acorus americanus[(c)]	American sweet-flag	P
Ammophila breviligulata	american beach grass	T
Arabis drummondii	Drummond's rock cress	E
Arabis hirsuta var. adpressipilis	southern hairy rock cress	P

Species	Common Name	State Status[a]
Artemisia campestris	beach wormwood	T
Astragalus canadensis	Canada milk-vetch	P
Cakile edentula[c]	inland sea rocket	P
Calamintha arkansana	limestone savory	T
Campanula rotundifolia	harebell	T
Carex aquatilis	leafy tussock sedge	P
Carex atherodes	wheat sedge	P
Carex aurea	golden-fruited sedge	P
Carex bebbii	Bebb’s sedge	P
Carex brevior	tufted fescue sedge	T
Carex cephaloidea	thin-leaved sedge	P
Carex garberi	Garber’s sedge	E
Carex sprengelii	Sprengel’s sedge	T
Carex viridula	little green sedge	P
Cyperus diandrus	low umbrella-sedge	P
Cyperus schweinitzii	Schweinitz’s umbrella-sedge	T
Dichanthelium lindheimeri	Lindheimer's panic grass	T
Draba reptans	Carolina whitlow-grass	T
Eleocharis compressa	flat-stemmed spike-rush	P
Eleocharis geniculata	Caribbean spike-rush	E
Eleocharis ovata	ovate spike-rush	E
Euphorbia polygonifolia	seaside spurge	P
Hedeoma hispida	rough pennyroyal	P
Juncus alpinoarticulatus	alpine rush	P
Juncus balticus	baltic rush	P
Minuartia michauxii	rock sandwort	P
Nuphar variegata	bullhead-lily	E
Oenothera oakesiana	Oakes’ evening-primrose	P
Packera paupercula	balsam squaw-weed	T
Panicum philadelphicum	philadelphia panic grass	E
Panicum tuckermanii	Tuckerman’s panic grass	T
Phragmites australis ssp. americanus	american reed grass	T
Platanthera leucophaea	prairie fringed orchid	T
Potamogeton natans	floating pondweed	P
Potamogeton richardsonii	Richardson’s pondweed	P
Potamogeton zosteriformis	flat-stemmed pondweed	T
Potentilla arguta	tall cinquefoil	E
Ranunculus fascicularis	early buttercup	T

Species	Common Name	State Status[a]
Rosa blanda	smooth rose	T
Sagittaria cuneata	wapato	T
Sagittaria rigida	deer's-tongue arrowhead	P
Salix candida	hoary willow	P
Schoenoplectus smithii	Smith's bulrush	E
Sisyrinchium mucronatum	narrow-leaved blue-eyed-grass	E
Spiranthes magnicamporum	great plains ladies'-tresses	P
Tortella inclinata	curved tortella	E
Triglochin palustris	marsh arrow-grass	P
Triplasis purpurea[c]	purple sand grass	P
Ulmus thomasii	rock elm	P
Viola nephrophylla	northern bog violet	E
Zizania aquatica	wild rice	T
Reptiles		
Elaphe vulpina gloydi	eastern fox snake	SC
Emydoidea blandingii	Blanding's turtle	SC
Nerodia sipedon insularum	Lake Erie water snake	E
Thamnophis sirtalis[c]	melanistic garter snake	SC

[a]State status defined by the Ohio Department of Natural Resources under Ohio Revised Code 1531.25. E=endangered; P=potentially threatened; SC=species of concern; SI=special interest; T=threatened.

[b]The ODNR's Natural Heritage Database (ODNR 2013) does not list these species as occurring in Ottawa County. However, the BSBO (2003, 2004, 2006a, 2007b, 2007c, 2008a, 2008d, 2008f, 2008e, 2009b, 2009e, 2009f, 2010, 2011a) observed these species during annual bird surveys.

[c]The ODNR's Natural Heritage Database (ODNR 2013) does not list these species as occurring in Ottawa County. However, in correspondence between ODNR and FENOC (ODNR 2010), these species were identified as occurring on or near the Davis-Besse site.

Source: BSBO 2003, 2004, 2006a, 2007b, 2007c, 2008a, 2008d, 2008f, 2008e, 2009b, 2009e, 2009f, 2010, 2011a; ODNR 2010a, 2013

<u>Birds</u>. The majority of the State-listed birds in Table 2-2.10 occur on the Davis-Besse site based on data from the BSBO, which conducts long-term research on breeding and migration of songbirds, raptors, shorebirds, and rails.

For songbirds, Table 2.2-11 summarizes the number of individuals banded in 2003, 2004, 2008, and 2009 at the BSBO's Navarre Station, which is located within Navarre Marsh (discussed in more detail in Section 2.2.6) on the Davis-Besse site. According to the BSBO's progress report data, the Davis-Besse site and surrounding area provides habitat for eight of the State-listed songbirds. State-listed species account for an average of 10.9 percent of the birds banded each season. The magnolia warbler (*Dendroica magnolia*) and hermit thrush (*Catharus guttatus*) are the most common State-listed songbirds during both the spring and fall migration. The Canada warbler (*Wilsonia canadensis*), mourning warbler (*Oporornis philadelphia*), and least flycatcher (*Empidonax minimus*) primarily use the Davis-Besse area during spring migration, but they are present in very small numbers during the fall migration as well. The golden-winged warbler (*Vermivora chrysoptera*) and yellow-bellied sapsucker (*Sphyrapicus varius*) are present, but rare, during both the spring and fall migration. The sedge wren (*Cistothorus platensis*) was not banded during any of the data years, but one individual was observed on a point count in Navarre Marsh in 2009 (BSBO 2009a). The western meadowlark (*Sturnella neglecta*) was not banded at Navarre Station or any of the other monitoring stations and was also not observed on point counts for the data years.

Table 2.2-11. Songbird Bandings During Annual Migration Surveys, 2003–2009

	Number of Individuals Banded							
	Spring Migration				Fall Migration			
Species	**2003**	**2004**	**2008**	**2009**	**2003**	**2004**	**2008**	**2009**
Canada warbler	90	156	106	125	2	4	9	9
golden-winged warbler	2	2	1	3	1	0	0	0
magnolia warbler	600	879	414	686	190	103	88	115
mourning warbler	126	19	88	109	6	10	5	12
hermit thrush	123	95	95	142	187	172	169	212
least flycatcher	131	39	56	108	2	7	7	2
yellow-bellied sapsucker	1	5	2	1	5	3	3	8
Total Banded (State-Listed Species)	**1,073**	**1,195**	**1,762**	**1,174**	**393**	**299**	**281**	**358**
Total Banded (All Species)	**7,841**	**8,970**	**7,822**	**10,042**	**4,191**	**3,206**	**2,790**	**3,645**

Source: BSBO 2003, 2004, 2008a, 2009b

For raptors, the BSBO conducts annual spring surveys between late February and early May. Table 2.2-12 summarizes the number of birds counted by species for the available data years (2006 through 2009). The BSBO surveys 23 sites throughout the marshes on the southwestern shore of Lake Erie. State-listed raptor species make up an average of 9.7 percent of the observed raptors each year. Sharp-shinned hawks (*Accipiter striatus*) and bald eagles (*Haliaeetus leucocephalus*) are the most commonly observed raptors, while peregrine falcons (*Falco peregrinus*) are the least commonly observed.

Table 2.2-12. Spring Raptor Survey Counts in the Lake Erie Marsh Region, 2006–2009

	Number of Individuals Observed			
Species	**2006**	**2007**	**2008**	**2009**
sharp-shinned hawk	245	492	389	467
northern harrier	95	122	167	61
peregrine falcon	10	8	3	4
bald eagle	247	181	371	153
osprey	12	14	29	31
Total Count (State-Listed Species)	**364**	**817**	**959**	**716**

Species	Number of Individuals Observed			
	2006	2007	2008	2009
Total Count (All Species)	**4,339**	**8,645**	**8,760**	**7,184**

Source: BSBO 2007c, 2008f, 2009f

For ducks, swans, and shorebirds, the BSBO conducts annual spring surveys in Navarre Marsh that captures species presence or absence on each day during the spring migration period (generally from early April through early June). Table 2.2-13 summarizes whether each species was observed in the survey for the years 2006 through 2011. Of the state-listed duck, swan, and shorebird species, six were consistently observed each survey year—the great egret (*Ardea alba*), black-crowned night-heron (*Nycticorax nycticorax*), trumpeter swan (*Cygnus buccinator*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), and common tern (*Sterna hirundo*). The least bittern (*Ixobrychus exilis*), northern shoveler (*Anas clypeata*), and ruddy duck (*Oxyura jamaicensis*) were observed during the majority of the survey years (4 out of the 6 years). The remaining species listed in Table 2.2-13 are relatively rare in the area and were observed less than half of the survey years. The king rail (*Rallus elegans*), black tern (*Chlidonias niger*), piping plover, and upland sandpiper (*Bartramia longicauda*) were not observed during the annual spring surveys. However, as discussed previously, the piping plover is known to seasonally occur in the area based on the BSBO's spring and fall banding program. Though not recorded in the annual spring surveys, the upland sandpiper has been recorded during the BSBO's shorebird migration and habitat use surveys in 2003, 2007, and 2009.

Table 2.2-13. Ducks, Swans, and Shorebirds Observed in Annual Spring Surveys at Navarre Marsh, 2006–2010

Species	Species Observed During Survey Year (Y/N)					
	2006	2007	2008	2009	2010	2011
great egret	Y	Y	Y	Y	Y	Y
snowy egret	Y	N	Y	N	N	N
black-crowned night-heron	Y	Y	Y	Y	Y	Y
least bittern	N	Y	Y	Y	N	Y
American bittern	N	Y	Y	N	N	Y
trumpeter swan	Y	Y	Y	Y	Y	Y
green-winged teal	N	N	Y	Y	N	Y
northern shoveler	N	Y	Y	Y	N	Y
redhead	N	N	N	Y	Y	Y
ruddy duck	N	N	Y	Y	Y	Y
sandhill crane	N	N	N	Y	N	Y
Virginia rail	Y	Y	Y	Y	Y	Y
sora	Y	Y	Y	Y	Y	Y
Wilson's snipe	N	N	N	Y	N	N

Species	Species Observed During Survey Year (Y/N)					
	2006	2007	2008	2009	2010	2011
common tern	Y	Y	Y	Y	Y	Y

Source: BSBO 2006a, 2007b, 2008d, 2008e, 2009e, 2010, 2011a

Plants. The ODNR (ODNR 2010) identified one Ohio-listed plant species as occurring onsite—the Canada milk-vetch (*Astragalus canadensis*). The Canada milk-vetch inhabits moist prairies, open woodlands, roadsides, and streambanks. Because this species occurs in a wide variety of habitats, it may occur on both the developed and undeveloped portions of the Davis-Besse site. However, the ODNR (2010) last recorded the Canada milk-vetch on the Davis-Besse site in 1979, and FENOC did not specifically note the occurrence of this species on the site in their ER. Therefore, it is unknown whether the species still occurs on the Davis-Besse site.

The ODNR (2010) noted six additional Ohio-listed plant species that are known to occur along the Davis-Besse site perimeter or just outside of the site. The six species and their habitats are as follows:

- Schweinitz's umbrella-sedge (*Cyperus schweinitzii*)—sandy shores, beaches, and barrens,
- inland sea rocket (*Cakile edentula*)—sandy beaches above the high tide line,
- purple sand grass (*Triplasis purpurea*)—sand dunes,
- seaside spurge (*Euphorbia polygonifolia*)—sand dunes,
- deer's-tongue arrowhead (*Sagittaria rigida*)—swamps and shallow water, and
- American sweet-flag (*Acorus americanus*)—emergent wetlands.

ODNR (2010) has recorded three of these species—Schweinitz's umbrella-sedge, purple sand grass, and deer's-tongue arrowhead—as occurring in the vicinity of the Davis-Besse site as recently as 2009. The inland sea rocket was last recorded in 1997, the sea side spurge in 1990, and the American sweet-flag in 1971 (ODNR 2010). Due to these species' habitat requirements, if they occur on the Davis-Besse site, all six of these plants would be restricted to the Lake Erie shoreline and Navarre Marsh. None of these species are likely to occur on the developed portion of the Davis-Besse site.

Fish and Freshwater Mussels. Within the vicinity of Davis-Besse, three State-listed fish species potentially occur. However, none of these species were identified by the ODNR (ODNR 2010) as occurring on or in the immediate vicinity of the Davis-Besse site.

Five Ohio-listed mussel species have been recorded as occurring in Lake Erie near the portion of the shoreline adjacent to the Davis-Besse site (ODNR 2010a). These species are:

- purple wartyback (*Cyclonaias tuberculata*),
- fawnsfoot (*Truncilla donaciformis*),
- eastern pondmussel (*Ligumia nasuta*),
- black sandshell (*Ligumia recta*), and
- deertoe (*Truncilla truncata*).

However, the ODNR (2010) has not recorded any of these species as occurring in this area since the late-1960s to late-1970s. The lack of recorded native mussel occurrences likely coincides with the introduction of the Eurasian dreissenid mussels—the zebra (*Dreissena polymorpha*) and quagga (*Dreissena rostriformis bugensis*) mussels—to Lake Erie in the 1980s.

From 2007 through 2009, Crail et al. (2011) surveyed numerous sites along the Lake Erie coast and within associated coastal marshes for native mussel species. The Toussaint River, which lies near the southern boundary of the Davis-Besse site, was one of the surveyed sites. Crail et al. (2011) found live mussels of eight species at the Toussaint River site, none of which were any of the five State-listed species above. However, Crail et al. (2011) identified three State-listed species at other sites northeast of the Davis-Besse site—live eastern pondmussel and deertoe individuals in Bayshore; fresh dead deertoe individuals at the Mamee Bay site; and fresh dead fawnsfoot individuals at Luna Pier. The Crail et al. (2011) survey indicates that though these mussel species may no longer occur in the immediate vicinity of Davis-Besse, at least three of the State-listed species continue to occur within Lake Erie's western basin.

<u>Reptiles</u>. The ODNR (2010) identified three Ohio-listed reptiles as having known occurrences on the Davis-Besse site—the Blanding's turtle (*Emydoidea blandingii*), the eastern fox snake (*Elaphe vulpina gloydi*), and the melanistic garter snake (*Thamnophis sirtalis*). The Blanding's turtle is a semi-aquatic turtle that occurs in coves, bays, ponds, and shallow marsh waters. The eastern fox snake is found in freshwater marshes along Lake Erie and Lake Huron, exclusively. The melanistic garter snake occurs in a wide variety of habitats, including forests, fields, prairies, streams, wetlands, meadows, and ponds. All three of these species are likely to inhabit Navarre Marsh on the Davis-Besse site.

<u>Insects</u>. The ODNR (2010) did not identify the occurrence of any State-listed insects on or near the Davis-Besse site. The BSBO conducts annual butterfly surveys within Navarre Marsh and other areas with the Ottawa National Wildlife Refuge. According to survey results from 2006 through 2009, the BSBO did not observe any State-listed butterfly species during their surveys (BSBO 2006b, 2007d, 2008c, 2009d). Navarre Marsh is likely to provide suitable habitat for the Canada darner (*Aeshna canadensis*), which inhabits wooded lakes and ponds, as well as marshes and bogs, fens, and slow-moving streams.

2.2.9 Socioeconomic Factors

This section describes current socioeconomic factors that have the potential to be directly or indirectly affected by changes in operations at Davis-Besse. Davis-Besse and the communities that support it can be described as a dynamic socioeconomic system. The communities provide the people, goods, and services required to operate the nuclear power plant. Power plant operations, in turn, provide wages and benefits for people and dollar expenditures for goods and services. The measure of a communities' ability to support Davis-Besse operations depends on the ability of the community to respond to changing environmental, social, economic, and demographic conditions.

The socioeconomic region of influence (ROI) is defined by the area where Davis-Besse employees and their families reside, spend their income, and use their benefits, thereby affecting the economic conditions of the region. The Davis-Besse ROI consists of a four-county area (Lucas, Ottawa, Sandusky, and Wood counties), where approximately 88 percent of Davis-Besse employees reside (FENOC 2010c).

FENOC employs a permanent workforce of approximately 825 employees at Davis-Besse (FENOC 2010c). Approximately 722 employees, or 88 percent, live in Ottawa, Lucas, Wood, and Sandusky Counties (Table 2.2-14). Most of the remaining 12 percent of the workforce are divided among 21 counties in Ohio, Michigan, and Pennsylvania, with numbers ranging from 1 to 46 employees per county. Given the residential locations of Davis-Besse employees, the most significant impacts of plant operations are likely to occur in Ottawa, Lucas, Wood, and Sandusky Counties. The focus of the socioeconomic impact analysis in this SEIS is, therefore, on the impacts of continued Davis-Besse operations on these four counties.

Table 2.2-14. Davis-Besse, Employee Residence by County

County	Number of Employees	Percentage of Total
	Ohio	
Lucas	163	19.8
Ottawa	307	37.2
Sandusky	124	15.0
Wood	128	15.5
Other counties	103	12.5
Total	**825**	**100.0**

Source: FENOC 2010c

Refueling outages at Davis-Besse normally occur at 24-month intervals. During refueling outages, site employment increases by as many as 1,300 temporary workers for approximately 48 days (FENOC 2010c). Most of these workers are assumed to be similarly distributed across the same geographic areas as Davis-Besse employees. The following sections describe the housing, public services, offsite land use, visual aesthetics and noise, population demography, and the economy in the ROI surrounding Davis-Besse.

2.2.9.1 Housing

Table 2.2-15 lists the total number of occupied and vacant housing units, vacancy rates, and median value in the four-county ROI. According to 2010 Census estimates, there were approximately 310,000 housing units in the socioeconomic region, approximately 271,000 of which were occupied. The vacancy rate was lowest in Wood County (8.1 percent) and highest in Ottawa County (37.3 percent) of the four counties. The 2009 through 2011 3-year estimated median value of owner occupied housing units in Lucas, Ottawa, Sandusky, and Wood Counties was $113,500, $137,200, $112,300, and $153,900, respectively (USCB 2012).

Table 2.2-15. Housing in Lucas, Ottawa, Sandusky, and Wood Counties in Ohio in 2010

	Lucas	Ottawa	Sandusky	Wood	ROI
total	202,630	27,909	26,390	53,376	310,305
occupied housing units	180,267	17,503	24,182	49,043	270,995
vacant units	22,363	10,406	2,208	4,333	39,310
vacancy rate (percent)	11.0	37.3	8.4	8.1	12.7
median value, owner occupied housing (dollars) (estimated)	113,500	137,200	112,300	153,900	129,225

Source: USCB 2012

2.2.9.2 Public Services

This section presents information regarding public services including water supply, education, and transportation.

<u>Water Supply</u>

There are six major public water suppliers In Lucas and Ottawa Counties. Toledo Public Water System in Lucas County serves a population of 380,000, while Ottawa County Regional system serves a population of 14,500 with the largest capacity and daily demand served, with smaller systems supplying other municipalities in the county (Table 2.2-16). There are also two major public water suppliers in Sandusky County—Fremont City Public Water System has the largest capacity at 7,500,000 gallons per day, while the Clyde Public Water System, serves a population of 5,900.

Davis-Besse obtains water from the Carroll Township water system, which has excess capacity of 700,000 gallons per day (FENOC 2010c).

Table 2.2-16. Major Public Water Supply Systems (Million Gallons Per Day)

Counties	Public Water System	Population Served	Water Use	Treatment Capacity
Lucas	Toledo	380,000	75,838	181,000
	Oregon City	18,334	4,463	8,087
Ottawa	Marblehead Village	1,600	193	553
	Put-in-Bay Village	700	67	140
	Ottawa County Regional	14,500	3,507	9,000
	Carroll	200	300	1,000
Sandusky	Clyde	5,900	958	2,000
	Fremont City	500	4,317	7,500
Wood	Bowling Green City	30,000	3,389	5,400
	North Baltimore	3,361	550	1,600

Source: FENOC 2010a

Education

There are eight school districts in Lucas County with 117 schools and an enrollment of 55,548 students during the 2009 to 2010 school year. Sandusky County has four school districts with 19 schools and 8,537 students. Wood County has 10 school districts with 49 schools and 17,917 students. In Ottawa County, the county in which Davis-Besse is located, there are seven school districts with 19 schools and 5,530 students (NCES 2010).

There are three public universities within 50 mi of Davis-Besse, which employed approximately 6,024 full- and part-time faculty during the 2009 school year. Student enrollment at the public universities in 2009 was approximately 80,176 (IES 2010).

Transportation. There are many major roads used by plant workers commuting to Davis-Besse. State Highway Route 2, located immediately adjacent to Davis-Besse, provides local access to the surrounding area. State Highway Route 2 runs through mostly rural and uncongested areas. The two-lane highway is used extensively by commercial truck carriers. Approximately 6 mi east of the site (and continuing east), Route 2 becomes a four-lane, divided and limited-access highway (FENOC 2010c). Table 2.2-17 lists commuting routes to Davis-Besse and average annual daily traffic (AADT) volume values. The AADT values represent traffic volumes for a 24-hour period factored by both day of week and month of year.

Table 2.2-17. Major Commuting Routes in the Vicinity of Davis-Besse, 2009 Average Annual Daily Traffic Count

Roadway & Location	Average Annual Daily Traffic (AADT)[a]
SR-2, West of Davis-Besse	
at Lucas County line	6,200
at SR-579 intersection	6,510
at SR-590 intersection	7,310
at SR-19 intersection	7,330
SR-2, East of Davis-Besse	
at SR-358 intersection	6,950
at SR-163 intersection	11,990
at SR-53 intersection	12,970

[a] All AADTs represent traffic volume during the average 24-hour day during 2009.

Source: OHDOT 2010

2.2.9.3 Offsite Land Use

Offsite land use conditions in Lucas, Ottawa, Sandusky, and Wood Counties are described in this section because 88 percent of the Davis-Besse permanent workforce lives in these four counties.

Lucas County has the largest urban area, accounting for nearly 37 percent of the total county area. It is also the most populated of the of the four-county area, with Toledo being the county seat and largest city (Lucas 2011). Ottawa County, the smallest of the four counties in land area (approximately 260 m^2 (670 km^2), is typical of the rural land-use character of the four-county area. Over 90 percent of the total county area comprises cropland, pasture, forest, open water, and wetlands. Urban areas, on the other hand, account for less than 10 percent of the total county area. Wood and Sandusky Counties have a similar distribution of land area. Ottawa County, although the smallest in land area, has the most open water (7 percent), as its northeastern boundary abuts Lake Erie and includes a peninsula and several islands (Ottawa 2011). Sandusky County is similar in land category to Wood County, with most land in farms. The county's land area (approximately 410 m^2 (1,060 km^2)), number of farms (770) is second only to Wood County (Sandusky 2011). Wood County is the largest county in land area (approximately 620 m^2 (1,600 km^2)) and comprises the most land in farms (269,000 ac) and most number of farms (1,180). Wood and Sandusky county have a similar average farm size at approximately 230 ac (90 ha)) (Wood 2011).

2.2.9.4 Visual Aesthetics and Noise

The topography of the Davis-Besse site and vicinity is relatively flat, bordered by marsh areas, Lake Erie, and the upland area rising to only 10 to 15 ft above the lake level. The site varies in elevation from marsh bottom, below lake level, to approximately 6 ft above lake level (FENOC 2010c).

The developed portions of the Davis-Besse site have 17 major structures, located approximately 3,000 ft (914 m) from the Lake Erie shoreline. The turbine building is 104 ft (approximately 32 m) high. West of the turbine building is the containment building standing 225 ft (approximately 69 m) high. West of the containment building is the switchyard and south of there is the 328 ft (100 m) meteorological tower. Visible from State Highway 2 and Lake Erie, the cooling tower stands approximately 490 ft (150 m) high (AEC 1973).

Given the industrial nature of the Davis-Besse station site, noise emissions from the site are intermittent minor nuisance in the vicinity. Noise levels may sometimes exceed the 55 dba level that the U.S. EPA uses as a threshold to protect against excess noise during outdoor activities (EPA 1974). To date, FENOC has received no complaints concerning noise from station operations.

2.2.9.5 Demography

According to the 2010 Census, an estimated 105,944 U.S. residents live within 20 mi (32 km) of Davis-Besse, which equates to a population density of 178 persons per square mile (CAPS 2012). This translates to a Category 4, "least sparse," population density using the GEIS measure of sparseness (greater than or equal to 120 persons per square mile within 20 mi (32 km) of the plant). An estimated 1,809,026 U.S. residents live within 50 mi (80 km) of Davis-Besse with a population density of 365 persons per square mile (CAPS 2012). This translates to a Category 4, "in close proximity," population using the GEIS measure of proximity (greater than or equal to 190 persons per square mile within 50 mi (80 km) of the plant). Therefore, Davis-Besse is located in a high-population area based on the GEIS sparseness and proximity matrix.

Table 2.2-18 shows population projections and growth rates from 1970 through 2050 in Lucas, Ottawa, Sandusky, and Wood Counties in Ohio. The growth rate in Lucas and Sandusky Counties showed a decrease of 2.9 and 1.4 percent, respectively, for the period of 2000 through2010. Ottawa and Wood County population shows an increase from 1990 through 2000 (1.1 and 3.6 percent, respectively). Wood County population is expected to increase over the next decades and through 2050, while Lucas and Sandusky Counties are expected to continue to decrease; Ottawa County population is expected to initially decrease and then slightly increase over the same period.

Table 2.2-18. Population and Percent Growth in Lucas, Ottawa, Sandusky, and Wood Counties from 1970–2010 and Projected for 2020–2050

Year	Lucas Population	Lucas Percent Growth[a]	Ottawa Population	Ottawa Percent Growth[a]	Sandusky Population	Sandusky Percent Growth[a]	Wood Population	Wood Percent Growth[a]
1970	484,370	-----	37,099	-----	60,983	-----	89,722	-----
1980	471,741	-2.6	40,076	8.0	63,267	3.7	107,372	19.7
1990	462,361	-2.0	40,029	-0.1	61,963	-2.1	113,269	5.5
2000	455,050	-1.6	40,990	2.4	61,790	-0.3	121,070	6.9
2010	441,815	-2.9	41,428	1.1	60,944	-1.4	125,488	3.6
2020	434,648	-1.6	40,269	-2.8	57,903	-5.0	133,326	6.2
2030	417,873	-3.9	38,522	-4.3	56,416	-2.6	141,877	6.4
2040	410,519	-1.8	40,638	5.5	56,831	0.7	150,388	6.0
2050	400,011	-2.6	40,854	0.5	55,922	-1.6	158,266	5.2

---- = No data available.

[a] Percent growth rate is calculated over the previous decade.

Source: Population data for 1970–2000 (USCB 2012); population projections for 2010–2030 (ODD 2003); projections for 2040 and 2050 (calculated).

Demographic Profile

The demographic profiles of the four-county ROI population are presented in Table 2.2-19. In 2010, minorities (race and ethnicity combined) comprised 22.7 percent of the total four-county population. The largest minority populations in the four-county area include Black or African American at 13 percent, followed by Hispanic or Latino (of any race) at 5.9 percent.

Table 2.2-19. Demographic Profile of the Population in the Davis-Besse Four-County Socioeconomic Region of Influence in 2010

	Lucas	Ottawa	Sandusky	Wood	ROI
total population	441,815	41,428	60,944	125,488	669,675
Race (Percent of Total Population, Not-Hispanic or Latino)					
White	71.0	93.6	86.2	90.1	77.3
Black or African American	18.7	0.7	2.7	2.3	13.0
American Indian & Alaska Native	0.2	0.1	0.2	0.2	0.2
Asian	1.5	0.3	0.3	1.5	1.3
Native Hawaiian or other Pacific Islander	0.0	0.0	0.0	0.0	0.0
some other race	0.2	0.0	0.1	0.1	0.1
two or more races	2.3	1.0	1.7	1.3	2.0
Ethnicity					
Hispanic or Latino	26,974	1,755	5,435	5,663	39,827
percent of total population	6.1	4.2	8.9	4.5	5.9
Minority Population (Including Hispanic or Latino Ethnicity)					
total minority population	128,219	2,648	8,417	12,467	151,751
percent minority	29.0	6.4	13.8	9.9	22.7

Source: USCB 2012

<u>Transient Population</u>

Within 50 mi (80 km) of Davis-Besse, colleges and recreational opportunities attract daily and seasonal visitors who create demand for temporary housing and services. In 2009, there were approximately 105,672 students attending universities within 50 mi (80 km) of Davis-Besse (IES 2010).

There are 19 counties across two states within a 50-mi radius of Davis-Besse. Of those counties, approximately 3.0 percent of the housing units are considered temporary housing for seasonal, recreational, or occasional use in 2010. Over 30 percent of the housing units in Ottawa County are considered seasonal housing. By comparison, seasonal housing accounted for 0.4, 1.1, and 0.6 percent of total housing units in Lucas, Sandusky and Wood Counties, respectively (USCB 2012). Four counties in Michigan within 50 mi (80 km) of Davis-Besse, only one (Lenawee) has seasonal housing units comprising more than 5 percent of total housing units. Table 2.2-20 provides information on seasonal housing for the 19 counties located all or partly within 50 mi of Davis-Besse (USCB 2012).

Table 2.2-20. Seasonal Housing in Counties Located within 50 Miles of Davis-Besse

County[(a)]	Housing Units	Vacant Housing Units—for seasonal, Recreational, or Occasional Use	Percent
		Ohio	
Ashland	22,141	413	1.9
Crawford	20,167	90	0.4
Erie	37,845	2,866	7.6
Fulton	17,407	112	0.6
Hancock	33,174	161	0.5
Henry	11,963	66	0.6
Huron	25,196	246	1.0
Lorain	127,036	714	0.6
Lucas	202,630	755	0.4
Ottawa	27,909	8,581	30.7
Richland	54,599	405	0.7
Sandusky	26,390	281	1.1
Seneca	24,122	121	0.5
Wood	53,376	329	0.6
Wyandot	9,870	62	0.6
		Michigan	
Lenawee	43,452	2,414	5.6
Monroe	62,971	426	0.7
Washtenaw	147,573	1,403	1.0
Wayne	821,693	2,544	0.3
Total	**1,747,373**	**21,576**	**2.9**

[(a)] These are counties within 50 mi (80 km) of Davis-Besse with at least one block group located within the 50-mi (80-km) radius.

Source: USCB 2012

Migrant Farm Workers

Migrant farm workers are individuals whose employment requires travel to harvest agricultural crops. These workers may or may not have a permanent residence. Some migrant workers follow the harvesting of crops, particularly fruit, throughout rural areas of the U.S. Others may be permanent residents near the Davis-Besse who travel from farm to farm harvesting crops.

Migrant workers may be members of minority or low-income populations. Because they travel and can spend a significant amount of time in an area without being actual residents, migrant workers may be unavailable for counting by census takers. If uncounted, these workers would be “underrepresented” in U.S. Census Bureau (USCB) minority and low-income population counts.

Information on migrant farm and temporary labor was collected in the 2007 Census of Agriculture. Table 2.2-21 provides information on migrant farm workers and temporary farm labor (less than 150 days) within 50 mi of Davis-Besse. According to the 2007 Census of Agriculture, approximately 11,126 farm workers were hired to work for less than 150 days and were employed on 2,313 farms within 50 mi of Davis-Besse. The county with the largest number of temporary farm workers (1,595) on 122 farms was Huron County (NASS 2009).

Table 2.2-21. Migrant Farm Workers and Temporary Hired Farm Labor in Counties Located Within 50 Miles of Davis-Besse

County[a]	Number of farms With Hired Farm Labor[b]	Number of Farms Hiring Workers for Less Than 150 Days[b]	Number of Farm Workers Working for Less Than 150 Days[b]	Number of Farms Reporting Migrant Farm Labor[b]
Ohio				
Ashland	213	184	421	5
Crawford	119	107	313	4
Erie	88	68	383	9
Fulton	173	148	686	13
Hancock	146	130	324	6
Henry	128	119	487	9
Huron	145	122	1,595	7
Lorain	195	156	651	14
Lucas	91	78	519	14
Ottawa	92	78	408	10
Richland	146	113	385	4
Sandusky	158	140	699	23
Seneca	179	154	347	12
Wood	170	148	600	11
Wyandot	100	82	350	4
County Subtotal	**1,143**	**1,827**	**8,168**	**145**
Michigan				
Lenawee	262	214	908	22
Monroe	222	193	1,035	27
Washtenaw	250	198	835	12
Wayne	86	65	601	6
County Subtotal	**820**	**670**	**3,379**	**67**
Total	**2,963**	**2,497**	**11,547**	**212**

[a] These are counties within 50 mi of Davis-Besse with at least one block group located within the 50-mi radius.

[b] Table 7. Hired Farm Labor—Workers and Payroll: 2007

Source: NASS 2011a, 2011b, 2011c

In the 2002 Census of Agriculture, farm operators were asked for the first time whether or not any hired migrant workers, defined as a farm worker whose employment required travel that prevented the migrant worker from returning to their permanent place of residence the same day. Within the 50-mi radius of the Davis-Besse, 207 farms reported hiring migrant workers in the 2007 Census of Agriculture. Monroe County in Michigan reported the most farms (27) with hired migrant workers, followed by Sandusky County in Ohio, with 23 farms (NASS 2009).

According to the 2007 Census of Agriculture estimates, 519 temporary farm workers (those working fewer than 150 days per year) were employed on 78 farms in Lucas County, and 408 temporary farm workers were employed on 78 farms in Ottawa County. Sandusky County has 699 temporary farm workers (those working fewer than 150 days per year) employed on 140 farms, and 600 emporary farm workers were employed on 148 farms in Ottawa County (NASS 2009).

2.2.9.6 Economy

This section contains a discussion of the economy, including employment and income, unemployment, and taxes.

Employment and Income

A list of some of the major employers in Ottawa County is provided in Table 2.2-22. As shown in the table, nine major employers are identified in Ottawa County; three of which were Government, two manufacturing, two service, one trade, and one (FENOC) utility.

Table 2.2-22. Major Employers in Ottawa County, 2009

Employer	Type of Industry
Benton-Carroll-Salem Local Schools	Government
Brush Wellman, Inc.	manufacturing
FirstEnergy Corp	utility
Luther Home of Mercy	service
Magruder Hospital	service
Ottawa County Government	Government
Port Clinton City Schools	Government
USGS Corp/U.S. Gypsum Co.	manufacturing
Wal-Mart Stores, Inc.	trade

Source: http://www.development.ohio.gov/research/files/S0/Ottawa.pdf

According to the 2008 through 2010 American Community Survey 3-year estimates, education services, health care, and social assistance represented the largest sector of employment (26.2 percent) followed by manufacturing (15.7 percent). In Ottawa County, retail services represented the largest sector of employment (22.4 percent) followed by manufacturing (17.0 percent). In Sandusky County, manufacturing represented the largest sector of employment followed by education services, health care, and social assistance. A list of employment by industry in the ROI is presented in Table 2.2-23.

Table 2.2-23. Employment by Industry in ROI, 2008-2010 3-Year Estimate

Industry	Lucas	Ottawa	Sandusky	Wood	Total	Percent
Total employed civilian workers	196,651	19,861	28,753	61,250	306,515	100
Agriculture, forestry, fishing and hunting, and mining	570	306	762	609	2,247	0.7
Construction	9,136	1,564	1,681	2,737	15,118	4.9
Manufacturing	27,661	3,162	7,597	9,627	48,047	15.7
Wholesale trade	5,816	386	522	1,735	8,459	2.8
Retail trade	23,758	2,443	3,022	7,165	36,388	11.9
Transportation, warehousing, and utilities	11,750	1,607	1,553	3,231	18,141	5.9
Information	3,102	166	300	1,122	4,690	1.5
Finance, insurance, real estate, rental, and leasing	9,998	927	811	2,947	14,683	4.8
Professional, scientific, management, administrative, and waste management services	16,826	946	1,285	4,662	23,719	7.7
Educational, health, and social services	52,035	4,477	6,503	17,315	80,330	26.2
Arts, entertainment, recreation, accommodation, and food services	20,721	2,232	2,607	5,105	30,665	10.0
Other services (except public administration)	8,946	909	1,359	2,858	14,072	4.6
Public administration	6,332	736	751	2,137	9,956	3.2

Source: USCB 2012

Estimated income information for the Davis-Besse ROI is presented in Table 2.2-24. According to the U.S. Census Bureau's (USBCs) 2008 through 2010 American Community Survey 3-year estimates, median household income were above the State average in Ottawa, Sandusky, and Wood Counties and lower in Lucas County. Ottawa and Wood Counties per capita income were above the State average, and they were lower in Lucas and Sandusky Counties. An estimated 19.1, 10, 11.6, and 12.2 percent of individuals in Lucas, Ottawa, Sandusky, and Wood Counties were living below the official poverty level, respectively, while Ohio, as a whole, had 14.8 percent of individuals living below the poverty level. The percentage of families living below the poverty level in Lucas, Ottawa, Sandusky, and Wood Counties was 14.9, 6.9, 7.9, and 7.3 percent, respectively. The percentage of families in Ohio as a whole was 10.8 percent (USCB 2012).

Table 2.2-24. Estimated Income Information for the Davis-Besse Four-County Socioeconomic Region of Influence, 2008–2010 3-Year Estimate

	Lucas	Ottawa	Sandusky	Wood	Ohio
median household income (dollars)[(a)]	40,017	51,712	46,024	52,512	46,563
per capita income (dollars)[(a)]	23,127	27,113	21,748	25,724	24,738
individuals living below the poverty level (percent)	19.1	10.0	11.6	12.2	14.8
families living below the poverty level (percent)	14.9	6.9	7.9	7.3	10.8

[(a)] In 2010 inflation-adjusted dollars

Source: USCB 2012

Unemployment

According to the USCB's 2008 through 2010 American Community Survey 3-year estimates, the unemployment rates in Lucas, Ottawa, Sandusky, and Wood Counties were 8.8, 4.9, 5.0, and 7.7 percent, respectively (USCB 2012). The unemployment rate for the State of Ohio was 6.3 (USCB 2012).

Taxes

The Ohio Tax Reform Act (Amended Substitute House Bill 66,126th General Assembly) went into effect on July 1, 2005. The Act has made significant changes in the structure of almost all major state and local taxes. Major business tax components of the Ohio Tax Reform Act consist of the phase-out of, tangible personal property tax (which excludes electric companies), corporate franchise tax, and the phase-in of the commercial activity tax. It is a privilege tax measured by gross receipts from activities within the State. The fully phased-in 0.26 percent commercial activity tax rate took effect on April 1, 2009 (impacting fiscal year 2010 tax revenues). Table 2.2-25 shows prior phase-in rates.

Table 2.2-25. 2005–2009 3-Year Phase-In Rates Percentage Result of the July 2005 Ohio Tax Reform Act and the Fully Phased-In 0.26 Percent Commercial Activity Tax

Tax Period	Base Tax Rate (Percent)	Phase-On Percentage	Effective Rate (Percent)
July–December 2005	0.06	N/A	0.0600
January–March 2006	0.26	23	0.0598
April 2006–March 2007	0.26	40	0.1040
April 2007–March 2008	0.26	60	0.1560
April 2008–March 2009	0.26	80	0.2080
After March 2009	0.26	100	0.2600

Source: FENOC 2010c

Table 2.2-26 compares property taxes paid by FENOC for Davis-Besse to the annual total operating budgets for Ottawa County, Carroll Township, Benton-Carroll-Salem School District, and the Penta County Joint Vocational School for the years 2004 through 2008. During this

5-year period, Davis-Besse property taxes contributed less than 10 percent to the Ottawa County total operating budget. The percentage of Davis-Besse property tax to the operating budget in Carroll Township, where Davis-Besse is located, varied widely from about 11 percent to nearly 28 percent. Property taxes paid to the Benton-Carroll-Salem School District and the Penta County Joint Vocational School, on the other hand, were more stable, averaging about 17 percent for the school district and 1.6 percent for the vocational school.

The amount of future property tax payments for Davis-Besse and the proportion of those payments are dependent on future market value of the units, future valuations of other properties in these jurisdictions, and other factors. FENOC assumes that the values presented in Table 2.2-26 are substantially representative of conditions that would exist in the license renewal term of the unit.

Table 2.2-26. Davis-Besse Property Tax Distribution and Jurisdictional Operating Budgets, 2004–2008

Year	Property Tax Paid by Davis-Besse (Dollar)	Operating Budget (Dollar)	Percent of Operating Budget (Percent)
Ottawa County			
2004	846,190	13,808,101	6.1
2005	1,171,511	13,909,810	8.4
2006	830,177	15,111,168	5.9
2007	949,380	15,846,381	6.0
2008	897,881	16,053,182	5.6
Carroll Township			
2004	485,644	4,334,322	11.2
2005	675,842	3,510,297	19.3
2006	533,277	1,908,000	27.9
2007	551,766	2,307,692	23.9
2008	558,791	4,829,032	11.6
Benton-Carroll-Salem Local School District			
2004	3,211,588	20,142,955	15.9
2005	4,484,582	21,114,350	21.2
2006	3,495,600	20,953,869	16.7
2007	3,607,888	22,038,419	16.4
2008	3,707,221	23,938,413	15.5
Penta County Joint Vocational School			
2004	372,018	24,832,789	1.5
2005	507,832	25,644,335	2.0
2006	397,738	26,553,076	1.5
2007	412,907	28,015,110	1.5

Year	Property Tax Paid by Davis-Besse (Dollar)	Operating Budget (Dollar)	Percent of Operating Budget (Percent)
2008	417,247	29,793,427	1.4

Source: FENOC 2010c

2.2.10 Historic and Archaeological Resources

This section discusses the cultural background and known historic and archaeological resources in and around Davis-Besse.

2.2.10.1 Cultural Background

The area in and around Davis-Besse has a low-to-moderate potential for significant prehistoric and historic resources. Human occupation of the Ohio area is generally characterized based on the following chronologic cultural sequence (Lepper 2005):

- Paleo-Indian Period (14,000+ to 10,000 years before present (BP)),
- Archaic Period (10,000 to 2,500 BP),
- Early Woodland Period (2,800 to 2,000 BP),
- Middle Woodland Period (2,100 to 1,500 BP),
- Late Woodland Period (1,500 to 1,100 BP), and
- Late Prehistoric Period (1,100 to 400 BP).

The Paleo-Indian Period is generally characterized by highly mobile bands of hunters and gatherers. Little information regarding subsistence is available for the Paleo-Indian Period in Ohio, although it is likely that these groups hunted small game and now-extinct megafauna (e.g., mastodon, saber-tooth tiger, and ground sloth) and gathered wild plants. Typical Paleo-Indian sites in Ohio consist of an isolated projectile point (of a style characteristic of the period, notably the fluted Clovis points). Over 1,000 projectile points have been found in the State, especially in the Ohio River drainage south of Davis-Besse (Neusius and Gross 2007). One documented fluted projectile point is located at the Peters site in Ottawa County, south of Davis-Besse along the Portage River was discovered (Prufer and Shane 1973). In addition to projectile points (both fluted and unfluted lancelote points), the Paleo-Indian tool kit included gravers, scrapers, knives, and biface blanks used to construct tools. Paleo-Indians prized high-quality stone for making their stone tools, especially the black flint from Coshocton County in Ohio (well to the southeast of the Davis-Besse), which was used for making most of the fluted Paleo-Indian projectile points that have been found in the state (Lepper 2005). However, there are several sites in Ohio that consist of more substantial Paleo-Indian cultural artifacts. At Sheridan Cave, about 45 mi (72 km) south of Davis-Besse, archaeologists found projectile points and stone tools associated with more than 60 species of the aforementioned extinct megafauna (Tankersly 1997). A Paleo-Indian base camp with a concentration of 6,835 stone tools was found at the Nobles Pond site in Stark County, southeast of Davis-Besse near Canton, Ohio (Lepper 2005).

The Archaic Period is generally distinguished from the preceding Paleo-Indian Period by changes in technology, population growth, and a changing environment. Technological changes are evidenced by the manufacture of notched projectile points, as well as tools and ornaments made from both bone and copper, in addition to ground stone tools. Toward the end of the Archaic Period, pottery was also being manufactured. As the Archaic period progressed, groups began adapting to a more stable, drier, and warmer environment, becoming more settled in their residential patterns. Toward the end of the Archaic Period, groups that resided in the river floodplains began the process of plant domestication and agriculture (Smith 1989). Additionally, as groups became more settled, they engaged in long-distance exchange networks. Their reduced mobility required them to establish connections with other groups that would engage in trade and exchange (Neusius and Gross 2007). Archaic sites in the vicinity of Davis-Besse are unlikely, as the area was a part of the Great Black Swamp. Prior to draining in the 19th and 20th centuries, the Great Black Swamp encompassed an area about 120 mi(190 km) long, and 30 to 40 mi (50 to 60 km) wide. Most of that area would not have been a favorable location for groups to inhabit during this time. However, Archaic sites have been found around the margins of the swamp, as well as fishing camps on the islands in Lake Erie (Lepper 2005). A predictive model for archaeological deposits has been proposed by Murphy (1988), suggesting that sites are most likely to be found on slightly elevated soils, specifically the Nappanee soil type.

During the Early Woodland Period, native groups began a gradual transition to a heavier reliance on domesticated plants, pottery, and established a more elaborate mortuary ritual. Building upon some of the characteristics of the cultures from the Early Woodland Period, the Hopewell Culture occupied large portions of Ohio in the subsequent Middle Woodland Period; however, some of the groups in the northern and eastern parts of Ohio continued the Early Woodland Period lifestyle without adopting the Hopewell lifeways. The Hopewell Culture was characterized by vast trade networks, increasing dependence on agriculture, mound and earthwork construction, as well as elaborate artifacts that were created and often found in vast amounts in burial contexts. These included plain and effigy pipes, pottery effigies, Hopewell series pottery, pottery and copper ear spools, panpipes and celts, and other artifacts fashioned from non-local materials (Neusius and Gross 2007). Most Early and Middle Woodland Period sites are found farther south than the area in and around Davis-Besse, although there are some sites that have been found in northern Ohio that would not be characterized as Hopewell but are from the same period (Lepper 2005).

The Late Woodland Period saw the decline of the Hopewell Culture and the vast trade networks that accompanied it. Consequently, most of the artifacts from this period were crafted from more locally procured materials. Despite the fact that the Hopewell Culture no longer continued to thrive, population continued to grow, and groups continued to congregate in villages and increase their social organization. Settlements were not just located in river valleys (as had been the norm in previous periods) but spread out into the landscape (Lepper 2005). Technological changes included the bow and arrow, which was adopted by 1,200 BP, evidenced by smaller notched and un-notched triangular projectile points. Agriculture played a large role in the subsistence systems of many Late Woodland groups, with increasing focus on domesticated crops; however, groups located near the margin of Lake Erie continued to rely on hunting, gathering, and fishing. In some areas, the Late Woodland Period continued unchanged until contact with European groups, while in other areas, the Late Prehistoric Period (also known as the Mississippian Period in parts of Ohio) began around 1,100 BP. The Late Prehistoric Period groups adopted maize agriculture along with beans and squash but continued a mixed economy in which hunting and gathering still played a prominent role.

Groups in and around Davis-Besse were not direct participants of the Mississippian or Iroquois culture's but likely were influenced by some elements (Lepper 2005). Several sites associated with the Mississippian Culture have been located along the Maumee River and its tributaries (Prahl et al. 1973). Those who resided on the western portion of Lake Erie during the Late Prehistoric Period were a part of the Sandusky Culture. Referred to as the Fire Nation by the Iroquois, the Sandusky Culture was both a trading and war partner of the Iroquois. There is evidence for increasing violence between Late Prehistoric groups, with some villages surrounded by palisades, and burials with traumatic injury incurred by projectile points (Lepper 2005). Almost 200 years prior to the arrival of Europeans in Ohio, Native American groups came into contact with European trade goods such as glass beads and iron and brass implements, as well as European diseases (Neusius and Gross 2007). At least four sites in close proximity to Davis-Besse have been documented with these European trade goods (the Indian Hills site, the La Salle site, the Petersen site, and the Edwards site). During this Proto-Historic Period, European demand for furs encouraged Native American groups to respond to this need. The Iroquois Tribe, in particular, made trade connections with European groups, forcing out many of the groups along Lake Erie, especially in the fur-rich Great Black Swamp area, in an effort to control the fur trade (Lepper 2005). The area around Davis-Besse, and most of Ohio, saw successive waves of Native American refugees as they were pushed out of their eastern seaboard and southern Appalachian piedmont areas. It is likely that the Wyandot and Ottawa tribes would have used the land in the area of Davis-Besse in this period prior to their forced move west into the area around southern Wisconsin by the Iroquois Confederation (Lepper 2005; Tanner 1987).

During the historic period, Native American groups continued to live in the area around Davis-Besse, trading with Europeans and colonists. The Euro-American presence continued to press into the territory occupied by the Native Americans, constructing trading posts and forts near Lake Erie. The area around present day Sandusky was home to both a French and British fort, as well as a French trading post during the mid-18th century (Tanner 1987). Three Wyandot settlements were also in the Sandusky region at the same time, and other Native American villages were located along the Maumee River to the north of Davis-Besse (Tanner 1987). Native American groups continued to fight back against the white settlement for their territory. This conflict came to a head at the Battle of Fallen Timbers along the Maumee River, just outside of Perrysburg, OH, west of Davis-Besse. The infamous General “Mad Anthony” Wayne commanded the American forces and engaged the Native Americans on August 20, 1794. The American forces drove the Native Americans from the battlefield, after which they fled to Fort Miamis and were denied refuge by the British forces. The Treaty of Greenville was signed the following year; it secured the Ohio and the Northwest Territory for the U.S. and allowed additional settlement by American pioneers (Ohio History Central 2005). By the 1830s, white populations had pushed the Native American groups out of the area currently occupied by Davis-Besse. The influx of white settlers was precipitated by the construction of the Erie Canal in 1825, which facilitated settlement of the western portion of the lake (Tanner 1987). The construction of the Maumee and Western Reserve Road, connecting Perrysburg to Fremont, OH, through the Great Black Swamp, also helped settlers migrate to the area. Initially, this road was a trail used by Native Americans, but, after several treaties, the 31-mi (50-km) long road was ceded to the U.S. Government by 1808. The road was used heavily during the War of 1812 and became a part of the “Great Trail” that connected Pittsburgh to Detroit. By 1827, the road had been improved enough so as to make it relatively passable for wagons, but, after a few years, its condition worsened. The road became notorious for its difficult conditions. It was given the nickname “Mud Pike,” and, consequently, several taverns were constructed along the route to service the troubled travelers. In the 1840s, the road was improved and made a toll road, after extensive draining of the Great Black Swamp took place (Coleman 2002).

As settlement continued, the area around Davis-Besse was used for agriculture. The early settlers drained the Great Black Swamp, put in several ditches, drain tiles, and removed trees; this turned the area into the fertile farm region that it is today.

In 1907, the U.S. National Guard Camp Perry was established, about 5 mi (8 km) to the southeast of Davis-Besse. The camp is named for Oliver Hazard Perry, a hero of the War of 1812, and it maintains the largest outdoor firing range in the world. During the First World War, officers and marksmen were trained there, and, during the Second World War, German and Italian prisoners were kept there. Today, the camp is home to the 213th Ordinance Company, the 200th Civil Engineering Squadron, the 372nd Missile Maintenance Company Detachment 1, the U.S. Coast Guard Port Security Unit 309, and the Ohio Naval Reserve. Since 1907, Camp Perry has hosted the "World Series of the Shooting Sports," a marksmanship event that boasts more than 4,000 participants (Ohio History Central 2008). The former Erie Army Depot takes up the rest of the area around Camp Perry, consisting of a privately owned industrial park and the Locust Point Anti-Aircraft Artillery Firing Area (LPAAAFA).

The LPAAAFA was an artillery training area located on the edge of Lake Erie used by the 371st Anti-Aircraft Artillery Group of the U.S. Army Ohio National Guard. In February of 1953, approximately 69 ac (28 ha) that would be used as the LPAAAFA was leased by the U.S. Army from the state of Ohio, and, in August of 1963, the land was transferred to private owners when the LPAAAFA was closed. A portion of the land occupied by the LPAAAFA extended from the coast of Lake Erie inland about 0.5 mi (0.8 km) adjacent to what is now the canal associated with Davis-Besse. The area associated with the LPAAAFA has been assessed for hazards and has been subsequently cleared; however, there is potential for Davis-Besse personnel to encounter remnants of Department of Defense (DoD) activities, including unexploded ordnance, on their property. There were three associated firing points for the LPAAAFA; two points within Davis-Besse property north of the Toussaint River along the shore of Lake Erie and a third point, a short guard tower, on the Camp Perry property, also along the Lake Erie shoreline. Each firing point location consisted of a 50-ft (15.2-m) tall safety tower equipped with a siren and horn, none of which are still in existence. During the 10-year period of use, guardsmen would use remote controlled aerial targets as well as towed targets for training, impacting 93,585 ac (37,873 ha) in the lake (ACE 2010).

On July 31, 1978, Davis-Besse began commercial operation, servicing customers in the Great Lakes region. Consisting of one reactor, the site sits on 954 ac (390 ha), much of which is leased by the FWS for use as the Ottawa National Wildlife Refuge.

2.2.10.2 Historic and Archaeological Resources

Davis-Besse encompasses 954 ac (390 ha) of land. Disturbed areas include the power block area, borrow pits, and quarry. Undisturbed areas include approximately 733 ac (297 ha) of marshland and additional maintained lands within the owner-controlled perimeter on the south side, a portion of the east side (to the south) and along the western side (south of the Davis-Besse railroad). An exact acreage of this land was not available. The Ottawa National Wildlife Refuge encompasses much of the marshland area and is managed by the FWS. Prior to the construction of the site, the area had been cleared, drained, and farmed since the 19th century. The land area adjacent to the Davis-Besse property is still used mainly for agricultural purposes, and directly west of Davis-Besse is the State of Ohio Magee Marsh Wildlife Area.

The parcel of land on which Davis-Besse is situated has not been surveyed for archaeological resources; however, the Ohio Archaeological Society and the Ohio State Historic Preservation Office (SHPO) had concluded that no archaeological resources would be affected by the plant's construction (AEC 1973). This is likely due to the fact that the area in and around Davis-Besse is a marshy wetland, and, consequently, the potential for significant cultural resources in this area is low. The western portion of Davis-Besse was cleared, drained, and farmed during the 19th century, and during construction of the main power block, the ground surface was graded up to an elevation of 6 to 12 ft (1.8 to 3.7 m) above the original surface grade. Consequently, the potential for significant archaeological resources in this area is also low. However, because no archaeological surveys have been conducted in and around Davis-Besse, the potential for the presence of unrecorded cultural resources remains. It should be noted that Nappanee soils are present in the southwestern portion of Davis-Besse property, and based on the model proposed by Murphy (1988), there is potential for archaeological materials at those locations. Additionally, the southwest portion of the property is also potentially undisturbed. One known cultural resource is located on Davis-Besse property. The Refuge Site, 33-OT-25, is situated on a small peninsula of dry land in the marshy area of the southeast corner of the property. This is a historic site consisting of nails, glass mason jar fragments, and a kaolin pipe fragment that has been determined to be ineligible for listing in the National Register of Historic Places (NRHP). It was also noted in discussions with the applicant that one pre-plant structure may still be in existence on the Davis-Besse site. It was indicated that a house and barn were originally on the site; the house had been moved at the time of construction, but the barn was kept in place. The barn has subsequently been re-sided. It is located in the undisturbed portion of the site within the owner-controlled area.

A recent query in the Ohio Historic Preservation Office's online mapping system by NRC staff identified 14 archaeological surveys have been conducted within 6 mi (10 km) of Davis-Besse. Additionally, within this 6-mi (10-km) radius, 378 properties (archaeological sites, historic structures, and cemeteries) were identified. Of those properties, 99 archaeological sites were recorded, of which 71 are prehistoric, 15 are historic, and 13 are multicomponent, having both prehistoric and historic elements. Four of the properties have been determined eligible for listing in the NRHP—sites 33-OT-88, 33-OT-91, 33-OT-141, and a historic structure located in Oak Harbor. In addition, there are 32 properties listed in the NRHP in Ottawa County, OH; however, only one, Carroll Township Hall, is located within 6 mi (10 km) of Davis-Besse (NPS 2011). Carroll Township Hall is within view of Davis-Besse.

2.3 Related Federal and State Activities

The NRC staff reviewed the possibility that activities of other Federal agencies might impact the renewal of the operating license for Davis-Besse. There are no Federal projects that would make it necessary for another Federal agency to become a cooperating agency in the preparation of this draft SEIS. There are no known American Indian lands within 50 mi of Davis-Besse; however, eight tribes were identified to have potential interests in the surrounding area. The tribes identified and contacted during the scoping period are the Delaware Nation, Forest County Potawatomi Community, Hannahville Indian Community Council, Miami Tribe of Oklahoma, Shawnee Tribe, Wyandotte Nation, Peoria Tribe of Indians of Oklahoma, and Ottawa Tribe of Oklahoma.

Federally owned facilities within 50 mi of Davis-Besse are listed below:

- U.S. National Guard Camp Perry—5 mi,
- Ottawa National Wildlife Refuge and Visitors Center—6 mi, and
- Cedar Point National Wildlife Refuge—13 mi.

2.3.1 Coastal Zone Management Act

In the U.S., coastal areas are managed through the Coastal Zone Management Act of 1972 (CZMA). The Act, administered by NOAA's Office of Ocean and Coastal Resource Management, provides for management of the Nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. Federal consistency is the CZMA requirement where Federal agency activities that have reasonably foreseeable effects on any land or water use or natural resource of the coastal zone must be consistent to the maximum extent practicable with the enforceable policies of a coastal state's Federally approved Coastal Management Program. The Federal consistency regulations implemented by the NOAA are contained in 15 CFR Part 930. This law authorizes individual states to develop plans that incorporate the strategies and policies they will employ to manage development and use of coastal land and water areas. NOAA must approve each plan. One of the components of an approved plan is "enforceable policies," by which a state exerts control over coastal uses and resources (NOAA 2011a, 2011b).

NOAA approved the Ohio Coastal Zone Management Program in May 1997. In Ohio, the approved program is the Ohio Coastal Management Program (OCMP), which was authorized by the Ohio General Assembly passage of the Ohio Coastal Management Law in 1988. Davis-Besse, located in Ottawa County, is within the OCMP. Accordingly, FENOC has contacted the Ohio Department of Natural Resources. The applicants ER illustrated the activities considered to have a direct and significant impact on the coastal lands. It reflects 30 of the 41 policies in the OCMP that FENOC has deemed enforceable pursuant to Title 15 of the Ohio Revised Code, "Conservation of Natural Resources" (FENOC 2010c).

2.4 <u>References</u>

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10 CFR Part 60. *Code of Federal Regulations,* Title 10, *Energy,* Part 60, "Licensing Requirements for Land Disposal of Radioactive Waste."

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40 CFR Part 239, et seq. *Code of Federal Regulations*, Title 40, Protection of Environment, Chapter I, Environmental Protection Agency, Subchapter I, "Solid Wastes."

40 CFR Part 260. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 260, "Hazardous Waste Management System: General."

40 CFR Part 261. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 261, "Identification and Listing of Hazardous Waste."

40 CFR Part 262. *Code of Federal Regulations*. Title 40, *Protection of Environment*, Part 262, "Standards Applicable to Generators of Hazardous Waste."

40 CFR Part 266. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 266, "Storage, Treatment, Transportation, and Disposal of Mixed-Waste."

40 CFR Part 273. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 273, "Standards for Universal Waste Management."

50 CFR Part 10. *Code of Federal Regulations*, Title 50, *Wildlife and Fisheries*, Part 10, "General Provisions."

50 CFR Part 20. *Code of Federal Regulations,* Title 50, *Wildlife and Fisheries,* Part 20, "Eagle Permits."

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3.0 ENVIRONMENTAL IMPACTS OF REFURBISHMENT

Facility owners or operators may need to undertake or, for economic or safety reasons, may choose to perform refurbishment activities in anticipation of license renewal or during the license renewal term. The major refurbishment class of activities characterized in the generic environmental impact statement (GEIS) (NRC 1996; 1999) is intended to encompass actions that typically take place only once in the life of a nuclear plant, if at all. Examples of these activities include, but are not limited to, replacement of recirculation piping in boiling-water reactors or replacement of steam generators in pressurized-water reactors. These actions may have an impact on the environment beyond those that occur during normal operations and may require evaluation, depending on the type of action and the plant-specific design. As described in Chapter 1, the NRC published a final rule (78 FR 37282) revising its environmental protection regulations in 10 CFR Part 51 and issued a revised GEIS. However, the environmental impacts of refurbishment activities for Davis-Besse were reviewed in accordance with the 1996 rule and GEIS (NRC 1996, 1999). Table 3.1-1 lists the environmental issues associated with refurbishment that the U.S. Nuclear Regulatory Commission (NRC) staff (the staff) determined to be Category 1 issues in the GEIS.

Table 3.1-1. Category 1 Issues Related to Refurbishment

Issue	GEIS Section(s)
Surface water quality, hydrology, and use (for all plants)	
Impacts of refurbishment on surface water quality	3.4.1
Impacts of refurbishment on surface water use	3.4.1
Aquatic ecology (for all plants)	
Refurbishment	3.5
Groundwater use and quality	
Impacts of refurbishment on groundwater use and quality	3.4.2
Land use	
Onsite land use	3.2
Human health	
Radiation exposures to the public during refurbishment	3.8.1
Occupational radiation exposures during refurbishment	3.8.2
Socioeconomics	
Public services: public safety, social services, and tourism and recreation	3.7.4; 3.7.4.3; 3.7.4.4; 3.7.4.6
Aesthetic impacts (refurbishment)	3.7.8

Source: Table B–1 in Appendix B, Subpart A, to 10 CFR Part 51.

Table 3.1-2 lists environmental issues related to refurbishment that the NRC staff determined to be plant-specific or inconclusive in the GEIS. These issues are Category 2 issues. The definitions of Category 1 and 2 issues can be found in Section 1.4.

Table 3.1-2. Category 2 Issues Related to Refurbishment

Issue	GEIS Section(s)	10 CFR 51.53 (c)(3)(ii) Subparagraph
Terrestrial resources		
Refurbishment impacts	3.6	E
Threatened or endangered species (for all plants)		
Threatened or endangered species	3.9	E
Air quality		
Air quality during refurbishment (non-attainment and maintenance areas)	3.3	F
Socioeconomics		
Housing impacts	3.7.2	I
Public services: public utilities	3.7.4.5	I
Public services: education (refurbishment)	3.7.4.1	I
Public services: transportation	3.7.4.2	J
Offsite land use (refurbishment)	3.7.5	I
Historic and archaeological resources	3.7.7	K
Environmental justice		
Environmental justice[a]	Not addressed	Not addressed

[a] Guidance related to environmental justice was not in place at the time the NRC prepared the GEIS and the associated revision to 10 CFR Part 51. If an applicant plans to undertake refurbishment activities for license renewal, the applicant's Environmental Report (ER) and the staff's environmental impact statement must address environmental justice.

Source: Table B–1 in Appendix B, Subpart A, to 10 CFR Part 51.

Table B.2 of the GEIS identifies systems, structures, and components (SSCs) that are subject to aging and might require refurbishment to support continued operation during the license renewal period of a nuclear facility. In preparation for its license renewal application, FirstEnergy Nuclear Operating Company (FENOC) performed an evaluation of these SSCs pursuant to 10 CFR 54.21 in order to identify the need to undertake any major refurbishment activities that would be necessary to support the continued operation of Davis-Besse during the proposed 20-year period of extended operation. FENOC addressed refurbishment activities in Section 3.2 of its Environmental Report (ER), "Refurbishment Activities," which is included as Appendix E of the license renewal application (FENOC 2010).

The NRC requirements for the assessment of refurbishing in a license renewal of operating nuclear power plants includes the preparation of an integrated plant assessment (IPA) under 10 CFR 54.21. The IPA must identify and list SSCs subject to an aging management review (AMR). Items that are subject to aging and might require refurbishment include, for example, the reactor vessel (RV), piping, supports, and pump casings, as well as those that are not subject to periodic replacement.

3.1 Refurbishment Activities at Davis-Besse

The NRC regulations for implementing the National Environmental Policy Act (NEPA) require ERs to describe in detail and assess the environmental impacts of refurbishment activities, such as planned modifications to SSCs or plant effluents, as stated in 10 CFR 51.53. FENOC replaced the RV head in October 2011, and the two original steam generators will be replaced in 2014. In order to facilitate the most cost-effective method for long-term storage, a new permanent storage facility was constructed in 2011. This storage facility will provide dedicated onsite storage for the vessel head, steam generator, and other large, irradiated plant equipment. A new warehouse to store the new steam generators was started in late 2012 and completed in early 2013. To house the personnel that will support the vessel head replacement and steam generator, a permanent multi-story office building will be constructed adjacent to the auxiliary building.

The activities associated with the vessel head replacement and the construction of the storage facility and multi-story office building are being performed under the current facility-operating license. Thus, the environmental impacts were previously determined under the final environmental statement (FES) for the Davis-Besse operating license.

FENOC considers the activities associated with the replacement of the steam generators and the associated hot leg piping as license renewal refurbishment activities. These construction activities will be performed during an extended refueling outage (RFO), scheduled for the spring of 2014. The duration of the activity is expected to be 70 days.

3.2 Environmental Impacts of Refurbishment

The following sections discuss the Category 2 issues associated with refurbishment activities at Davis-Besse. Any environmental impacts from refurbishment will be in addition to those associated with continued operation of Davis-Besse for the period of license renewal. Chapter 4 of this report discusses those issues.

3.2.1 Terrestrial Resources—Refurbishment Impacts

FENOC's planned refurbishment activities (discussed in Section 3.1) will require FENOC to construct several new buildings and designate areas for decontamination and building material and supplies lay down. The descriptions of terrestrial resources in Section 2.2.6 and protected species and habitats in Section 2.2.7 serve as the basis for the assessment of refurbishment impacts to terrestrial resources contained in this section. The information concerning refurbishment activity timing and logistics was drawn from FENOC's ER (2010). Changes to FENOC's refurbishment plan will be submitted with the annual update to their license renewal application.

Onsite Impacts. FENOC plans to complete all refurbishment activities during an extended RFO in the spring of 2014, which would last approximately 70 days. During the refurbishment period, FENOC would construct temporary and permanent buildings, move heavy equipment and machinery, and create lay down areas on previously disturbed areas within the owner-controlled area of the Davis-Besse site. FENOC estimates that total land disturbance would be less than 10 acres (ac) (4 hectares (ha)).

FENOC has constructed or plans to construct the following refurbishment-related buildings and facilities:

- an 18,000-square foot (ft^2) (740-square meter (m^2)) permanent storage facility to store the current RV head, the original steam generators, and the reactor coolant system (RCS) hot legs;
- an 18,000-ft^2 (1670-square meter (m^2)) permanent structure to house the replacement steam generators until they are installed in the plant;
- a permanent multi-story office building to support the extra personnel required for refurbishment activities; and
- various temporary facilities totaling 68,000 ft^2 (6320 m^2) including tents and portable trailers for fabrication and assembly activities, mock-up activities, weld testing, decontamination, warehouse storage, and lay down areas.

Additionally, FENOC may opt to construct a concrete pad to serve as a base for the temporary buildings described above. If FENOC constructs a concrete pad, the pad would remain on the site as a permanent structure following the completion of refurbishment activities.

All land that would be disturbed for construction and other refurbishment-related activities is previously disturbed and currently maintained as parking lots or other paved surface or as landscaped areas that are regularly mowed. Because of this, no terrestrial habitat would be affected by refurbishment. Some sediment transport or erosion may occur during construction. Some wildlife in neighboring marsh and grassland habitat would likely avoid habitat margins during the refurbishment period due to increased noise and lighting, which would reduce the available habitat for those species. Edges species would be affected more than interior species. Because refurbishment is planned for the spring, construction activities could affect the nesting behavior of certain bird species. However, these impacts would be short-term because the refurbishment period will only last for about 70 days. Additionally, all nesting birds would benefit from the protective measures that FENOC follows regarding the bald eagle (*Haliaeetus leucocephalus*) and its nesting season (discussed below under "Protected Species and Habitats").

Onsite impacts to terrestrial resources would be SMALL. The protective measures in place for bald eagles (discussed below) would benefit all wildlife in the immediate area. Increased noise and lighting may reduce habitat usage for a short time, but no undisturbed land would be immediately impacted; therefore, refurbishment would not result in the long-term conversion or loss of habitat or noticeably alter the behavior of any wildlife populations.

<u>Offsite Impacts</u>. Babcock and Wilcox Canada, Ltd., will transport and deliver the steam generators to the Davis-Besse site via railroad. FENOC noted in their ER that physical modifications to the rail lines might be necessary to safely transport the new steam generators to the site. If rail lines need to be widened or improved, this would likely be contained within the established rail line right-of-way. However, depending on the surrounding habitat, construction activities could lead to loss of habitat, erosion, and altered wildlife behavior. Edge species and nesting birds would be affected more than interior species. Because the extent of offsite impacts is unknown at this stage, the impacts could range from SMALL to MODERATE.

<u>Protected Species and Habitats</u>. As discussed in Section 2.2.7, the U.S. Fish and Wildlife Service (FWS) identified two bald eagle nests that are located on the Davis-Besse site—one within Navarre Marsh and one northwest of the cooling tower near the site boundary (FWS 2010). FENOC's (2011) environmental best management practices specify that no ground disturbing activity, tree clearing, or habitat modification occur within 660 feet (ft) (200 meters (m)) of any bald eagle nest from January 1 through July 31. If activities are

planned during this timeframe, FENOC's procedures require them to coordinate with the FWS prior to taking action (FENOC 2011). Additionally, the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §668-668c), prohibits the taking of eagles without a FWS-issued eagle permit. Taking includes any action or activity that decreases an eagle's productivity by interfering with breeding, feeding, or sheltering behavior or any activity that results in an eagle abandoning its nest (50 CFR 22.3). Because the refurbishment activities would likely be within a 660 ft (200 m) radius of one or more bald eagle nest, FENOC would have to consult with the FWS prior to beginning refurbishment activities in the spring of 2014 to ensure that the appropriate mitigation measures are taken to minimize adverse impacts to bald eagles during the 70-day refurbishment period.

FENOC also maintains procedures concerning the Indiana bat (*Myotis sodalis*) (discussed in Section 2.2.7). If any Indiana bats inhabit natural areas on the Davis-Besse site, these individuals may avoid the area for a short period during refurbishment activities due to increased noise and lighting. However, because FENOC will not remove trees as part of the refurbishment activities, the NRC staff does not anticipate any measurable impacts to the Indiana bat.

None of the refurbishment activities are expected to impact any other Federally listed species, migratory birds, or State-listed species. Many State-listed plant species are known to occur on the Davis-Besse site (discussed in Section 2.2.7), but, because only previously disturbed land would be involved in refurbishment activities, no State-protected plants would be affected. State-listed animals that are known to occur on the site may avoid the immediate area and neighboring habitat edges due to construction noise and lighting. No critical habitat is designated in the vicinity of Davis-Besse.

Impacts to protected species and habitats would be SMALL because FENOC has procedures in place to protect the bald eagle, which is the protected species most likely to be affected by refurbishment activities. These protective measures would, in turn, benefit all migratory birds and other protected wildlife in the immediate area. Federally and State-listed plant species would not be impacted because all refurbishment activities would take place on previously disturbed land.

Conclusion. The NRC staff concludes that impacts on terrestrial resources from refurbishment would be SMALL to MODERATE. Some animals, especially nesting birds, may avoid habitats neighboring refurbishment activities due to increased noise and lighting during the 70-day refurbishment period. This impact would reduce the available habitat for a short time for certain animal populations. If any refurbishment activities are planned within 660 ft (200 m) of any bald eagle nest, FENOC would have to consult with the FWS regarding impacts to bald eagles and potential mitigation measures to reduce or avoid impacts. Offsite impacts will vary depending on the necessity to widen or improve rail lines to transport the steam generators to the Davis-Besse site. Potential mitigation measures that could reduce impacts to terrestrial resources during the refurbishment period include installing silt fences to minimize sediment transport and the use of best management practices, such as those currently in place regarding the bald eagle and Indiana bat.

3.2.2 Threatened and Endangered Species

Section 3.1.1 discusses FENOC's planned refurbishment activities. The description of protected species and habitats in Section 2.2.7 serves as the basis for the assessment of refurbishment impacts to protected species and habitats contained in this section. The information concerning refurbishment activity timing and logistics was drawn from FENOC's ER (2010).

Terrestrial Species and Habitats. Section 3.2.1 discusses terrestrial protected species and habitats and concludes that the impacts to these species would be SMALL because refurbishment activities would take place on previously disturbed areas of the site and would occur for only a short time (approximately 70 days). Additionally, impacts to the bald eagle, which is the most likely protected species to be affected by refurbishment activities, would be mitigated by the protective measures identified in FENOC's (2011) environmental best management practices and by the bald eagle permit regulations (50 CFR Part 22) implementing the Bald and Golden Eagles Protection Act.

Aquatic Species and Habitats. Aquatic protected species and habitats, identified in Section 2.2.7, would not be affected by any refurbishment activities on the Davis-Besse site because FENOC does not anticipate any in-water work as part of refurbishment, and the replacement steam generators will be transported overland by rail (versus over-water barge).

Conclusion. The NRC staff concludes that the impacts to protected species and habitats from refurbishment would be SMALL. Refurbishment is most likely to affect bald eagles. However, if any refurbishment activities are planned within 660 ft (200 m) of any bald eagle nest, FENOC would have to consult with the FWS regarding impacts to bald eagles and potential mitigation measures to reduce or avoid impacts.

3.2.3 Housing Impacts—Refurbishment

Employment-Related Housing Impacts. Housing impacts is a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes the following:

> Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development.

FENOC estimates that steam generator replacement would require a one-time increase in the number of RFO workers for up to 70 days at Davis-Besse. Approximately 900 additional workers would be needed to perform replacement activities in addition to the normal number of RFO workers (FENOC 2010).

Conclusion. The number of additional workers would cause a short-term increase in the demand for temporary (rental) housing units in the vicinity of Davis-Besse, beyond what is normally experienced during RFOs. Since Davis-Besse is located in a high-population area, and the number of available housing units has kept pace or exceeded changes in county populations (see Section 2.2.8.5), the additional number of workers would have no noticeable effect on the availability of rental housing. Due to the short duration of the replacement activity and the availability of housing in the region, employment-related housing impacts would be SMALL.

3.2.4 Public Services: Public Utilities—Refurbishment

Water Supply. Public utilities are a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes that, "[a]n increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability."

Davis-Besse acquires potable water from the Carroll Township Water System, which has an excess capacity of 700,000 gallons per day (FENOC 2010). Hydro-demolition, if used, could require up to approximately 230,000 gallons of water per day, which is approximately one-third of the excess capacity of the Carroll Township Water Supply System. Coordination between Davis-Besse and Carroll Township Water Supply personnel during hydro-demolition could minimize the impact of this potential increased demand in water use at Davis-Besse (FENOC 2010).

As discussed in Section 3.2.4, steam generator replacement at Davis-Besse would require a one-time increase in the number of RFO workers for up to 70 days. The additional number of RFO workers needed to replace the steam generator would cause a short-term increase in the amount of public water and sewer services used in the immediate vicinity of Davis-Besse.

Conclusion. Since there is no water shortage in the region, and the public water systems located in the four counties have excess capacity, any changes in demand for public water from the additional number of workers at Davis-Besse would have no noticeable effect on water supply availability in the four counties. As a result, the impacts to public utilities would be SMALL.

3.2.5 Public Services: Education—Refurbishment

Educational Services. Education is a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes that, "[m]ost sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors."

Conclusion. As discussed in Section 3.2.4, steam generator replacement at Davis-Besse would require a one-time increase in the number of workers at the station during the RFO for up to 70 days. Because of the short duration of the replacement activity, families and school age children would not accompany the workers; therefore, there would be no impact on educational services during the extended RFO.

3.2.6 Offsite Land Use—Refurbishment

Land Assessment. Offsite land use is a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes that, "[i]mpacts may be of moderate significance at plants in low population areas."

Since Davis-Besse is in a high-population area, any changes in employment would have no noticeable effect on offsite land use in the region. Because of the short duration of the replacement activity, the additional number of RFO workers is not expected to cause any permanent changes in population and tax-revenue-related offsite land use in the immediate vicinity of Davis-Besse. Nevertheless, the replacement of the existing steam generators could increase the assessed value of Davis-Besse, and property tax payments to Ottawa County, Carroll Township could increase. However, it is expected that any increase in assessed property value would be small because the station improvement is replacing existing equipment.

Conclusion. Since FENOC's tax payments to Ottawa County are a small percentage (around 6 percent per year) of the total annual county operating budget, the incremental contribution and resulting impact to the county's tax revenue—even with an increased assessment—would have no noticeable effect on offsite land use.

3.2.7 Public Services: Transportation—Refurbishment

Traffic Flow. Transportation is a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes the following:

> Transportation impacts (level of service) of highway traffic generated during plant refurbishment and during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites.

As previously discussed in Section 2.2.8.2, commuting routes to Davis-Besse via State Highway 2 are in rural and uncongested areas. According to FENOC, increased traffic volumes entering and leaving Davis-Besse during RFOs, which occur at intervals of approximately 24 months, has not degraded the level of service capacity on local roads. Portable flashing caution and warning signs on State Route 2 are needed to slow traffic during outages to allow site traffic exiting the station to merge safely into traffic flow on State Route 2 (FENOC 2010).

Conclusion. Due to the information presented in the ER, the short duration of the replacement activity (up to 70 days), and given that the steam generator replacement would occur during an extended RFO, transportation (level of service) impacts would be SMALL.

3.2.8 Historic and Archaeological Resources

National Register-Eligible Historic or Archeological Resources. Historic and archeological resources are a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes the following:

> Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether there are properties present that require protection.

FENOC has not proposed any new facilities, service roads, or transmission lines to support continued operations at Davis-Besse. However, as discussed in Section 3.1, FENOC plans to replace Davis-Besse steam generators in 2014. Ground disturbance would be limited to the construction of temporary and permanent concrete pads, temporary buildings to support construction activities, a permanent storage facility to house the retired steam generators, and a permanent multi-story office building. Construction of the steam generator storage facility and office building occurred in 2011. All construction activities have occurred or would occur on land that was previously disturbed during the construction of Davis-Besse. In addition, existing onsite rail lines may be improved for the transport of new steam generators (FENOC 2010).

The transport of the new steam generators to Davis-Besse would make use of existing infrastructure with little or no additional offsite land disturbance. The replacement generators would travel by rail and barge and, after delivery, would be transported over an existing service road by a heavy-duty, self-propelled modular transporter. A load-haul path, consisting of fill and gravel, would be constructed onsite to haul the old steam generators to the permanent storage facility (FENOC 2010).

Conclusion. Steam generator replacement would not adversely impact any known historic or archeological resources on or in the vicinity of Davis-Besse as all activities are taking place on land that was previously disturbed during the construction of Davis-Besse. Furthermore, FENOC has formal guidelines in its *Environmental Procedure* (NOP-OP-2010 Revision 5) for protecting historic and archaeological resources prior to ground-disturbing activities. Therefore, impacts from this activity on National Register-eligible historic or archeological resources are SMALL.

3.2.9 Environmental Justice—Refurbishment

Environmental Justice. Environmental justice is a Category 2 refurbishment issue. Table B-1 of Appendix B to 10 CFR Part 51, Subpart A, notes that, “[t]he need for and the content of an analysis of environmental justice will be addressed in plant specific reviews.”

Potential impacts to minority and low-income populations from refurbishment-related plant modifications (steam generator replacement) at Davis-Besse would mostly consist of environmental and socioeconomic effects (e.g., noise, dust, traffic, employment, and housing impacts). Radiation doses from plant operations after steam generator replacement are expected to remain at current levels and well within regulatory limits.

Noise and dust impacts during steam generator replacement would be short-term and limited to onsite activities at Davis-Besse. Construction activities associated with steam generator removal would likely increase noise levels at the station (primarily from hydro-demolition, if used, or other mechanical means of concrete removal) greater than those associated with normal reactor operations at Davis-Besse. The loudest noise from construction activities, however, would be intermittent and relatively brief, and noise levels would decrease as the distance from the noise source increases.

Minority and low-income populations residing along site access roads would experience increased commuter vehicle traffic during RFO shift changes. In addition, increased demand for rental housing in the vicinity of Davis-Besse during the RFO and steam generator replacement could disproportionately affect low-income populations. However, due to the short duration of this refurbishment activity and the availability of rental housing in the four-county region of interest (ROI), any impact experienced by low-income populations would be short-term and limited. According to the American Community 3-year Estimate Survey 2007–2009, there were over 40,000 vacant housing units in Ottawa, Lucas, Wood, and Sandusky Counties (USCB 2010).

Conclusion. Due to the short duration of the replacement activity, and based on the analysis of impacts for the other resource areas discussed in Section 3.2, impacts to minority and low-income populations living near Davis-Besse would be temporary and not disproportionately high and adverse.

3.2.10 Air Quality

Air quality during refurbishment (non-attainment and maintenance areas) is a Category 2 issue[1]. Table B-1 of Appendix A to Subpart B, "Environmental Effect of Renewing the Operating License of a Nuclear Power Plant," of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," notes the following:

> Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance statutes of each site and the numbers of workers expected to be employed during the outage.

Specifically, 10 CFR 51.53(c)(3)(ii)(F) requires the following:

> If the applicant's plant is located in or near a nonattainment or maintenance area, an assessment of vehicle exhaust emissions anticipated at the time of peak refurbishment work force must be provided in accordance with the Clean Air Act (CAA) as amended.

The 1996 GEIS states the following:

> The 1990 CAA amendments include a provision that no federal agency shall support any activity that does not conform to a state implementation plan designed to achieve the National Ambient Air Quality Standards (NAAQS) for criteria pollutants (sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter less than 10 μm in diameter). On November 30, 1993, the U.S. Environmental Protection Agency (EPA) issued a final rule (58 FR 63214) implementing the new statutory requirements, effective January 31, 1994. The final rule requires that federal agencies prepare a written conformity analysis and determination for each pollutant where the total of direct and indirect emissions caused by proposed federal action would exceed established threshold emission levels in a nonattainment or maintenance area. An area is designated "nonattainment" for a criteria pollutant if it does not meet the NAAQS for the pollutant. A maintenance area has been redesignated by a State from nonattainment to attainment; the State must submit to EPA a plan for maintaining the NAAQS as a revision to its State Implementation Plan.

Activities associated with refurbishment at Davis-Besse are discussed in Section 3.1. Minor and short-duration air quality impacts can be expected to occur during the steam generator replacement project activities. As described in the ER (FENOC 2010), the applicant identified the need to construct a new steam generator storage facility to support site refurbishment activities. In the interim, construction of this new, permanent facility was completed in 2011. The main contributors to air quality impacts associated with completed and ongoing refurbishment activities would be fugitive dust generation from facility construction activities,

[1] As described in Section 1.4 of this SEIS, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions" (NRC 2012). With respect to air quality, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by changing "Air Quality during refurbishment (non-attainment and maintenance areas)" issue from, a Category 2 to a Category 1 issue and renamed, "Air Quality impacts (all plants)." This Category 1 issue, "Air Quality impacts (all plants)," has an impact level of SMALL. There was no change to the Category 1, "Air Quality effects of transmission lines" issue. The NRC staff performed its review of air quality issues in accordance with the 1996 GEIS (NUREG-1437) and rule for this issue.

refurbishment work to open the shield building and containment vessel to replace the steam generators and related equipment, and exhaust emissions from motorized equipment and vehicles of temporary workers. Best management practices in accordance with FENOC and site procedures will be implemented to minimize the amount of fugitive dust (FENOC 2010). Additionally, fugitive emissions and exhaust emission from motorized equipment will be temporary and short term.

As discussed in Section 2.2.2.1, Davis-Besse is located in Ottawa County, which is part of the Sandusky Intrastate Air Quality Control Region (AQCR) (40 CFR 81.203). Ottawa County is designated in attainment for CO, Pb, NO_2, PM_{10}, $PM_{2.5}$ and is not designated for SO_2 (OEPA 2013). Lucas and Wood Counties abutting Ottawa County to the north and west, respectively, are designated as maintenance areas for 1997 8-hour ozone NAAQS (EPA 2013). The nearest nonattainment area is Monroe County, Michigan, for $PM_{2.5}$ NAAQS; Monroe County is also designated as a maintenance area for 1997 8-hour ozone NAAQS (EPA 2013). Wood County is about 17 miles from Davis-Besse (distance can range from 17 to 51 miles), Lucas County is about 5 miles from Davis-Besse (distance can range from 5 to 43 miles), and Monroe County is about 21 miles from Davis-Besse (distance can range from 21 to 49 miles).Refurbishment activities will require an estimated additional 900 workers (FENOC 2010). As noted in the ER, 74 percent of Davis-Besse employee's reside in Ottawa County (37.2 percent), Lucas County (19.8 percent), Wood County(15.5 percent) and Monroe County (1.4 percent) (FENOC 2010). Therefore, it can be expected that the additional workforce would reside in these counties, which are within the 50-mile radius of Davis-Besse (see distances above). Consequently, it is assumed that the additional workforce needed would travel from areas within the 50-mile radius of Davis-Besse and that each of the 900 workers would travel 100 miles daily commuting to and from Davis-Besse. This would result in an additional 900 vehicles and 90,000 vehicle miles per day within the region. In 2011, the average number of vehicle miles traveled within Lucas, Wood, and Monroe counties was 6,940,080, 4,807,420 and 3,172,149 per day, respectively (MDOT 2013; ODOT 2013). The additional number of vehicle miles that would be traveled in the region per day during refurbishment represents 1.3, 1.87, and 2.83 percent of the total miles traveled daily in Lucas, Wood or Monroe County, respectively. Because the additional workforce would travel from all over the 50-mile region and not necessarily have a 100-mile roundtrip commute, this projected increase in miles traveled daily for each county is conservative. As noted above, Lucas, Wood, and Monroe counties are designated maintenance areas for 1997 8-hour ozone NAAQS, and Monroe County is a nonattainment area for $PM_{2.5}$ NAAQS. The increase in emissions for each of these pollutants resulting from the additional workforce was estimated to determine if emissions would be likely to exceed established threshold emission levels in a non-attainment or maintenance area. Ozone is formed when NO_x and VOCs combine in the presence of heat and sunlight; hence, VOCs and NO_x are precursors that contribute to the formation of ozone. $PM_{2.5}$ can be emitted directly as well as indirectly as a result of chemical reactions of gases (NO_x, SO_2, VOCs, and ammonia) that form $PM_{2.5}$. The Michigan Department of Environmental Quality (MDEQ) has determined that SO_2 and NO_x are the main precursors of $PM_{2.5}$; therefore, only direct $PM_{2.5}$, NO_x, and SO_2 from vehicle emissions are analyzed in the assessment below (MDEQ 2008). Replacement of Davis-Besse's steam generators, with work estimated to commence in February 2014, is estimated to be completed within 70 days. Therefore, the total vehicle miles during the steam generator replacement and RFO would be 6.3 million miles (assuming a daily 100-mile roundtrip commute as discussed above). It is estimated that the additional 6.3 million miles would result in an additional 12.54 tons of VOCs, 24.62 tons of NO_x, 0.54 tons of SO_2, and 0.76 tons of $PM_{2.5}$ (direct emissions) being emitted, which do not exceed the de minimis levels of 100 tons per year of NO_x, 50 tons per year of VOCs for ozone maintenance areas, 100 tons per year of direct emissions of $PM_{2.5}$, 100 tons per year of SO_2, and 100 tons per year of for $PM_{2.5}$ maintenance areas set forth in 40 CFR 93.153(b).

Additionally, a screening analysis in the 1996 GEIS determined that emissions from 2,300 vehicles over a 9 month refurbishment period may exceed the thresholds for carbon monoxide, oxides of nitrogen, and VOCs in non-attainment and maintenance areas and that the amount of road dust generated by the vehicles traveling to and from the work site would exceed the threshold for PM_{10} in serious non-attainment areas. Consequently, vehicular emissions that will result from the additional 900 workers for 70 days will not be significant. On this basis, the NRC staff concludes that the impact of vehicle exhaust emissions associated with steam generator replacement activities would be SMALL.

3.3 Evaluation of New and Potentially Significant Information on Impacts of Refurbishment

The NRC staff reviewed the information presented in the Davis-Besse ER, supporting documentation, and information gathered during the site audits and interviews. During the review, the staff did not identify any new and significant information that would affect the conclusion presented in the ER. The staff does not expect that the environmental impacts caused by Davis-Besse during the renewal term will be beyond those that occur during the normal plant operations. Therefore, the NRC staff adopts the findings in the GEIS for Category 1 issues associated with refurbishment and concludes that there would be no environmental impacts during the renewal term beyond those discussed in the GEIS for these issues.

3.4 Summary Impacts of Refurbishment

For all but one of the eight Category 2 issues and environmental justice, the impacts of refurbishment at Davis-Besse range from unnoticeable impacts to a SMALL impact. The NRC staff concludes that there would be a SMALL impact for the following refurbishment issues:

- Threatened or Endangered Species,
- Offsite Land Use,
- Historic and Archeological Resources, and
- Air Quality.

The NRC staff concludes that the potential environmental effects are unnoticeable to SMALL for the following refurbishment issues:

- Housing Impacts,
- Public Services: Education,
- Public Services: Public Utilities, and
- Public Services: Transportation.

The NRC staff concludes that the potential environmental impacts to terrestrial resources are SMALL to MODERATE.

3.5 References

10 CFR Part 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, “Domestic Licensing of Production and Utilization Facilities.”

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 54. *Code of Federal Regulations*, Title 10, *Energy*, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

50 CFR Part 22. *Code of Federal Regulations*, Title 50, *Wildlife and Fisheries*, Part 22, "Eagle Permits."

Bald and Golden Eagles Protection Act of 1940, as amended, 16 U.S.C. § 668–668c.

[EPA] U.S. Environmental Protection Agency. 2013. The Green Book Nonattainment Areas for Criteria Pollutants. Updated on December 14, 2012. Available URL: <http://www.epa.gov/oaqps001/greenbk/> (accessed 4 March 2013).

[FENOC] FirstEnergy Nuclear Operating Company. 2010. "Davis-Besse Nuclear Power Station License Renewal Application," Toledo, OH, August 2010, Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML102450572

[FENOC] FirstEnergy Nuclear Operating Company. 2011. Letter from Barry S. Allen, to Document Control Desk, NRC. Subject: Davis-Besse Nuclear Power Station, Unit No.1, Docket No. 50-346, License Number NPF-3, "Reply to Requests for Additional Information for the Review of the Davis-Besse Nuclear Power Station. Unit No.1. License Renewal Application (TAC No. ME4613) Environmental Report." May 27. ADAMS Accession No. ML111930294.

[FWS] U.S. Fish and Wildlife Service. 2010ms. E-mail from Seymour M, Wildlife Biologist, to Bulavinetz R, NRC. Subject: Federally listed species along Davis-Besse transmission line corridors. September 24, 2010. ADAMS Accession No. ML110730328.

[NRC] U.S. Nuclear Regulatory Commission. 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, NUREG-1437, Washington, D.C., May. ADAMS Accession Nos. ML040690705 and ML040690738.

[NRC] U.S. Nuclear Regulatory Commission. 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, NUREG-1437, Section 6.3, Table 9.1, Volume 1, Addendum 1, Washington, D.C.

[ODOT] Ohio Department of Transportation. 2013. Division of Planning, Office of Technical Services, Daily Vehicle Miles Traveled Report (DVMT). Available URL: http://www.dot.state.oh.us/Divisions/Planning/TechServ/TIM/Pages/DVMT.aspx.

[OEPA] Ohio Environmental Protection Agency. 2013. National Ambient Air Quality Standards—Attainment Status. Available URL: http://www.epa.state.oh.us/dapc/general/naaqs.aspx (accessed 4 June 2013).

[MDEQ] Michigan Department of Environmental Quality. 2008. State Implementation Plan Submittal. Available URL: http://www.michigan.gov/documents/deq/deq-aqd-air-aqe-PM25-SIP-Final-2008_238092_7.pdf.

[MDOT] Michigan Department of Transportation. 2013. Traffic Monitoring Information System (TMIS), 2011 Traffic Estimates. Available URL: http://mdotnetpublic.state.mi.us/tmispublic/ReportLinks.aspx

[USCB] U.S. Census Bureau. 2010. “American FactFinder, Census 2000 and 2006–2008, 3-Year Estimate, American Community Survey, State and County QuickFacts on Lucas, Sandusky, Ottawa and Wood Counties, Ohio, and Housing Characteristics for 2000 and 2006–2008, 3-Year Estimate.” Available URLs: <http://factfinder.census.gov> and <http://quickfacts.census.gov> (accessed April 2011).

4.0 ENVIRONMENTAL IMPACTS OF OPERATION

This chapter addresses potential environmental impacts related to the period of extended operation of Davis-Besse Nuclear Power Station, Unit No.1, (Davis-Besse). These impacts are grouped and presented according to resource. Generic issues (Category 1) issues rely on the analysis provided in the generic environmental impact statement (GEIS) (NRC 1996, 1999a, 2013a) and are generally discussed briefly. Site-specific issues (Category 2) have been analyzed for Davis-Besse and assigned a significance level of SMALL, MODERATE, or LARGE, accordingly. Some remaining issues are not applicable to Davis-Besse because of site characteristics or plant features. For an explanation of the criteria for Category 1 and Category 2 issues, as well as the definitions of SMALL, MODERATE, and LARGE, refer to Section 1.4 of this supplemental environmental impact statement (SEIS). As also described in Section 1.4, the U.S. Nuclear Regulatory Commission (NRC) has published a final rule (78 FR 37282, June 20, 2013) revising its environmental protection regulation, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." The final rule consolidates similar Category 1 and 2 issues, changes some Category 2 issues into Category 1 issues, and consolidates some of those issues with existing Category 1 issues. The final rule also adds new Category 1 and 2 issues.

As described in Section 1.5 of this SEIS, FENOC submitted its Environmental Report (ER) under NRC's 1996 rule governing license renewal environmental reviews (61 FR 28467, June 5, 1996, as amended), as codified in NRC's environmental protection regulation, 10 CFR Part 51. The 1996 GEIS (NRC 1996) and Addendum 1 to the GEIS (NRC 1999) provided the technical basis for the list of NEPA issues and associated environmental impact findings for license renewal contained in Table B–1 in Appendix B to Subpart A of 10 CFR Part 51. For Davis-Besse, the NRC staff initiated its environmental review in accordance with the 1996 rule and GEIS (NRC 1996, 1999) and documented its findings in this chapter of the SEIS. General references within this SEIS that refer to the "GEIS" without stipulation are inclusive of the 1996 and 1999 GEIS (NRC 1996, 1999). Information and findings specific to the June 2013, final rule (78 FR 37282) and/or the June 2013 GEIS (NRC 2013) are appropriately referenced as such.

4.1 Land Use

Onsite land use issues that could be affected by license renewal are listed in Table 4.1-1. As discussed in the GEIS, onsite land use and powerline right-of-way (ROW) conditions are expected to remain unchanged during the license renewal term at all nuclear plants; thus, impacts would be SMALL. These issues were, therefore, classified as Category 1 issues. Section 2.2.1 of this SEIS describes the land use conditions at Davis-Besse.

Davis-Besse's Environmental Report (ER) (FENOC 2010), scoping comments, and other available data records for Davis-Besse were reviewed and evaluated for new and significant information. The review included a data gathering site visit to Davis-Besse. No new and significant information was identified during this review that would change the conclusions presented in the GEIS. Therefore, for these Category 1 issues, impacts during the renewal term are not expected to exceed those discussed in the GEIS and are SMALL.

Table 4.1-1. Land Use Issues

Issues	GEIS Section	Category
Onsite land use	4.5.3	1
Powerline ROW	4.5.3	1

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.2 Air Quality

As described in Section 1.4 of this SEIS, the NRC approved a revision to its environmental protection regulation, 10 CFR Part 51, “Environmental protection regulations for domestic licensing and related regulatory functions” (NRC 2013). With respect to air quality, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by changing “Air quality during refurbishment (non-attainment and maintenance areas)” issue from a Category 2 to a Category 1 issue and renamed “Air quality impact (all plants).” This Category 1 issue, “Air quality impacts (all plants),” has an impact level of SMALL. There was no change to the Category 1, “Air quality effects of transmission lines” issue. The NRC staff performed its review, as discussed below, of air quality issues in accordance with the 1996 GEIS.

The air quality issues applicable to Davis-Besse are listed in Table 4.2-1. In evaluating the potential impacts on air quality associated with license renewal, the NRC staff uses as its baseline the existing air quality conditions described in Section 2.2.2.1 of this SEIS. These baseline conditions encompass the existing air quality conditions (EPA’s National Ambient Air Quality Standards county designations) potentially affected by air emissions from license renewal. Davis-Besse is located in Ottawa County, which is part of the Sandusky Intrastate Air Quality Control Region (AQCR) (40 CFR 81.203). Ottawa County is designated in attainment for CO, Pb, NO_2, PM_{10}, $PM_{2.5}$ and is not designated for SO_2 (OEPA 2013).

Table 4.2-1. Air Quality Issues

Issue	GEIS Section	Category
Air quality during refurbishment (non-attainment & maintenance areas)	3.3	2
Air quality effects of transmission lines	4.5.2	1

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

Air quality impacts from planned refurbishment activities associated with license renewal is a Category 2 issue. As discussed in Section 3.2.10, refurbishment activities will require an estimated additional 900 workers for 70 days. Exhaust emissions from vehicles of temporary workers can contribute to air quality impacts. Vehicular emissions that will result from the additional 900 workers for 70 days will be temporary and will not be significant. As discussed in Section 3.2.10, the NRC staff concludes that the impact of vehicle exhaust emissions associated with refurbishment activities would be SMALL

For the Category 1 issue of air quality effects of transmission lines, the NRC found that “production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.” The NRC staff did not identify any new and significant information based on review of the ER (FENOC 2010), the public scoping process, or as a result of the environmental site audit that would change the conclusions presented in the GEIS (NRC 1996), and therefore, the NRC staff concludes the impacts are SMALL.

4.3 Geologic Environment

The geologic environment issue related to the Davis-Besse license renewal is listed in Table 4.3-1 (also see Table B-1 of Appendix B of 10 CFR Part 51 (78 FR 37282)). This is a new Category 1 issue that was identified in the 2013 GEIS.

Table 4.3-1. Geologic Environment Issue

Issue	GEIS Section	Category
Geology and Soils	4.4	1

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (78 FR 37282, NRC 2013).

4.3.1 Geology and Soils

As described in Section 1.4 of this SEIS, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions" (NRC 2013). With respect to the geologic environment of a plant site, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 1 issue, "Geology and soils." This new issue has an impact level of SMALL. This new Category 1 issue considers geology and soils from the perspective of those resource conditions or attributes that can be affected by continued operations during the renewal term. An understanding of geologic and soil conditions has been well established at all nuclear power plants and associated transmission lines during the current licensing term, and these conditions are expected to remain unchanged during the 20-year license renewal term for each plant. The impact of these conditions on plant operations and the impact of continued power plant operations and refurbishment activities on geology and soils are SMALL for all nuclear power plants and not expected to change appreciably during the license renewal term. Operating experience shows that any impacts to geologic and soil strata would be limited to soil disturbance from construction activities associated with routine infrastructure renovation and maintenance projects during continued plant operations. Implementing best management practices would reduce soil erosion and subsequent impacts on surface water quality. Information in plant-specific SEISs prepared to date and reference documents have not identified these impacts as being significant.

Section 2.2.3 of this SEIS describes the local and regional geologic environment relevant to Davis-Besse. The NRC staff did not identify any new and significant information with regard to this Category 1 (generic) issue based on review of the ER (FENOC 2010), the public scoping process, or as a result of the environmental site audit. As discussed in Chapter 3 of this SEIS and as identified in the ER (FENOC 2010), FENOC plans to construct new facilities in support of associated refurbishment activities that could affect up to 10 ac (4 ha) of land (see Section 3.2.1). Such activities would require site clearing, grading, ground excavation, and placement of backfill. However, ground-disturbing activities would be confined to previously disturbed areas that currently exist as impervious surface (e.g., parking lots), or are currently maintained as landscaped areas. This work would be performed in accordance with Davis-Besse's stormwater pollution prevention plan (see Section 2.2.4) and associated best management practices to control runoff from disturbed areas and to prevent or significantly mitigate soil erosion and loss. It is also anticipated that plant operation and maintenance activities would be confined to previously disturbed areas or existing ROWs during the license renewal term. Based on this information, it is expected that any incremental impacts on geology and soils during the license renewal term would be SMALL (NRC 2013).

4.4 Surface Water Resources

The surface water issues applicable to Davis-Besse are listed in Table 4.4-1 (also see Table B-1 of Appendix B of 10 CFR Part 51). Surface water use and water quality relative to Davis-Besse are described in Sections 2.1.7.1 and 2.2.4 of this SEIS, respectively.

4.4.1 Generic Surface Water Issues

The NRC staff did not identify any new and significant information based on review of the ER (FENOC 2010), the public scoping process, or the environmental site audit. The NRC staff also reviewed other sources of information such as various permits, assorted applicant files, and data reports. As a result, no information or impacts related to these issues was identified that would change the conclusions presented in the GEIS (NRC 1996). Therefore, it is expected that there would be no impacts related to these Category 1 issues during the period of extended operation beyond those discussed in the GEIS. For these surface water issues, the GEIS concludes that the impacts are SMALL.

Table 4.4-1. Surface Water Use and Quality Issues

Issue	GEIS Section	Category
Altered current patterns at intake & discharge structures	4.2.1.2.1	1
Altered thermal stratification of lakes	4.2.1.2.3	1
Temperature effects on sediment transport capacity	4.2.1.2.3	1
Scouring caused by discharged cooling water	4.2.1.2.3	1
Eutrophication	4.2.1.2.3	1
Discharge of chlorine or other biocides	4.2.1.2.4	1
Discharge of sanitary wastes & minor chemical spills	4.2.1.2.4	1
Discharge of other metals in wastewater	4.2.1.2.4	1

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.4.2 Surface Water Use Conflicts

No Category 2 surface water issues were found to be applicable to the continued operation of the facility, and no further evaluation was performed for Davis-Besse.

4.5 Groundwater Resources

The groundwater issues applicable to Davis-Besse are listed in Table 4.5-1 (also see Table B-1 of Appendix B of 10 CFR Part 51). Groundwater use and water quality relative to Davis-Besse are described in Sections 2.1.7.2 and 2.2.5 of this SEIS, respectively.

Table 4.5-1. Groundwater Use and Quality Issues

Issue	GEIS Section	Category
Groundwater use conflicts (potable & service water; plants that use <100 gallons per minute (gpm))	4.8.1.1	1
Radionuclides released to groundwater	4.5.1.2[a]	2

Issue	GEIS Section	Category
[a]NRC 2013: 78 FR 37282		

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.5.1 Groundwater Use Conflicts

Groundwater is not used at the Davis-Besse plant, and groundwater withdrawal has not taken place since construction phase dewatering. The NRC staff did not identify any new and significant information based on review of the ER (FENOC 2010), the public scoping process, or the environmental site audit that would change the conclusions presented in the GEIS. Therefore, it is expected that were would be no impacts related to this Category 1 issue during the period of extended operation beyond those discussed in the GEIS (NRC 1996). For the single Category 1 (generic) groundwater issue applicable to Davis-Besse, the GEIS concludes that the impact is SMALL.

4.5.2 Radionuclides Released to Groundwater

As described in Section 1.4 of this SEIS, in 2013, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51. With respect to groundwater quality, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 2 issue, “Radionuclides released to groundwater,” with an impact level range of SMALL to MODERATE, to evaluate the potential impact of discharges of radionuclides from plant systems into groundwater. This new Category 2 issue has been added to evaluate the potential impact to groundwater quality from the discharge of radionuclides from plant systems, piping, and tanks. This issue was added because, within the past several years, there have been events at nuclear power reactor sites that involved unknown, uncontrolled, and unmonitored releases of radioactive liquids into the groundwater.

Davis-Besse has had leaks of tritium to onsite groundwater, as described in Section 2.2.5. Tritium-contaminated groundwater has not moved offsite. Identified sources of groundwater leaks were repaired. The highest tritium concentrations reported are well below the U.S. EPA drinking water standard of 20,000 pCi/l (40 CFR 141.66). At the end of 2011, tritium concentrations in all monitoring wells were at or very close to background concentrations. The impact of radionuclides released to groundwater is determined to be SMALL and is expected to remain SMALL during the license renewal term.

4.6 <u>Aquatic Resources</u>

Table 4.6-1 lists the issues related to aquatic resources applicable to Davis-Besse. No Category 2 issues are related to aquatic resources. The NRC staff did not find any new and significant information during the review of the applicant’s ER (FENOC 2010), the site audit, the scoping process, or the evaluation of other available information. As a result, no information or impacts related to these issues was identified that would change the conclusions presented in the GEIS (NRC 1996). Therefore, the NRC staff concludes that there would be no impacts related to these issues beyond those discussed in the GEIS. The GEIS concludes that the impacts are SMALL.

Table 4.6-1. Aquatic Resources Issues

Issue	GEIS Section	Category
For all plants		
Accumulation of contaminants in sediments or biota	4.2.1.2.4	1
Entrainment of phytoplankton & zooplankton	4.2.2.1.1	1
Cold shock	4.2.2.1.5	1
Thermal plume barrier to migrating fish	4.2.2.1.6	1
Distribution of aquatic organisms	4.2.2.1.6	1
Premature emergence of aquatic insects	4.2.2.1.7	1
Gas supersaturation (gas bubble disease)	4.2.2.1.8	1
Low dissolved oxygen in the discharge	4.2.2.1.9	1
Losses from predation, parasitism, & disease among organisms exposed to sublethal stresses	4.2.2.1.10	1
Stimulation of nuisance organisms	4.2.2.1.11	1
Exposure of aquatic organisms to radionuclides	4.6.1.2[a]	1
For plants with cooling tower-based heat-dissipation systems		
Entrainment of fish & shellfish in early life stages	4.3.3	1
Impingement of fish & shellfish	4.3.3	1
Heat shock	4.3.3	1

[a] NRC 2013: 78 FR 37282

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.6.1 Exposure of Aquatic Organisms to Radionuclides

As described in Section 1.4 of this SEIS, in 2013, the NRC approved a revision to its environmental protection regulation, 10 CFR Part 51, governing environmental impact reviews of nuclear power plant operating renewed licenses. With respect to the aquatic organisms, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 1 issue, “Exposure of aquatic organisms to radionuclides,” among other changes. This new Category 1 issue considers the impacts to aquatic organisms from exposure to radioactive effluents discharged from a nuclear power plant during the license renewal term. An understanding of the radiological conditions in the aquatic environment from the discharge of radioactive effluents within NRC regulations has been well established at nuclear power plants during their current licensing term. Based on this information, the NRC concluded that the doses to aquatic organisms are expected to be well below exposure guidelines developed to protect these organisms and assigned an impact level of SMALL.

The NRC staff has not identified any new and significant information related to the exposure of aquatic organisms to radionuclides during its independent review of the applicant’s ER (FENOC 2010) , the site audit, and the scoping process. Section 2.1.2 of this SEIS describes the applicant’s Radioactive Waste Management Program to control radioactive effluent discharges to ensure that they comply with NRC regulations in 10 CFR Part 20. Section 4.9.1

of this SEIS contains the NRC staff's evaluation of Davis-Besse's radioactive effluent and radiological environmental monitoring programs. Based on its evaluation of Davis-Besse's radioactive effluent and radiological environmental monitoring programs, the NRC staff concludes that the impacts from radioactive effluents to aquatic organisms are SMALL. The NRC staff concludes that there would be no impacts to aquatic organisms from radionuclides beyond those impacts contained in the GEIS (NRC 2013) and therefore, the impacts to aquatic organisms from radionuclides are SMALL.

4.7 Terrestrial Resources

The issues related to terrestrial resources applicable to Davis-Besse are discussed in the following sections and listed in Table 4.7-1.

4.7.1 Generic Terrestrial Resources Issues

The NRC did not identify any new and significant information during the review of the applicant's ER (FENOC 2010), the NRC staff's site audit, the scoping process, or the evaluation of other available information that would change the conclusions presented in the GEIS. Therefore, it is expected that there would be no impacts related to these the Category 1 issues beyond those discussed in the GEIS (NRC 1996). For these issues, the GEIS concludes that the impacts are SMALL.

Table 4.7-1. Terrestrial Resources Issues

Issue	GEIS Section	Category
Cooling tower impacts on crops & ornamental vegetation	4.3.4	1
Cooling tower impacts on native plants	4.3.5.1	1
Bird collisions with cooling towers	4.3.5.2	1
Powerline right-of-way management (cutting herbicide application)	4.5.6.1	1
Bird collisions with powerlines	4.5.6.1	1
Impacts of electromagnetic fields on flora & fauna (plants, agricultural crops, honeybees, wildlife, livestock)	4.5.6.3	1
Floodplains & wetland on powerline right-of-ways	4.5.7	1
Exposure of terrestrial organisms to radionuclides	4.6.1.1[a]	1
Effects on terrestrial resources (non-cooling system impacts)	4.6.1.1 [a]	2

[a] NRC 2013: 78 FR 37282

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.7.2 Exposure of Terrestrial Organisms to Radionuclides

As described in Section 1.4 of this draft SEIS, in 2013, the NRC approved a revision to its environmental protection regulation, 10 CFR Part 51, governing environmental impact reviews of nuclear power plant operating renewed licenses (NRC 2013). With respect to the terrestrial organisms, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 1 issue, "Exposure of terrestrial organisms to radionuclides," among other changes. This new issue has an impact level of SMALL. This new Category 1 issue considers the impacts to terrestrial organisms from exposure to radioactive effluents discharged from a nuclear power plant during the license renewal term. An understanding of the radiological conditions in the terrestrial environment from the discharge of radioactive effluents within NRC regulations has been well established at nuclear power plants during their current licensing term. Based on this information, the NRC concluded that the doses to terrestrial organisms are expected to be well below exposure guidelines developed to protect these organisms and assigned an impact level of SMALL.

The NRC staff has not identified any new and significant information related to the exposure of terrestrial organisms to radionuclided during its independent review of Davis-Besse's ER (FENOC 2010), the site audit, and the scoping process. Chapter 2 of this SEIS describes the applicant’s radioactive waste management program to control radioactive effluent discharges to ensure that they comply with NRC regulations. Section 4.9.1 of this SEIS contains the NRC staff’s evaluation of the applicant’s radioactive effluent and radiological environmental monitoring programs. Based on its review of Davis-Besse’s radioactive effluent and radiological environmental monitoring programs, the NRC staff concludes that the impacts from radioactive effluents to terrestrial organisms would be SMALL. The NRC staff concludes that there would be no impact to terrestrial organisms to radionuclides beyond those impacts described in the GEIS (NRC 2013), and therefore, the impacts to terrestrial organisms from radionuclides would be SMALL.

4.7.3 - Effects on Terrestrial Resources (Non-cooling System Impacts)

As described in Section 1.4 of this SEIS, in 2013, the NRC approved a revision to its environmental protection regulation, 10 CFR Part 51. With respect to the terrestrial organisms, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by expanding the Category 2 issue, “Refurbishment impacts,” among others, to include normal operations, refurbishment, and other supporting activities during the license renewal term. This issue remains a Category 2 issue with an impact level range of SMALL to LARGE; however, the final rule renames this issue, “Effects on terrestrial resources (non-cooling system impacts).”

Section 2.2.7 describes the terrestrial resources on and in the vicinity of the plant site and vicinity, and Section 2.2.8 describes protected species and habitats. As discussed in Chapter 3 of this SEIS and described in Section 4.3.1 above, FENOC plans to construct new facilities in support of associated refurbishment activities that could affect up to 10 ac (4 ha) of land. However, ground-disturbing activities would be confined to previously disturbed areas. FENOC (2010) anticipates no new impacts on terrestrial resources because of refurbishment or as a result of operation and maintenance on the plant site or along the in-scope transmission line corridors during the license renewal term. Based on the NRC staff’s independent review, the NRC staff concurs that refurbishment activities and operation and maintenance activities that FENOC might undertake during the renewal term, such as maintenance and repair of plant infrastructure (e.g., roadways, piping installations, onsite transmission lines, fencing, and other security infrastructure), likely would be confined to previously disturbed areas of the Davis-Besse site. Therefore, the NRC staff expects non-cooling system impacts on terrestrial resources during the license renewal term to be SMALL.

4.8 <u>Protected Species and Habitats</u>

Section 2.2.7 of this SEIS describes protected species and habitats in the vicinity of the Davis-Besse site. Table 4.8-1 lists the one Category 2 issue related to protected species and habitats that is applicable to Davis-Besse.

Table 4.8-1. Protected Species Issues

Issue	GEIS Section	Category
Threatened or endangered species	4.1	2

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

This site-specific, or Category 2 issue, requires consultation with the appropriate agencies to determine whether threatened or endangered species are present and whether they would be affected by continued operation of Davis-Besse during the license renewal term. In the case of Davis-Besse, the U.S. Fish and Wildlife Service (FWS) is responsible for terrestrial and freshwater species listed under the Endangered Species Act (ESA), the Bald and Golden Eagles Act, and the Migratory Bird Treaty Act (MBTA). The National Marine Fisheries Service (NMFS) is responsible for marine and anadromous species listed under the ESA. The Ohio Department of Natural Resources (ODNR) is responsible for species protected by the State of Ohio. Descriptions of protected species and habitats appear in Section 2.2.8 of this SEIS.

4.8.1 Species Protected Under the Endangered Species Act.

4.8.1.1 Chronology of Endangered Species Act Section 7 Consultation

The NRC staff corresponded with both the FWS and NMFS to determine impacts to Federally listed species and to decide whether to initiate section 7 consultation as a result of the proposed Davis-Besse license renewal. No species under the NMFS's jurisdiction are present on the Davis-Besse site or within Lake Erie (NMFS 2010). Thus, NRC has no obligations under section 7 of the ESA for species under NMFS's jurisdiction.

For species under FWS's jurisdiction, the FWS provided information to FENOC on protected species in 2009 (FWS 2009) and confirmed that the information contained in their 2009 letter to FENOC remained current in a letter to the NRC in 2010 (FWS 2010). The NRC developed a list of Federally listed species potentially on or in the vicinity of the Davis-Besse site and requested concurrence on this list in a June 1, 2011, letter (NRC 2011a). Since that time, the NRC has defined the action area (see Section 2.2.8.1) and reviewed available information on the FWS's Endangered Species Program Web site to ensure that it considers any newly listed species or updated information concerning species that could be affected by the proposed license renewal.

Following the publication of the draft SEIS, the NRC intends to submit the draft SEIS to FWS for concurrence in accordance with the ESA section 7 regulations at 50 CFR 402.12(j). The final SEIS will include an updated status of the section 7 consultation in this section.

4.8.1.2 Species and Habitats Under NMFS's Jurisdiction

No Federally listed or proposed species or proposed or designated critical habitat under the NMFS's jurisdiction occur in the action area.

4.8.1.3 Species and Habitats Under FWS's Jurisdiction

Section 2.2.8.1 discusses species and habitats protected under the ESA and within FWS's jurisdiction that occur in Ottawa County and have the potential to occur in the action area. Of the four Federally listed species identified in Table 2.2-8 as occurring in Ottawa County, the NRC staff determined that three of these species—piping plover (*Charadrius melodus*), eastern prairie fringed orchid (*Platanthera leucophaea*), and lakeside daisy (*Tetraneuris herbacea*)—

are very unlikely to occur in the action area based on habitat requirements or occurrence data. The NRC concludes that the proposed license renewal would have no effect on these species based on the lack of suitable habitat and unlikelihood of occurrence in the vicinity of the Davis-Besse site (see Table 4.8-2). The remaining species, the Indiana bat (*Sodalis myotis*), may occur in the action area. Table 4.8-2 lists the four Federally listed species and summarizes the habitat, the likelihood of occurrence in the action area, and the NRC's ESA effect determinations for each species.

Table 4.8-2. Summary of Impacts to Federally Listed Species

Scientific Name	Common Name	Habitat	Suitable Habitat Present?[a]	Effect Determination[b]
Charadrius melodus	piping plover	nesting: N/A for Lake Erie foraging: sandy beaches; mudflats	Yes	No effect
Myotis sodalis	Indiana bat	hibernating: cool, humid caves; abandoned mines roosting: dead trees with loose tree bark foraging: forest edges; riparian zones	Yes	May affect, but is unlikely to adversely affect
Platanthera leucophaea	eastern prairie fringed orchid	mesic prairie; sage meadows; marsh edges; bogs	Yes	No effect
Hymenoxy acaulis var. glabra	lakeside daisy	dry, rocky prairie with full sun and limestone deposits	No	No effect

[a] This column indicates whether suitable habitat occurs in the action area as defined in Section 2.2.8.1.

[b] Conclusions presented are consistent with effect determinations under the ESA: (1) no effect, (2) unlikely to adversely affect, or (3) likely to adversely affect.

Piping Plover *(Charadrius melodus).* The Davis-Besse site may provide marginal habitat for migrating piping plovers, but the occurrence of this species within the action area would be rare. The Black Swamp Bird Observatory (BSBO) has recorded this species as occurring within Lake Erie marsh region, which includes the Navarre Marsh on the Davis-Besse site, which FENOC leases to the FWS for management as part of the Ottawa National Wildlife Refuge.

Continued operation and maintenance of the Davis-Besse site during the proposed license renewal term would not involve any construction, ground-disturbing activities or changes to existing land use conditions in either natural or developed areas. Thus, continued operation of Davis-Besse would not affect habitat or prey availability. Noise levels and human activity would remain similar to current operations and would not cause any additional disturbances that would cause piping plovers to avoid or abandon habitat within the action area. The NRC staff did not identify any direct or indirect adverse effects to piping plovers that would result from continued operation during the proposed license renewal term. Furthermore, the continued operation of Davis-Besse during the proposed license renewal term would preserve the existing habitats on the Davis-Besse site.

If piping plovers are observed on the Davis-Besse site by plant personnel, the NRC has measures in place to ensure that it would be notified so that the NRC staff could determine the appropriate course of action, such as possibly reinitiating section 7 consultation under the ESA with the FWS at that time. The NRC's regulations containing notification requirements that necessitate operating nuclear power reactors to report to the NRC within 4 hours "any event or situation, related to…protection of the environment, for which a news release is planned or notification to other government agencies has been or will be made" (10 CFR 50.72(b)(2)(xi)). Such notifications include reports regarding Federally listed species, as described in Section 3.2.12 of NUREG-1022, *Event Reporting Guidelines for 10 CFR 50.72 and 50.73* (NRC 2013).

The NRC staff concludes that the proposed license renewal would have no effect on the piping plover.

Indiana Bat side *(Sodalis myotis).* The Indiana bat may occur within areas of suitable roosting and foraging habitat in the action area, such as riparian areas, grasslands, and meadows. As indicated in the discussion of impacts to the piping plover, the proposed license renewal term would not involve any construction, ground-disturbing activities or changes to existing land use conditions in either natural or developed areas. Tree removal as part of site or transmission line maintenance could affect the Indiana bat. However, FENOC's (2011) Environmental Best Management Practices require FENOC staff to conduct all tree removal or disturbance from September 30 through April 1 when bats would not be in the region. If trees need to be removed during the summer months, FENOC's procedure specifies that FENOC must conduct a net survey for those tree species that are likely to provide Indiana bat roosting habitat. FENOC must complete such surveys before disturbing any trees to ensure that the Indiana bat is not adversely affected. FENOC could also perform such maintenance in the fall or winter months when the Indiana bat has migrated to hibernation sites. Thus, this potential adverse impact would be insignificant because it is unlikely to result in a take.

If Indiana bats are observed on the Davis-Besse site by plant personnel, the measures in place to ensure that the NRC takes appropriate action upon identification of a Federally listed species on the Davis-Besse site (described previously for the piping plover) would apply for the Indiana bat as well.

The NRC staff concludes that the proposed license renewal may affect, but is unlikely to adversely affect, the Indiana bat.

Eastern Prairie Fringed Orchid *(Platanthera leucophaea).* The eastern prairie fringed orchid may occur in areas of suitable habitat within the action area, such as mesic prairie, sage meadows, marsh edges, bogs, and other wetland habitats within Navarre Marsh. Though suitable habitat exists in the action area, during the NRC's site audit (NRC 2011b), the FWS noted that it was unable to find any eastern prairie fringed orchid populations during a 2010 survey within the Ottawa National Wildlife Refuge. Nonetheless, FWS's continued management of the Navarre Marsh as part of the Ottawa National Wildlife Refuge would ensure that, if present, the eastern prairie fringed orchid would not be adversely affected. The NRC staff did not identify any direct or indirect adverse effects to this species that would result from continued operation during the proposed license renewal term.

The NRC staff concludes that the proposed license renewal would have no effect on the eastern prairie fringed orchid.

Lakeside Daisy (*Tetraneuris herbacea*). Suitable habitat for the lakeside daisy does not occur within the action area. Thus, the NRC staff concludes that the proposed license renewal would have no effect on the lakeside daisy.

4.8.1.4 Critical Habitat and Proposed Species

As noted in Section 2.2.7 of this SEIS, no critical habitat occurs in the action area. Therefore, the proposed license renewal would have no effect on proposed or designated critical habitat. Additionally, no proposed species occur on the Davis-Besse site or along the transmission line corridors; therefore, the proposed license renewal would have no effect on any proposed species.

4.8.2 Species Protected Under the Bald and Golden Eagles Protection Act

Bald eagles (*Haliaeetus leucocephalus*) are relatively common in the vicinity of the Davis-Besse site. Several bald eagle nests are located on the Davis-Besse site. Two bald eagle nests are specifically located on the Davis-Besse site—one within Navarre Marsh and one northwest of the cooling tower near the site boundary (FWS 2010ms).

No activities on the Davis-Besse site would disturb bald eagles during the proposed license renewal term. Ground disturbing activities, increased noise and lighting, and other refurbishment impacts to bald eagles are discussed in Sections 3.2.1 and 3.2.2. Transmission line corridor maintenance has the potential to disturb eagles if trees with nests need to be trimmed or cut down. However, FENOC's (2011) *Environmental Best Management Practices* (discussed in Section 2.2.7) require that activities within 660 ft (200 m) of eagle nests that could disturb those nests be limited to August 1 through December 31, when eagles are least likely to be in the area. Additionally, the procedure requires FENOC to coordinate with the FWS to discuss potential mitigation options that could reduce or minimize impacts to eagles if activities must take place from January 1 through July 31. These specifications apply to the Davis-Besse site as well as the in-scope transmission line corridors. Additionally, the Bald and Golden Eagle Protection Act prohibits the taking of eagles without an FWS-issued eagle permit. Therefore, any activities that would require coordination per the procedures in FENOC's *Environmental Best Management Practices* may also require an eagle permit under the Bald and Golden Eagle Act implementing regulations (50 CFR Part 22). As a result of these two processes, impacts to the bald eagle as a result of transmission line maintenance during the proposed renewal term would be minimal.

4.8.3 Species Protected Under the Migratory Bird Treaty Act

No activities associated with the proposed license renewal would directly impact migratory birds. Transmission line corridor maintenance has the potential to disturb migratory bird nests if trees or shrubs containing nests are trimmed or cut down. However, the MBTA only pertains to direct impacts to migratory birds and does not protect migratory bird habitat (as described in Section 2.2.7.3).

4.8.4 Species Protected by the State of Ohio

Many Ohio-listed species occur (or have been recorded as historically occurring) on and in the vicinity of the Davis-Besse site, including many species of birds, seven species of plants, five species of mussels, and three species of reptiles. These species are discussed in Section 2.2.8.4 of this SEIS. Section 4.14.4 discusses cumulative impacts on Ohio State-listed species.

In their correspondence with FENOC prior to FENOC's submittal of the Davis-Besse license renewal application (LRA) to the NRC, the ODNR determined that the proposed license renewal would not impact any State-listed species because no tree removals, in-water work, or other major construction activities would take place that might disturb the habitat of or otherwise impact any species (ODNR 2010). The NRC (NRC 2010a, 2010b) sent letters to the ODNR during its scoping process to confirm the information contained in ODNR's previous letter to FENOC and to request any updated information concerning State-listed species. In a letter dated August 30, 2011 (ODNR 2011), the ODNR provided the NRC staff with its concurrence on this list. The ODNR provided no updated information concerning effects to State-listed species as a result of the proposed Davis-Besse license renewal. Based on correspondence with the ODNR and the NRC staff's independent review, the NRC staff concludes that the proposed Davis-Besse license renewal will have no adverse impacts on any State-listed species.

4.8.5 Conclusion

The NRC staff concludes that the proposed Davis-Besse license renewal will have no adverse effects on three Federally protected species (piping plover, eastern prairie fringed orchid, and lakeside daisy) and may affect, but is unlikely to adversely affect, one species (Indiana bat).

4.9 Human Health

Table 4.9-1 lists the human health issues identified in the GEIS.

Table 4.9-1. Human Health Issues

Issue	GEIS Section	Category
Radiation exposures to the public during refurbishment	3.8.1[a]	1
Occupational radiation exposures during refurbishment	3.8.2[a]	1
Microbiological organisms (occupational health)	4.3.6	1
Microbiological organisms (public health, for plants using lakes or canals or cooling towers or cooling ponds that discharge to a small river)	4.3.6[b]	2
Noise	4.3.7	1
Radiation exposures to public (license renewal term)	4.6.2	1
Occupation radiation exposures (license renewal term	4.6.3	1
Electromagnetic fields—acute effects (electric shock)	4.5.4.1	2
Electromagnetic fields—chronic effects	4.5.4.2	Uncertain
Human health impact from chemicals	4.9.1.1.2[c]	1
Physical occupational hazards	4.9.1.1.5[c]	1

[a] Issues apply to refurbishment, an activity that Davis-Besse plans to undertake.

[b] Issue applies to plants with features such as cooling lakes of cooling towers that discharge to a small river. This issue does not apply to Davis-Besse.

[c] NRC 2013: 78 FR 37282

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.9.1 Generic Human Health Issues

.The NRC staff has not identified any new and significant information during its independent review of the applicant's ER (FENOC 2010), the site audit, the scoping process, or its evaluation of other available information that would change the conclusions in the GEIS (NRC 1996) for the Category 1 human health issues. For the Category 1 human health issues, the GEIS (NRC 1996) concludes the impacts to be SMALL. For the new Category 1 issues identified in the 2013 GEIS, human health impact from chemicals and physical occupational hazards, the impacts have been determined to be SMALL.

The information presented below is a discussion of new human health issues followed by a discussion of selected radiological programs conducted at Davis-Besse.

4.9.1.1 New Category 1 Human Health Issues

As described in Section 1.4 of this draft SEIS, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51, governing environmental impact reviews of nuclear power plant operating renewed licenses (NRC 2013). With respect to the human health, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding two new Category 1 issues, "Human health impact from chemicals" and "Physical occupational hazards." The first issue considers the impacts from chemicals to plant workers and members of the public. The second issue only considers the nonradiological occupational hazards of working at a nuclear power plant. An understanding of these nonradiological hazards to nuclear power plant workers and members of the public have been well established at nuclear power plants during the current licensing term. The impacts from chemical hazards are expected to be minimized through the applicant's use of good industrial hygiene practices as required by permits and Federal and State regulations. Also, the impacts from physical hazards to plant workers will be of small significance if workers adhere to safety standards and use protective equipment as required by Federal and State regulations. The impacts to human health for each of these new issues from continued plant operations are SMALL.

The NRC staff has not identified any new and significant information related to these nonradiological issues during its independent review of applicant's ER (FENOC 2010), the site audit, and the scoping process. Therefore, the NRC staff concludes that there would be no impact to human health from chemicals or physical hazards beyond those impacts described in Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 of the final rule; therefore, the impacts are SMALL.

4.9.1.2 Davis-Besse Radiological Environmental Monitoring Program

Davis-Besse conducts a Radiological Environmental Monitoring Program (REMP) to assess the radiological impact, if any, to its employees, the public, and the environment from its operations. The REMP measures the aquatic, terrestrial, and atmospheric environment for radioactivity, as well as the ambient radiation. In addition, the REMP measures background radiation (i.e., cosmic sources, global fallout, and naturally occurring radioactive material, including radon). The REMP supplements the Radioactive Effluent Monitoring Program by verifying that any measurable concentrations of radioactive materials and levels of radiation in the environment are not higher than those calculated using the radioactive effluent release measurements and transport models.

Radiation levels and radioactivity have been monitored within a 25-mi radius around Davis-Besse since 1972. The REMP was established at Davis-Besse about 5 years before the station became operational. This pre-operational sampling and analysis program provided data on radiation and radioactivity normally present in the area as natural background. Davis-Besse has continued to monitor the environment by sampling air, groundwater, milk, wild meat, fruit and vegetables, wild animal feed, drinking water, surface water, fish, and shoreline sediment, as well as through direct measurement of radiation.

The Davis-Besse REMP is made up of four categories based on the radiation exposure pathways to the public. The REMP collects and measures environmental media samples from the following: atmospheric, terrestrial, aquatic, and direct radiation. The air is sampled in areas around the plant site by measuring the levels of radioactive iodine and particulate matter on filters. Terrestrial monitoring includes the collection and analysis of milk, groundwater, meat, fruits, vegetables, animal feed, and soil samples. Aquatic monitoring includes the collection and analysis of drinking water, untreated surface water, fish, and shoreline sediment from the plant site and the vicinity of Lake Erie. Direct radiation is measured at various locations around the plant site using thermoluminescent Dosimeters (TLDs). In addition to the REMP, Davis-Besse began monitoring groundwater wells near the plant site in 2007, as part of the FENOC Groundwater Protection Initiative (GPI). The initiative is designed to determine whether there have been any inadvertent releases of radioactivity that have impacted groundwater or could potentially affect local water supplies. A detailed discussion of the GPI is contained in section 2.2.5 of this SEIS.

The NRC staff reviewed Davis-Besse's annual radiological environmental operating reports for 2008 through 2012 to look for any significant impacts to the environment or any unusual trends in the data (FENOC 2009a, 2010b, 2011a, 2012, 2013). The NRC staff uses a multi-year time period because it provides a data set that covers a broad range of activities that occur at a nuclear power plant such as; refueling outages, non-refueling outage years, routine operation, and years where there may be significant maintenance activities. Based on the NRC staff's review of FENOC's reports, no adverse trends (i.e., steadily increasing buildup of radioactivity levels) were observed and the data showed that there was no measurable impact to the environment from operations at Davis-Besse.

4.9.1.3 Davis-Besse Radioactive Effluent Release Program

All nuclear plants were licensed with the expectation that they would release radioactive material to both the air and water during normal operation. However, NRC regulations require that radioactive gaseous and liquid releases from nuclear power plants must meet radiation dose based limits specified in 10 CFR Part 20, and the as low as is reasonably achievable (ALARA) criteria in Appendix I to 10 CFR Part 50. Regulatory limits are placed on the radiation dose that members of the public can receive from radioactive material released by a nuclear power plant. In addition, nuclear power plants are required by 10 CFR 50.36(a) to submit an annual report to the NRC, which lists the types and quantities of radioactive effluents released into the environment. The radioactive effluent release and radiological environmental monitoring reports are available for review by the public through the Agencywide Documents Access and Management System (ADAMS) electronic reading room, which is available through the NRC Web site.

The NRC staff reviewed the annual radioactive effluent release reports for 2008 through 2012 (FENOC 2009b, 2010c, 2011b, 2012, 2013). The review focused on the calculated doses to a member of the public from radioactive effluents released from Davis-Besse. The doses were compared to the radiation protection standards in 10 CFR 20.1301, the ALARA dose design objectives in Appendix I to 10 CFR Part 50, and the EPA's 40 CFR Part 190.

Dose estimates for members of the public are calculated based on radioactive gaseous and liquid effluent release data and atmospheric and aquatic transport models. The 2012 annual radioactive material release report (FENOC 2013) contains a detailed presentation of the radioactive discharges and the resultant calculated doses. The following information summarizes the calculated maximum dose to a member of the public located outside the Davis-Besse site boundary from radioactive gaseous and liquid effluents released during 2012:

- The maximum total body dose to an offsite member of the public from radioactive liquid effluents was 4.49×10^{-3} mrem (4.49×10^{-5} mSv), which is well below the 3 mrem (0.03 mSv) dose criterion in Appendix I to 10 CFR Part 50.
- The maximum organ (liver) dose to an offsite member of the public from radioactive liquid effluents was 1.14×10^{-2} mrem (1.14×10^{-4} mSv), which is well below the 10 mrem (0.1 mSv) dose criterion in Appendix I to 10 CFR Part 50.
- The maximum air dose at the site boundary from gamma radiation in gaseous effluents was 9.09×10^{-5} mrad (9.09×10^{-7} mGy), which is well below the 10 mrad (0.1 mGy) dose criterion in Appendix I to 10 CFR Part 50.
- The maximum air dose at the site boundary from beta radiation in gaseous effluents was 1.58×10^{-4} mrad (1.58×10^{-6} mGy), which is well below the 20 mrad (0.2 mGy) dose criterion in Appendix I to 10 CFR Part 50.
- The maximum organ (thyroid) dose to an offsite member of the public from radioactive iodine and radioactive material in particulate form was 3.13×10^{-3} mrem (3.13×10^{-5} mSv), which is well below the 15 mrem (0.15 mSv) dose criterion in Appendix I to 10 CFR Part 50.
- The maximum total body dose to an offsite member of the public from the combined radioactive releases (i.e., gaseous, liquid, and direct radiation) was 7.49×10^{-2} mrem (7.49×10^{-4} mSv), which is well below the 25 mrem (0.25 mSv) dose standard in 40 CFR Part 190.

The NRC staff's review of the Davis-Besse Radioactive Effluent Control Program showed that the radiation doses to members of the public from radioactive effluents were controlled within the Federal radiation protection standards contained in 10 CFR Part 20, Appendix I to 10 CFR Part 50 and 40 CFR Part 190.

Routine plant operational and maintenance activities currently performed will continue during the license renewal term. Based on the past performance of the radioactive waste system to maintain the dose from radioactive effluents to be ALARA, similar performance is expected during the license renewal term.

The radiological impacts from the current operation of Davis-Besse, including those from refurbishment, are not expected to change significantly. Continued compliance with regulatory requirements is expected during the license renewal term; therefore, the impacts from radioactive effluents would be SMALL.

4.9.2 Electromagnetic Fields—Acute Effects

Based on the GEIS (NRC 1996), the NRC found that electric shock resulting from direct access to energized conductors or from induced charges in metallic structures has not been found to be a problem at most operating plants and generally is not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electric shock potential along the portions of the transmission lines that are within the scope of this SEIS.

In the GEIS, the NRC staff found that without a review of the conformance of each nuclear plant transmission line with National Electrical Safety Code (NESC) criteria, it was not possible to determine the significance of the electric shock potential (IEEE 2002). Evaluation of individual plant transmission lines is necessary because the issue of electric shock safety was not addressed in the licensing process for some plants. For other plants, land use in the vicinity of transmission lines may have changed or power distribution companies may have chosen to upgrade line voltage. To comply with 10 CFR 51.53(c)(3)(ii)(H), the applicant must provide an assessment of the impact of the proposed action on the potential shock hazard from the transmission lines if the transmission lines that were constructed for the specific purpose of connecting the plant to the transmission system do not meet the recommendations of the NESC for preventing electric shock from induced currents. The NRC uses the NESC criteria as its baseline to assess the potential human health impact of the induced current from an applicant's transmission lines. As discussed in the GEIS, the issue of electric shock is of small significance for transmission lines that are operated in adherence with the NESC criteria.

Davis-Besse electrical output is delivered via three separate 345 kilovolt (kV) transmission lines to three different Toledo Edison substations. The Bay shoreline is about 21 mi long, extending from the Davis-Besse switchyard west and then northwest to Toledo Edison's Bay Shore substation. The Lemoyne line also is about 21 mi long, extending from the Davis-Besse switchyard west and then southwest to Toledo Edison's Lemoyne substation. The Beaver line is about 59 mi long, extending from the Davis-Besse switchyard south and then southeast to Ohio Edison's Beaver substation.

The Bay Shore, the Lemoyne, and the Beaver transmission lines were constructed before the 1977 NESC adoption of the 5 milliamperes (mA) provision for electric shock produced from induced currents. Therefore, FENOC conducted a screening analysis for each road crossing under the three transmission lines to determine conformance with the 5 mA NESC standard. FENOC's evaluation of their transmission lines concluded that the induced current was less than the 5 mA NESC standard (FENOC 2010).

The Davis-Besse transmission line corridor consists of approximately 1,800 acres of primarily flat agricultural land for ROWs. FENOC conducts routine vegetation maintenance of its rural transmission line corridors approximately every 5 years. Maintenance includes removal or pruning of woody vegetation, as necessary, to ensure adequate line clearance and to allow vehicular access for maintenance (FENOC 2010).

The NRC staff reviewed the available information, including the applicant's evaluation and results. Based on this information, and because the transmission lines are operated in adherence with NESC criteria, the NRC staff concludes that the potential impacts from electric shock during the renewal period would be SMALL.

4.9.3 Electromagnetic Fields—Chronic Effects

In the GEIS, the effects of chronic exposure to 60-hertz (Hz) electromagnetic fields from powerlines were not designated as Category 1 or 2 and will not be until a scientific consensus is reached on the health implications of these fields.

The potential effects of chronic exposure from these fields continue to be studied and are not known at this time. The National Institute of Environmental Health Sciences (NIEHS) directs related research through the U.S. Department of Energy (DOE).

The report by NIEHS (NIEHS 1999) contains the following conclusion:

> The NIEHS concludes that ELF-EMF (extremely low frequency-electromagnetic field) exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion, this finding is insufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern.

This statement is not sufficient to cause the NRC staff to change its position with respect to the chronic effects of electromagnetic fields. The NRC staff considers the GEIS finding of "UNCERTAIN" still appropriate and will continue to follow developments on this issue.

4.10 Socioeconomics

The socioeconomic issues applicable to Davis-Besse are shown in Table 4.10-1 for Category 1 and Category 2. Section 2.2.9 of this SEIS describes the socioeconomic conditions near Davis-Besse.

Table 4.10-1. Socioeconomics During the Renewal Term

Issues	GEIS Section(s)	Category
Housing impacts	4.7.1	2
Public services—public safety, social services, and tourism & recreation	4.7.3; 4.7.3.3; 4.7.3.4; 4.7.3.6	1
Public services—public utilities	4.7.3.5	2
Public services—education (license renewal term)	4.7.3.1	1
Public services—transportation	4.7.3.2	2
Aesthetic impacts (license renewal term)	4.7.6	1
Aesthetic impacts of transmission lines (license renewal term)	4.5.8	1
Environmental justice minority & low-income populations	4.10.1[a]	2
Offsite land use (license renewal term)	4.7.4	2
Historic & archaeological resources	4.7.7	2

[a] NRC 2013, 78 FR 37282.

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996).

4.10.1 Generic Socioeconomic Issues

The Davis-Besse ER (FENOC 2010), scoping comments, other available data records on Davis-Besse were reviewed and evaluated for new and significant information. The review included a data gathering site visit to Davis-Besse. No new and significant information was identified during this review that would change the conclusions presented in the GEIS.

Therefore, for these Category 1 issues, impacts during the renewal term are not expected to exceed those discussed in the GEIS. Impacts for Category 2 and environmental justice, which was listed as an uncategorized issue in the 1996 rule (61 FR 28467), are discussed in Sections 4.10.2 through 4.10.4, 4.11, 4.12, and 4-13. The NRC uses the existing socioeconomic conditions described in Section 2.2.9 of this SEIS as its baseline to evaluate the potential socioeconomic impacts resulting from license renewal. These baseline socioeconomic conditions include existing housing, transportation, offsite land use, demographic information, public services, and economic conditions affected by ongoing operations at the nuclear power plant.

4.10.2 Housing Impacts

Appendix C of the GEIS presents a population characterization method based on two factors—sparseness and proximity (GEIS, Section C.1.4). Sparseness measures population density within 20 mi (32 km) of the site, and proximity measures population density and city size within 50 mi (80 km). Each factor has categories of density and size (GEIS, Table C.1). A matrix is used to rank the population category as low, medium, or high (GEIS, Figure C.1).

According to the 2000 Census, an estimated 129,411 people lived within 20 mi (32 km) of Davis-Besse, which equates to a population density of 169 persons per square mile (mi^2) (FENOC 2010). This translates to a Category 4, “least sparse,” population density using the GEIS measure of sparseness (greater than or equal to 120 persons per mi^2 within 20 mi). An estimated 2,375,624 people live within 50 mi (80 km) of Davis-Besse with a population density of 316 persons per mi^2 (FENOC 2010). Applying the GEIS proximity measures, Davis-Besse is classified as proximity Category 4 (greater than, or equal to, 190 persons per mi^2 within 50 mi). Therefore, according to the sparseness and proximity matrix presented in the GEIS, rankings of sparseness Category 4 and proximity Category 4 result in the conclusion that the Davis-Besse is located in a high-population area.

Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, states that impacts on housing availability are expected to be of small significance in a medium or high-density population area where growth-control measures are not in effect. Since Davis-Besse is located in a high-population area and Lucas, Ottawa, Sandusky and Wood counties are not subject to growth-control measures that would limit housing development, any changes in employment at Davis-Besse would have little noticeable effect on housing availability in these counties. Since FENOC has no plans to add non-outage employees during the license renewal period, employment levels at Davis-Besse would remain relatively constant with no additional demand for permanent housing during the license renewal term. Based on this information, there would be no additional impact on housing during the license renewal term beyond what has already been experienced; therefore, the NRC staff concludes that the impact on housing would be SMALL.

FENOC indicated in their ER (FENOC 2010) that the steam generators would be replaced during the license renewal term in 2017, however steam generator replacement is now scheduled to be done during the 2014 refueling outage. FENOC estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 70 days (FENOC 2010). These additional workers would create an additional demand for temporary (rental) housing in the immediate vicinity of Davis-Besse. Steam generator replacement impacts are discussed in Chapter 3 of this SEIS. As a result of replacing the steam generators, there will be a one-time increase in the need for temporary housing for the additional workers. However, the NRC staff concludes that the overall impacts on housing due to steam generator replacement will remain SMALL.

4.10.3 Public Services—Public Utilities

While the impact findings of SMALL, MODERATE and LARGE are defined in Section 1.4 of this SEIS, the definitions for these three findings are slightly different with respect to the impact on public utilities. Impacts on public utility services (e.g., water, sewer) are considered SMALL if the public utility has the ability to respond to changes in demand and would have no need to add or modify facilities. Impacts are considered MODERATE if service capabilities are overtaxed during periods of peak demand. Impacts are considered LARGE if additional system capacity is needed to meet ongoing demand.

Analysis of impacts on the public water systems considered both plant demand and plant-related population growth. Section 2.1.7 describes the permitted withdrawal rate and actual use of water for reactor cooling at Davis-Besse.

Since FENOC has no plans to add non-outage employees during the license renewal period, employment levels at Davis-Besse would remain relatively unchanged with no additional demand for public water services. Public water systems in the region are adequate to meet the demands of residential and industrial customers in the area. Therefore, there would be no additional impact to public water services during the license renewal term beyond what is currently being experienced.

As discussed in Section 4.9.2, FENOC indicated in their ER that steam generators would be replaced during the license renewal term in 2017, however steam generator replacement is now scheduled to be done during the 2014 refueling outage (FENOC 2010). The additional number of refueling outage workers needed to replace the steam generators would cause a short-term increase in the amount of public water and sewer services used in the immediate vicinity of Davis-Besse. The impacts to public utilities from refurbishment activities are discussed in Chapter 3 of this SEIS, and have been determined to be SMALL.

4.10.4 Public Services—Transportation

Table B-1 of Appendix B to Subpart A of 10 CFR Part 51 states the following:

> Transportation impacts (level of service) of highway traffic generated...during the term of the renewed license are generally expected to be of SMALL significance. However, the increase in traffic associated with additional workers and the local road and traffic control conditions may lead to impacts of MODERATE or LARGE significance at some sites.

The regulation in 10 CFR 51.53(c)(3)(ii)(J) requires all applicants to assess the impacts of highway traffic generated by the proposed project on the level of service of local highways during the term of the renewed license. Since FirstEnergy Davis-Besse has no plans to add non-outage employees during the license renewal period, traffic volume and levels of service on roadways in the vicinity of Davis-Besse would not change. Therefore, there would be no transportation impacts during the license renewal term beyond those already being experienced.

As discussed in Section 4.9.2, FENOC indicated in their ER that steam generators would be replaced during the license renewal term in 2017, however steam generator replacement is now scheduled to be done during the 2014 refueling outage (FENOC 2010). The additional number of refueling outage workers and truck material deliveries needed to support the replacement of the steam generators would cause a short-term transportation impact on access roads in the immediate vicinity of Davis-Besse. The impacts to transportation from refurbishment activities are discussed in Chapter 3 of this SEIS, and have been determined to be SMALL.

4.11 Environmental Justice

As described in Section 1.4 of this SEIS, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51. With respect to environmental justice concerns, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 2 issue, “Minority and low-income populations,” to evaluate the impacts of continued operations and any refurbishment activities during the license renewal term on minority populations and low-income populations living in the vicinity of the plant. Environmental justice was listed in Table B-1 as a concern before this final rule, but it was not evaluated in the 1996 GEIS and, therefore, is addressed in each SEIS.

Under Executive Order (EO) 12898 (59 FR 7629), Federal agencies are responsible for identifying and addressing, as appropriate, disproportionately high and adverse human health and environmental impacts on minority and low-income populations. In 2004, the Commission issued a Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions (69 FR 52040), which states, “The Commission is committed to the general goals set forth in EO 12898, and strives to meet those goals as part of its NEPA review process.”

The Council of Environmental Quality (CEQ) provides the following information in Environmental Justice: Guidance Under the National Environmental Policy Act (CEQ 1997):

> Disproportionately High and Adverse Human Health Effects.
>
> Adverse health effects are measured in risks and rates that could result in latent cancer fatalities, as well as other fatal or nonfatal adverse impacts on human health. Adverse health effects may include bodily impairment, infirmity, illness, or death. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant (as employed by NEPA) and appreciably exceeds the risk or exposure rate for the general population or for another appropriate comparison group (CEQ 1997).
>
> Disproportionately High and Adverse Environmental Effects.
>
> A disproportionately high environmental impact that is significant (as employed by NEPA) refers to an impact or risk of an impact on the natural or physical environment in a low-income or minority community that appreciably exceeds the environmental impact on the larger community. Such effects may include ecological, cultural, human health, economic, or social impacts. An adverse environmental impact is an impact that is determined to be both harmful and significant (as employed by NEPA). In assessing cultural and aesthetic environmental impacts, impacts that uniquely affect geographically dislocated or dispersed minority or low-income populations or American Indian tribes are considered (CEQ 1997).

The environmental justice analysis assesses the potential for disproportionately high and adverse human health or environmental effects on minority and low-income populations that could result from the operation of Davis-Besse during the renewal term. In assessing the impacts, the following definitions of minority individuals and populations and low-income population were used (CEQ 1997):

Minority Individuals. Individuals who identify themselves as members of the following population groups: Hispanic or Latino, American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, or two or more races, meaning individuals who identified themselves on a Census form as being a member of two or more races, for example, Hispanic and Asian.

Minority Populations. Minority populations are identified when (1) the minority population of an affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Low-income Population. Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series P60, on Income and Poverty.

Minority Population

According to 2010 Census data, approximately 23 percent of the U.S. population (approximately 1,809,000 persons) residing within a 50-mi (80 km) radius of Davis-Besse identified themselves as minority individuals. The largest minority group was Black or African American (11.4 percent), followed by Hispanic or Latino (of any race) (7.0 percent) (CAPS 2012).

According to 2010 Census data, minority populations in the socioeconomic ROI (Lucas, Ottawa, Sandusky, and Wood) comprised 22.7 percent of the total four-county population (see Table 2.2-17). Persons identifying themselves as Black or African American comprised the largest minority race population at 13 percent of the combined total four-county population. Hispanic or Latinos comprised the next largest minority population at 5.9 percent (USCB 2012). Figure 4.11-1 shows minority block groups, using 2010 Census data for race and ethnicity, within 50-mi (80-km) radius of Davis-Besse that exceed 23 percent or more minority populations.

Census block groups were considered minority population block groups if the percentage of the minority population within any block group exceeded 23 percent (the percent of the minority population within the 50-mi radius of Davis-Besse). A minority population block group exists if the percentage of the minority population within the block group is meaningfully greater than the minority population percentage in the 50-mi (80-km) radius. Of the approximately 1,629 census block groups located within the 50-mi radius of Davis-Besse, 504 block groups were found to have minority race population percentages that exceeded 23 percent or more. Minority population block groups are concentrated primarily in the Toledo and Detroit metropolitan areas, with smaller concentrations in Fremont and Sandusky in Ohio. The minority population nearest to Davis-Besse is located in Oak Harbor, Ohio.

Low-Income Population

According to 2010 Census data, approximately 15.4 percent of the U.S. population residing within a 50-mi (80 km) radius of Davis-Besse were identified as living below the Federal poverty threshold in 2010. The 2010 Federal poverty threshold was $22,314 for a family of four (USCB 2012). According to 2010 American Community Survey 1-year estimates, 11.8 percent of families and 15.8 percent of individuals in Ohio were living below the Federal poverty threshold in 2010, and the median household income for Ohio was $45,090 (USCB 2012).

According to 2008-2010 American Community Survey 3-year estimates, Ottawa County had a higher median household income average ($51,712) and lower percentages of individuals (10 percent) and families (6.9 percent) living below the poverty level when compared to the state average. Conversely, Lucas County had the lowest median household income average ($40,017) and highest percentage of individuals (19.1 percent) and families (14.9 percent) living below the poverty level when compared to the other three counties. Sandusky County had a median household income of $46,024 with 11.6 percent of individuals and 7.9 percent of families living below the poverty level. Wood County had the highest median household income ($52,512) and the lowest percentage of families (7.3 percent) living below the poverty level amongst the four counties (USCB 2012).

Figure 4.11-2 shows low-income census block groups within a 50-mi (80 km) radius of Davis-Besse that exceeds 15.4 percent or more low-income populations. Census block groups were considered low-income population block groups if the percentage of individuals living below the Federal poverty threshold within any block group exceeded the percent of the individuals living below the Federal poverty threshold within the 50-mile radius of Davis-Besse. Approximately 582 of the 1,629 census block groups located within the 50-mile (80-kilometer) radius of Davis-Besse were determined to have meaningfully greater low-income populations.

Low-income population block groups appear evenly distributed throughout the 50-mi (80 km) radius including the block group that contains Davis-Besse. Similar to the locations of minority population block groups, the majority of low-income population block groups are located in the Toledo and Detroit metropolitan areas, with smaller concentrations in Fremont and Bowling Green, Ohio.

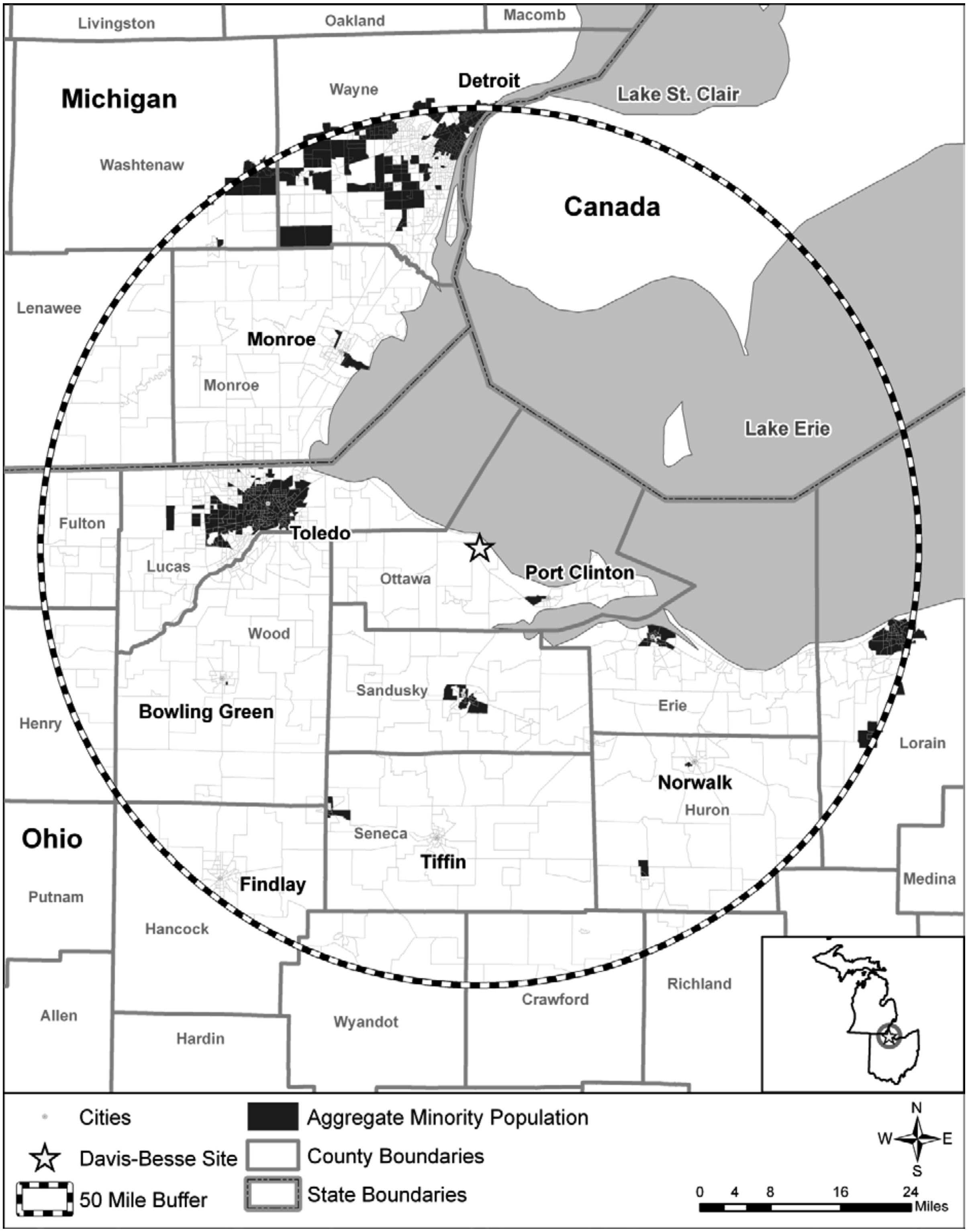

Figure 4.11-1. Census 2010 Minority Block Groups Within a 50-mi Radius of Davis-Besse

Source: USCB 2012

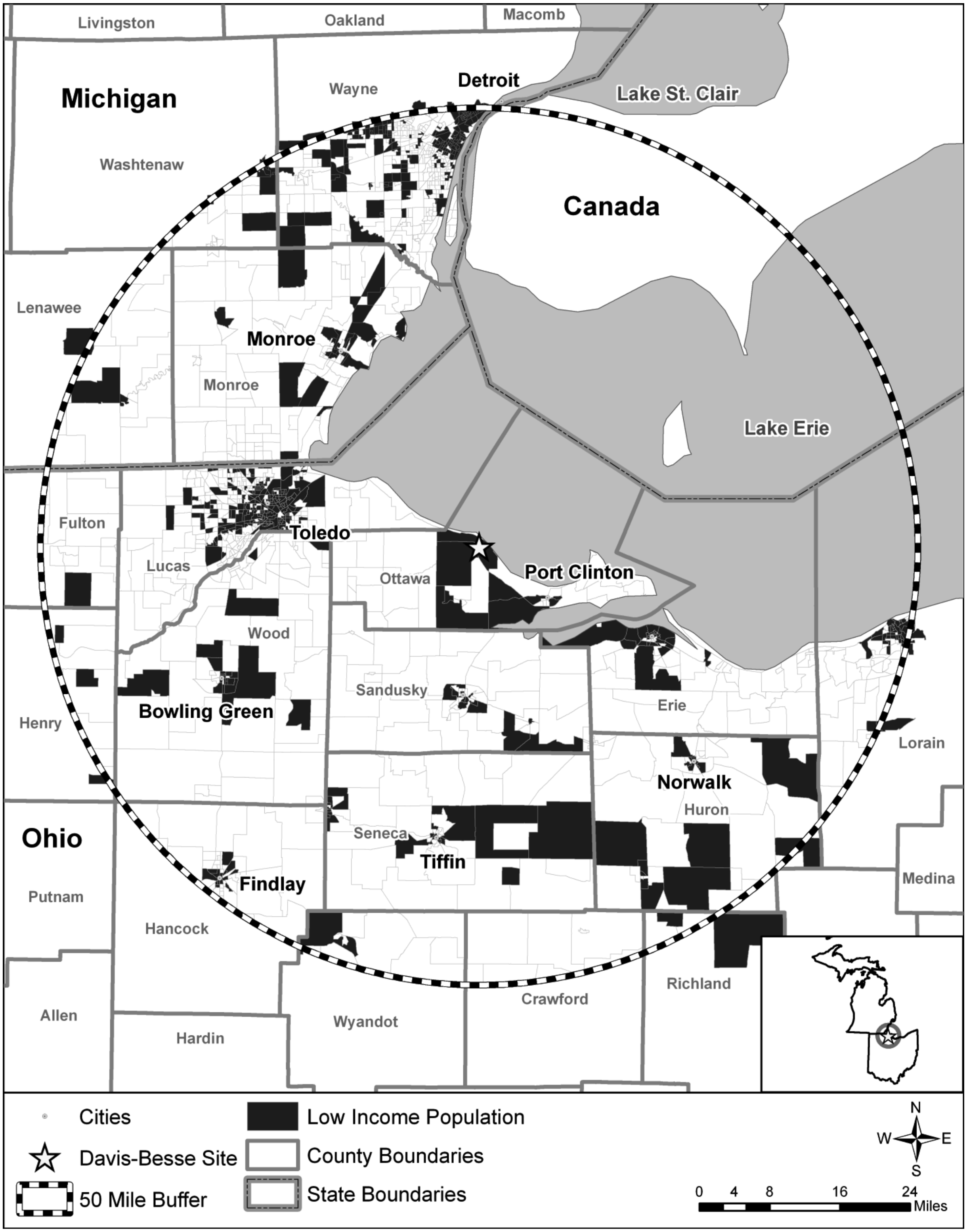

Figure 4.11-2. Census 2010 Low-Income Block Groups Within a 50-mi Radius of Davis-Besse

Source: USCB 2012

Analysis of Impacts

The NRC addresses environmental justice matters for license renewal through (1) identification of minority and low-income populations that may be affected by the proposed license renewal, and (2) examining any potential human health or environmental effects on these populations to determine if these effects may be disproportionately high and adverse.

The discussion and figures above identifies the minority and low-income populations residing within a 50-mi (80-km) radius of Davis-Besse. This area of impact is consistent with the impact analysis for public and occupational health and safety, which also focuses on populations within a 50-mi (80-km) radius of the plant. As previously discussed for the other resource areas in Chapter 4, the analyses of impacts for all environmental resource areas indicated that the impact from license renewal would be SMALL.

Potential impacts to minority and low-income populations (including migrant workers or Native Americans) would mostly consist of radiological effects; however radiation doses from continued operations associated with this license renewal are expected to continue at current levels, and would remain within regulatory limits. Chapter 5 of this SEIS discusses the environmental impacts from postulated accidents that might occur during the license renewal term, which include design basis accidents. The Commission has generically determined that impacts associated with such accidents are SMALL because the plant was designed to successfully withstand design basis accidents.

Therefore, based on this information and the analysis of human health and environmental impacts presented in Chapters 4 and 5, it is unlikely there would be any disproportionately high and adverse impacts to minority and low-income populations from the continued operation of Davis-Besse during the license renewal term.

Subsistence Consumption of Fish and Wildlife

As part of addressing environmental justice concerns associated with license renewal, the NRC also assessed the potential radiological risk to special population groups (such as minority and low-income populations, migrant workers, and Native Americans) from exposure to radioactive material received through their unique consumption and interaction with the environment. Patterns of exposure include subsistence consumption of fish, native vegetation, surface waters, sediments, and local produce; absorption of contaminants in sediments through the skin; and inhalation of airborne radioactive material released from the plant during routine operation. The special pathway receptors analysis is important to the environmental justice analysis because consumption patterns may reflect the traditional or cultural practices of minority and low-income populations in the area, such as migrant workers or Native Americans. This analysis is presented below.

Section 4-4 of Executive Order 12898 (1994) directs Federal agencies, whenever practical and appropriate, to collect and analyze information on the consumption patterns of populations that rely principally on fish or wildlife for subsistence and to communicate the risks of these consumption patterns to the public. In this SEIS, NRC considered whether there were any means for minority or low-income populations to be disproportionately affected by examining impacts to Native Americans, Hispanics, migrant workers, and other traditional lifestyle special pathway receptors. Special pathways that took into account the levels of contaminants in native vegetation, crops, soils and sediments, groundwater, surface water, fish, and game animals on or near Davis-Besse were considered.

The following is a summary discussion of the NRC's evaluation from Section 4.8.2 of the radiological environmental monitoring programs that assess the potential impacts for subsistence consumption of fish and wildlife near the Davis-Besse site.

FENOC has an ongoing comprehensive REMP at Davis-Besse to assess the impact of site operations on the environment. To assess the impact of the nuclear power station on the environment, samples of environmental media are collected and analyzed for radioactivity. Two types of samples are taken. The first type, control samples, is collected from areas that are beyond measurable influence of the nuclear plant. These samples are used as reference data. Normal background radiation levels, or radiation present due to causes other than nuclear power generation, can be compared to the environment surrounding the nuclear plant. Indicator samples are the second sample type obtained. These samples show how much radiation or radioactivity is contributed to the environment by the nuclear power plant. Indicator samples are taken from areas close to the station where any contribution will be at the highest concentration. An effect would be indicated if the radioactive material detected in an indicator sample was significantly larger than the background level or control sample.

Samples of environmental media are collected from the aquatic and terrestrial pathways in the vicinity of Davis-Besse. Over 2,000 radiological environmental samples were collected and analyzed in 2010. The aquatic pathways include groundwater, surface water, drinking water, fish, and shoreline sediment. The terrestrial pathways include airborne particulates, milk, food products (i.e., fruit apples and leafy vegetables such as kale and cabbage, are collected from gardens and farms in the vicinity of the Station), wild animal feed (i.e., edible portions of cattails), wild animal meat (i.e., waterfowl, deer, rabbits and muskrats), and leafy vegetation. During 2010, analyses performed on samples of environmental media showed no significant or measurable radiological impact above background levels from site operations (FENOC 2011).

Based on the radiological environmental monitoring data from Davis-Besse, the NRC finds that no disproportionately high and adverse human health impacts would be expected in special pathway receptor populations in the region as a result of subsistence consumption of water, local food, fish, and wildlife.

4.12 Offsite Land Use

Offsite land use during the license renewal term is a Category 2 issue (10 CFR Part 51, Subpart A, Appendix B, Table B-1). Table B-1 notes that "significant changes in land use may be associated with population and tax revenue changes resulting from license renewal." Section 4.7.4 of the GEIS defines the magnitude of land-use changes as a result of plant operation during the license renewal term as SMALL when there will be little new development and minimal changes to an area's land-use pattern. It is defined as MODERATE when there will be considerable new development and some changes to the land-use pattern, and it is defined as LARGE when there will be large-scale new development and major changes in the land-use pattern.

Tax revenue can affect land use because it enables local jurisdictions to provide the public services (e.g., transportation and utilities) necessary to support development. Section 4.7.4.1 of the GEIS states that the assessment of tax-driven land-use impacts during the license renewal term should consider the following:

- the size of the plant's tax payments relative to the community's total revenues,
- the nature of the community's existing land-use pattern, and

- the extent to which the community already has public services in place to support and guide development.

If the plant's tax payments are projected to be small relative to the community's total revenue, tax driven land-use changes during the plant's license renewal term would be SMALL, especially where the community has pre-established patterns of development and has provided public services to support and guide development. Section 4.7.2.1 of the GEIS states that if tax payments by the plant owner are less than 10 percent of the taxing jurisdiction's revenue, the significance level would be SMALL. If tax payments are 10 to 20 percent of the community's total revenue, new tax-driven land-use changes would be MODERATE. If tax payments are greater than 20 percent of the community's total revenue, new tax-driven land-use changes would be LARGE. This would be especially true where the community has no pre-established pattern of development or has not provided adequate public services to support and guide development.

4.12.1 Population-Related Impacts

Since FENOC has no plans to add non-outage employees during the license renewal period, there would be no plant operations-driven population increase in the vicinity of Davis-Besse. Therefore, there would be no additional population-related offsite land use impacts during the license renewal term beyond those already being experienced.

As discussed in Section 4.9.2, FENOC indicated in their ER that steam generators would be replaced during the license renewal term in 2017 (FENOC 2010), however the steam generators will actually be replaced during the 2014 refueling outage.. Due to the short amount of time needed to replace the steam generators, the additional number of refueling outage workers would not cause any permanent population-related land use changes in the immediate vicinity of Davis-Besse. These impacts are discussed in Chapter 3 of this SEIS.

4.12.2 Tax Revenue-Related Impacts

As discussed in Chapter 2, FENOC pays property taxes for Davis-Besse to Ottawa County, Carroll Township, the Benton-Carroll-Salem School District, and the Penta County Joint Vocational School. Since FENOC started making property tax payments to local jurisdictions, population levels and land use conditions in Ottawa County have declined; therefore, tax revenue has had not any effect on land use activities within the county. For the 5-year period from 2005 through 2009, property tax payments to Ottawa County contributed less than 10 percent of the total operating budget. Property tax payments to Carroll Township ranged from 11 to 28 percent of the operating budget, while payments to the Benton-Carroll-Salem School District averaged about 17 percent of the operating budget. Payments to the Penta County Joint Vocational School averaged 1.6 percent (FENOC 2010).

Since FirstEnergy Davis-Besse has no plans to add non-outage employees during the license renewal period, employment levels at Davis-Besse would remain relatively unchanged. There would be no increase in the assessed value of Davis-Besse, and annual property tax payments would also remain relatively unchanged throughout the license renewal period. Based on this information, there would be no additional tax-revenue-related offsite land use impacts during the license renewal term beyond those already being experienced.

As discussed in Section 4.9.2, FENOC indicated in their ER that steam generators would be replaced during the license renewal term in 2017 (FENOC 2010), however the steam generators will actually be replaced during the 2014 refueling outage. The replacement of the existing steam generators could increase the assessed value of Davis-Besse, and property tax payments could increase. These and other tax-revenue related impacts associated with refurbishment are discussed in Chapter 3 of this SEIS. The NRC staff has determined there will be no noticeable effect on offsite land use .

4.13 Historic and Archaeological Resources

As listed in Table 4.10.1, historic and archaeological resources is a Category 2 issue, and therefore, the NRC staff is required to perform a site-specific review. The National Historic Preservation Act of 1966 (NHPA), as amended through 2000, requires Federal agencies to take into account the potential effects of their undertakings on historic properties. Historic properties are defined as resources that are eligible for listing on the *National Register of Historic Places* (NRHP). The criteria for eligibility include the following (ACHP 2008):

- association with significant events in history;
- association with the lives of persons significant in the past;
- embodiment of distinctive characteristics of type, period, and construction; and
- association with or potential to yield important information.

The historic preservation review process mandated by Section 106 of the NHPA is outlined in regulations issued by the Advisory Council on Historic Preservation (ACHP) in 36 CFR Part 800.

The issuance of a renewed operating license for a nuclear power plant is a Federal undertaking that could possibly affect either known or currently undiscovered historic properties located on or near the plant site and its associated transmission corridors. In accordance with the provisions of the NHPA, the NRC is required to make a reasonable effort to identify historic properties in the area of potential effect. If no historic properties are present or affected, the NRC is required to notify the State Historic Preservation Office (SHPO) before proceeding. If it is determined that historic properties are present, the NRC is required to assess and resolve possible adverse effects of the undertaking.

In accordance with 36 CFR 800.8(c), the NRC initiated Section 106 consultation with the ACHP and the Ohio SHPO in December 2010 by notifying them of the agency's intent to conduct a review of a request from FENOC to renew Davis-Besse's operating license (NRC 2010c, 2010d). Documentation for consultation with the ACHP and the Ohio SHPO is presented in Appendix D. As of the time of publication of this SEIS, the Ohio SHPO and ACHP have not responded to the NRC.

The NRC also initiated consultation with eight Federally recognized Native American tribes, notifying them of the proposed action and requesting comments and concerns (NRC 2010e). To date, one of the tribes, the Peoria Tribe of Indians of Oklahoma, has responded (Peoria Tribe of Indians of Oklahoma 2010). They indicated no objection to the undertaking, but asked to be contacted in the event skeletal remains were discovered within the area of potential effect. Documentation for tribal consultation is presented in Appendix D. As of the time of publication of this SEIS, the other seven tribes contacted have not responded to the NRC.

FENOC has not proposed any new facilities, service roads, or transmission lines to support continued operations at Davis-Besse. FENOC has formal guidelines in its *Environmental Procedure* (NOP-OP-2010 Revision 5) for protecting historic and archaeological resources and consulting with the SHPO prior to ground-disturbing activities. An additional procedure, FENOC *Environmental Best Management Practices* (NOBP-OP-2000 Revision 002) requires work to be stopped and consultation with the SHPO if any human remains or archaeological, cultural, or historic resource is encountered. These guidelines are in place to ensure that any archaeological resources that may be present receive consideration and protection. On Davis-Besse lands leased to the FWS, the FWS personnel have procedures in place to stop work upon the discovery of a cultural resource, protect the area from further disturbance, and contact the FWS Cultural Resource Specialist in their Minnesota office. It is the responsibility of the Cultural Resource Specialist to contact the Ohio SHPO should cultural resources be encountered.

As noted in Section 2.2.10.2, the potential for any significant historic and archaeological resources in this area is low. However, since no formalized survey has been conducted of the entire property and portions of the area are undisturbed, the potential for additional resources to be present on the property and disturbed during normal operations remains. The only historic or cultural resource recorded on Davis-Besse property by the Ohio SHPO was listed as not eligible for the NRHP. The Refuge Site, 33-OT-25, is situated on a small peninsula of dry land in the marshy area of the southeast corner of the property. This is a historic site consisting of nails, glass mason jar fragments, and a kaolin pipe fragment that has been determined to be ineligible for listing in the National Register of Historic Places (NRHP). There are no historic properties located on Davis-Besse property.

Therefore, based on the NRC staff's review of Ohio SHPO files, review of FENOC's cultural resource management plan, and the potential for additional resources to be located on Davis-Besse property, NRC staff concludes that potential impacts from license renewal of Davis-Besse on historic and archaeological resources would be SMALL to MODERATE. There would be no adverse effect on historic properties per 36 CFR 800.4(d)(1).

4.14 Evaluation of New and Potentially Significant Information

New and significant information is information that identifies a significant environmental issue not covered in the GEIS and codified in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, or information that was not considered in the analyses summarized in the GEIS and that leads to an impact finding that is different from the finding presented in the GEIS and codified in 10 CFR Part 51.

In preparing to submit its application to renew the Davis-Besse operating license, FENOC developed a process to ensure that information not addressed in or available during the GEIS evaluation regarding the environmental impacts of license renewal for Davis-Besse would be properly reviewed before submitting the ER. It also ensured that such new and potentially significant information related to renewal of the operating license for Davis-Besse would be identified, reviewed, and assessed during the period of NRC review. FENOC reviewed the Category 1 issues that appear in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, to verify that the conclusions of the GEIS remained valid with respect to Davis-Besse. This review was performed by personnel from Davis-Besse and its support organization that were familiar with NEPA issues and the scientific disciplines involved in the preparation of a license renewal ER.

The NRC staff also has a process for identifying new and significant information. That process is described in detail in NUREG-1555, Supplement 1, *Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal* (NRC 1999b). The search for new information includes the following:

- review of an applicant's ER and the process for discovering and evaluating the significance of new information;
- review of records of public comments;
- review of environmental quality standards and regulations;
- coordination with Federal, State, and local environmental protection and resource agencies; and
- review of the technical literature.

New information discovered by the NRC staff is evaluated for significance using the criteria set forth in the GEIS. For Category 1 issues where new and significant information is identified, reconsideration of the conclusions for those issues is limited in scope to the assessment of the relevant new and significant information. The scope of the assessment does not include other facets of the issue that are not affected by the new information.

The NRC staff has not identified any new and significant information on environmental issues listed in Table B-1 of 10 CFR Part 51, Subpart A, Appendix B, related to the operation of Davis-Besse during the period of license renewal. The NRC staff also determined that information provided during the public comment period did not identify any new issues that require site-specific assessment. The NRC staff reviewed the discussion of environmental impacts in the GEIS (NRC 1996) and conducted its own independent review (including the public scoping meetings held in July 2008) to identify new and significant information.

4.15 Cumulative Impacts

As described in Section 1.4 of this SEIS, the NRC has approved a revision to its environmental protection regulation, 10 CFR Part 51. With respect to cumulative impacts, the final rule amends Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 by adding a new Category 2 issue, "Cumulative impacts," to evaluate the potential cumulative impacts of license renewal.

> **Cumulative Impacts**, as defined by CEQ in §1508.7, are the impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The NRC staff considered potential cumulative impacts in the environmental analysis of continued operation of Davis-Besse during the 20-year license renewal period. Cumulative impacts may result when the environmental effects associated with the proposed action are overlaid or added to temporary or permanent effects associated with other past, present, and reasonably foreseeable actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time. It is possible that an impact that may be SMALL by itself could result in a MODERATE or LARGE cumulative impact when considered in combination with the impacts of other actions on the affected resource. Likewise, if a resource is regionally declining or imperiled, even a SMALL individual impact could be important if it contributes to or accelerates the overall resource decline.

For the purposes of this cumulative analysis, past actions are those before the receipt of the LRA. Present actions are those related to the resources at the time of current operation of the power plant, and future actions are those that are reasonably foreseeable through the end of plant operation including the period of extended operation. Therefore, the analysis considers potential impacts through the end of the current license terms, as well as the 20-year renewal license term. The geographic area over which past, present, and reasonably foreseeable actions would occur is dependent on the type of action considered.

To evaluate cumulative impacts, the incremental impacts of the proposed action, as described in Sections 4.1 through 4.12, are combined with other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. The NRC staff used the information given in the ER (FENOC 2010); responses to requests for additional information; information from other Federal, State, and local agencies; scoping comments; and information gathered during the visits to the Davis-Besse site to note other past, present, and reasonably foreseeable actions. To be considered in the cumulative analysis, the NRC staff determined if the project would occur within the geographic areas of interest and within the period of extended operation, if it was reasonably foreseeable, and if there would be potential overlapping effect with the proposed action. For past actions, consideration within the cumulative impacts assessment is resource- and project-specific. In general, the effects of past actions are included in the description of the affected environment in Chapter 2, which serves as the baseline for the cumulative impacts analysis. However, past actions that continue to have an overlapping effect on a resource potentially affected by the proposed action are considered in the cumulative analysis. Other actions and projects that were noted during this review and considered in the NRC staff's independent analysis of the potential cumulative effects are described in Table 4.15-1.

Table 4.15-1. Other Projects and Actions Considered in the Cumulative Analysis for Davis-Besse

Project/Action	Location	Status
Locust Point Firing Range; served as an anti-aircraft artillery range in support of the Erie Army Depot	Northeast of Davis-Besse, a portion of the site is within the eastern section of the Davis-Besse site	Closed in 1963; In 1996 & 2001, Davis-Besse personnel found ordnance rounds along the beach area near the mouth of the Toussaint River (FENOC 2010)
Camp Perry Military Reservation; site is part of the Ohio National Guard	Between Davis-Besse & Port Clinton (6 mi southeast of Davis-Besse)	Operational (FENOC 2010)
Lake Erie Industrial Park	Between Davis-Besse & Port Clinton (6 mi southeast of Davis-Besse)	Operational (FENOC 2010)
Cleveland-Toledo-Detroit Passenger Rail Line; addition to regional transportation hub with rail lines connecting Cleveland, Buffalo, Toronto, Pittsburgh, Cincinnati, & Detroit	Rail line would run from Cleveland to Toledo, passing through Ottawa County	Proposed; schedule undetermined (MHR 2011)
FWS Private Lands Program	Northwestern Ohio	Ongoing; total of 6,898 acres on 801 sites across Ohio have been restored since program implementation (FWS 2011).
Energy projects		
Independent Spent Fuel Storage Installation on Davis-Besse site; dry spent-fuel storage	Davis-Besse site	Spent fuel storage at 1,624 fuel assemblies and additional temporary storage of 90 fuel assemblies in the fuel transfer pit (NRC 2001)
Fremont Energy Center; 540 megawatts	Sandusky Township, Ohio (15 mi	In construction; operations

Project/Action	Location	Status
(MW) natural gas-fired combined-cycle electric generating plant, with a peaking capacity of 704 MW	south of Davis-Besse)	projected to begin in mid-2012 (OPSB 2011a)
Bay Shore Plant; 648 MW of electricity produced from three coal-fired units, one petroleum coke-fired unit, & one oil-fired unit	Maumee Bay in Oregon, Ohio (16 mi northwest of Davis-Besse)	Operational (Feco 2007)
Toledo Refinery Substation Project; construction of a new 138/69 kV substation to provide additional electrical power & improved reliability to the BP-Husky Refinery	Oregon, Ohio, near the intersection of (19 mi west of Davis-Davis-Besse)	Proposed (OPSB 2011b)
Troy Energy Facility; 600 MW gas turbine peaking plant	Lemoyne Industrial Park, Troy Township, Ohio (20 mi southwest of Davis-Besse)	Operations began in 2002 (OPSB 2003)
J.R. Whiting Power Plant; 328 MW coal-fired plant	On Lake Erie in Luna Pier, MI (23 mi northeast of Davis-Besse)	Operational (CE 2011)
Detroit Edison Monroe Power Plant; 3,280 MW coal-fired plant	On Lake Erie in Monroe, MI (24 mi northeast of Davis-Besse)	Operational (DTE 2011a)
Fermi Nuclear Power Plant, Unit 1	Near Monroe, MI, on Lake Erie (27 mi northeast of Davis-Besse)	Not operational; proposed decommissioning & demolition of the plant (DTE 2011b)
Fermi Nuclear Power Plant Unit 2; 1,098 MW nuclear power plant	Near Monroe, MI, on Lake Erie (27 mi northeast of Davis-Besse)	Operational (DTE 2011b)
Fermi Nuclear Power Plant Unit 3; 1,535 MW proposed nuclear reactor	Near Monroe, MI, on Lake Erie (27 mi northeast of Davis-Besse)	Proposed; operations could begin as early as 2021 (DTE 2011b)
Independent spent fuel storage installation on Fermi site; dry spent-fuel storage	Near Monroe, MI, on Lake Erie (27 mi northeast of Davis-Besse)	Proposed (DTE 2011b)

4.15.1 Cumulative Impacts on Air Quality

The following analysis considers potential impacts through the end of the current license term as well as the 20-year renewal license term. In evaluating the potential impacts on air quality associated with license renewal, the NRC staff uses as its baseline the existing air quality conditions described in Section 2.2.2.1 of this SEIS. These baseline conditions encompass the existing air quality conditions (EPA's NAAQS county designations) potentially affected by air emissions from the continued operations and refurbishment activities. As described in Section 2.2.2.1, Ottawa County—where Davis-Besse is located—is designated in attainment for CO, Pb, NO_2, PM_{10}, $PM_{2.5}$ and is not designated for SO_2 (OEPA 2013). Lucas and Wood counties, abutting Ottawa County to the west, are designated as maintenance area for 8-hour ozone NAAQS. The nearest non-attainment area is Monroe County[1] in Michigan, for $PM_{2.5}$ NAAQS, which is northwest of Ottawa County.

[1] Michigan Department of Environmental Quality finds that, based in part on air quality monitoring data collected in the 2007 through 2010 period, all its counties are currently in compliance with the $PM_{2.5}$ standards and has drafted a letter to the U.S. EPA requesting that it make a determination that Southeast Michigan is in attainment with the $PM_{2.5}$ NAAQS (see http://www.michigan.gov/documents/deq/deq-aqd-draft-SE-redesignation_pm2.5v9_350980_7.pdf).

Currently, Davis-Besse is operating under one air permit for an auxiliary boiler but exempt for emergency generators. Davis-Besse is applying for a “synthetic minor” permit to OEPA, which covers the sitewide emission sources. Davis-Besse operations comply with its air pollution control permit application, and FENOC has no plans that would change this practice for the license renewal term (FENOC 2010). Annual emissions of criteria pollutants, volatile organic compounds (VOCs), and hazardous air pollutants (HAPs) at Davis-Besse vary from year to year but are well below the threshold for a major source (see Table 2.2-1). Accordingly, air emissions from continued operation of the plant and associated impacts on ambient air quality would not be expected to change during the license renewal period. Considering the location of nearby non-attainment and maintenance areas and the prevailing southwesterly wind direction in the area, these emissions are not anticipated to deteriorate the current nonattainment and maintenance status. Minor and short-duration air quality impacts can be expected to occur during the steam generator replacement project activities. The main contributors to air quality impacts associated with completed and ongoing refurbishment activities would be fugitive dust generation from facility construction activities, refurbishment work to open the shield building and containment vessel to replace the steam generators and related equipment, and exhaust emissions from motorized equipment and vehicles of temporary workers.

Combustion-related greenhouse gas (GHG) emissions (such as CO_2, CH_4, and N_2O) at Davis-Besse are minor, given the nature of a nuclear facility that is not burning fossil fuels to generate electricity. As discussed in Section 2.2.2.1, GHG stationary emission sources at the station include primarily auxiliary boilers, small and large emergency diesel generators, and miscellaneous diesel-powered equipment. These combustion sources are designed for efficiency and operated using good combustion practices on a limited basis throughout the year (i.e., often only for testing). Other combustion-related GHG emission sources at Davis-Besse include commuter, visitor, support, and delivery vehicle traffic within, to, and from the plant. In addition, small amounts of HFCs, PFCs, and sulfur hexafluoride (SF_6) might be released into the atmosphere during normal operations or at various stages of the equipment’s life cycle.

In April 2012, EPA published the official U.S. inventory of GHG emissions, which finds and quantifies the primary anthropogenic sources and sinks of GHGs. EPA reported that, in 2010, the total amount of carbon dioxide equivalent[2] (CO_{2e}) emissions related to electricity generation was 2,277.3 teragrams (2,277.3 MMT) (EPA 2012). The EIA reported that, in 2010, electricity production in Ohio was responsible for 121 teragrams of CO_2 emissions (121 MMT CO_{2e}) (EIA 2012). The NRC staff estimates that annual carbon dioxide equivalent emissions from operation at Davis-Besse amount to 4,693 MT/year.

In Ohio, Senate Bill 221, Alternative Energy Portfolio Standard (AEPS) and Energy Efficiency Portfolio Standard (EEPS)—which establishes annual benchmarks for renewable energy and energy efficiency—was signed into law on May 1, 2008 (Ohio Department of Development 2011). SB 221 requires Ohio investor-owned utilities to meet both AEPS and EEPS by 2025. The AEPS includes requirements for renewable energy sources to supply 12.5 percent of electricity demand, and the EEPS will achieve a cumulative, annual energy savings in excess of 22 percent. Ohio’s renewable energy standard requires at least 6,000 MW of new wind and solar capacity. Solar photovoltaics, of about 450 to 800 MW, will be deployed or delivered to the State due to the 0.5 percent solar requirement.

[2] Carbon dioxide equivalent (CO_2e) is a measure used to compare the emissions from various GHGs on the basis on their global warming potential (GWP), defined as the cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas, CO_2. The CO_2e for a gas is derived by multiplying the mass of the gas by the associated GWP. For example, the GWP for CH_4 is estimated to be 21; thus, one ton of CH_4 emission is equivalent to 21 tons of CO_2 emissions.

Based on all of the above information, the NRC staff concludes that combined with the emissions from other past, present, and reasonably foreseeable future actions, cumulative impacts of criteria and hazardous air pollutants on ambient air quality from operations at Davis-Besse would be SMALL.

4.15.2 Cumulative Impacts on Water Resources

This section addresses the direct and indirect effects of license renewal on water resources when added to the aggregate effects of other past, present, and reasonably foreseeable future actions. Water availability and water quality are both considered. The geographic area considered in this analysis is defined for groundwater as an area within a 3-mi (5-km) radius of the site, groundwater impacts to tributaries for impacts to Lake Erie, and, for surface water, as Lake Erie in its entirety.

4.15.2.1 Groundwater

The U.S. Global Change Research Program predicts an increase in precipitation intensity in winter and spring, with more frequent heavy downpours. The increased intensity of storms will likely cause faster runoff rates and a reduction in overall recharge of groundwater and aquifers. As documented in the Lake Erie Lakewide Management Plan (LAMP) the reduction in groundwater recharge due to the increase of spring runoff has resulted in a reduction in summer groundwater base flows. In addition, the continued human use and consumption of groundwater resources reduced water tables and consequently reduced spring water flow to rivers and streams that feed into Lake Erie (EPA 2008).

Although Davis-Besse has not withdrawn groundwater since construction-phase dewatering, 60 percent of all Ottawa County residents rely on groundwater (Graham et al., 1997). As a result, NRC staff concludes that the impact to groundwater quantity is MODERATE due to the noticeable cumulative impacts due to urbanization and climate change. The direct and indirect impacts from continued operation of Davis-Besse however would be SMALL.

Groundwater quality in the vicinity of the site may be affected by point source pollution, such as industries or septic tanks, and non-point source pollution, such as agricultural chemical usage and lawn chemicals (Graham et al. 1997). In a study summarized by Graham et al. (1997), nitrate-nitrogen (a common agricultural chemical) results from a county-wide Groundwater Sampling Program were found to be below the safe drinking water standard of 10 ppm. As described in Section 2.2.5, groundwater at Davis-Besse has been shown to have tritium elevated above background but well below the drinking water standard. Tritium concentrations have been decreasing. Petroleum products have been released onsite but are not believed to have traveled offsite, and they have undergone partial remediation. Other operational or planned projects or industries, such as those in Table 4.15-1, could affect groundwater quality but likely would not result in significant, widespread groundwater impacts, especially within several miles of Davis-Besse.

The NRC staff concludes that the cumulative impacts on groundwater quality from the proposed license renewal and other past, present, and reasonably foreseeable projects would be SMALL. The direct and indirect impacts from continued operation of Davis-Besse on groundwater quality would also be SMALL.

4.15.2.2 Surface Water

The water of Lake Erie is a valuable resource both in the relatively shallow western basin adjacent to Davis-Besse and across the entire lake. Public supply systems in Ottawa County relying on surface water (mainly from Lake Erie) withdraw an average of 3,447,000 gallons per day (Graham et al. 1997). The intake for Toledo, OH, is 12 mi west of Davis-Besse; average withdrawal is 77,800,000 gallons per day (FENOC 2010d). In total, U.S. and Canadian annual Lake Erie water use was over 56,543 MGD in 2004, with 54,723 MGD as power plant withdrawals and 1,106 MGD as public-supply withdrawals (GLC 2006). In 2004, the total consumptive use was 485 MGD (GLC 2006). Active or proposed projects, such as those listed in Table 4.15-1, have the potential to consume large amounts of lake water, especially for cooling systems at power plants. In addition to the projects listed, other industries relying on Lake Erie water will be operating in the U.S. and Canada during the license renewal term.

Climate change has the potential to affect water resources available for cooling systems and the impact of reactor operations on water resource availability for other users. A recent compilation of the state of the knowledge in this area (USGCRP 2009) projects the changes in the climate for the region of interest during the license renewal period to include an increase in average temperature. Precipitation is expected to increase slightly in the winter and spring, with more intense rainstorms year-round. The average level of Lake Erie could decrease more than a foot (more than 0.3 m) due to increased evaporation caused by the warmer temperatures, resulting in a decrease of the lake's volume. As discussed in 2.1.7.1, the intake is about 14 ft (4.3 m) below the lake surface, so operations should be able to continue. However, warmer lake water would result in increased cooling water use by power plants. The impact from climate change could be measureable in Lake Erie, and these changes are potentially significant (Figure 4.15-2 and Figure 4.15-3).

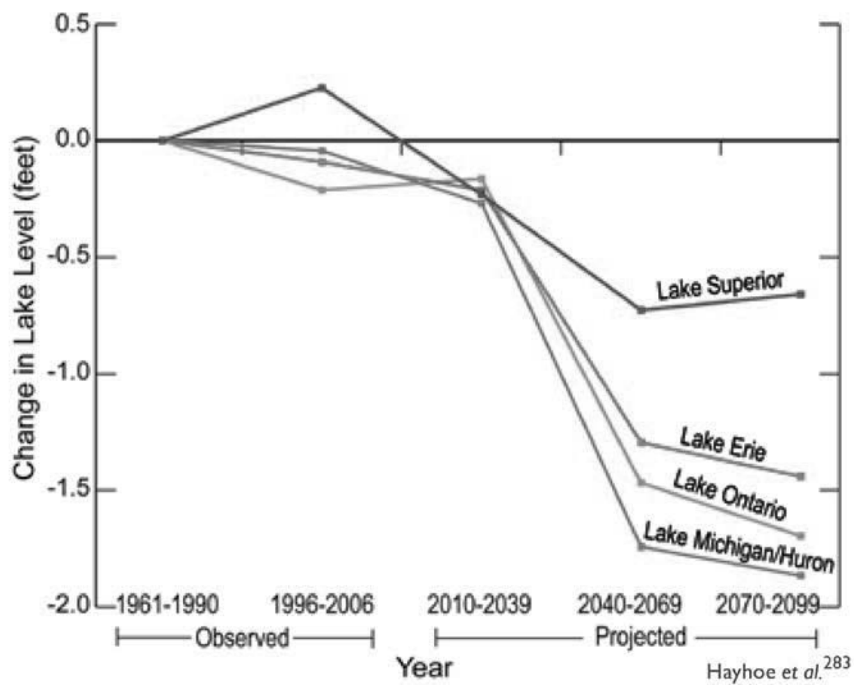

Figure 4.15-2. Projected Changes in Lake Levels Under a High Emission Scenario

Source: USGCRP 2009

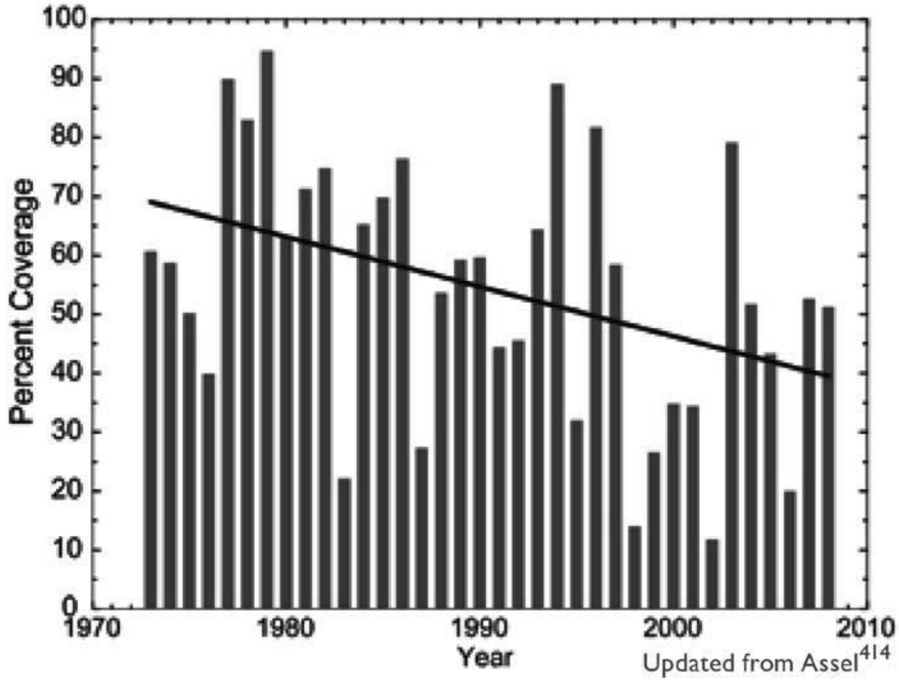

Figure 4.15-3. Observed Changes in Great Lakes Ice Cover, Seasonal Maximum Coverage 1973–2008

Source: USGCRP 2009

Point and non-point sources of pollution have affected the water quality of the western basin of Lake Erie. Ottawa County rivers and creeks, including the Toussaint River, are affected by non-point source contamination (Graham et al. 1997). Sources include channelization, sanitary landfills, urbanization, silviculture, livestock, and agricultural production. These rivers and creeks are tributaries to Lake Erie. Similar issues have the potential to affect water quality from numerous other Lake Erie tributaries located in Ohio, Pennsylvania, New York, and Ontario. The two main water quality concerns in Lake Erie are increased phosphorus loading, which can cause toxic algal blooms, and elevated concentrations of the bioaccumulative contaminants dioxin, polychlorinated biphenyls (PCBs), and mercury (Brannan 2009; Hartig et al. 2007). In the ER (FENOC 2010), over 200 facilities were identified that have an NPDES permit to discharge in the four-county (Ottawa, Lucas, Wood, Sandusky) area closest to Davis-Besse. These discharges are generally made to Lake Erie or its tributaries. Numerous other dischargers are present in the Lake Erie watershed in the U.S. and Canada.

The EPA's Great Lakes National Program Office has initiated the Great Lakes Restoration Initiative (EPA 2011e), a consortium of 11 Federal agencies that developed an action plan to address environmental issues. These issues fall into five areas—cleaning up toxics and areas of concern, combating invasive species, promoting nearshore health by protecting watersheds from polluted runoff, restoring wetlands and other habitats, and tracking progress and working with strategic partners. This long-term initiative includes the water quality concerns of Lake Erie.

Climate change, discussed above, could affect surface water quality in the region (USGCRP 2009). Greater storm intensity could increase erosion and sediment loads in tributaries of Lake Erie. Lower lake levels could magnify factors such as sediment loading, phosphorous loading, and bioaccumulative contaminants. The thermal plume from power plant cooling systems would increase, and a reduced lake volume would result in a larger thermal mixing zone. Warmer average lake water temperature would result in increased water usage for cooling systems, further increasing the thermal plumes. These changes are potentially significant.

The NRC staff concludes that cumulative impacts on surface water resources in the geographic area of interest from the proposed license renewal and other past, present, and reasonably foreseeable actions would be SMALL to MODERATE. However, the overall direct and indirect impacts from the proposed license renewal would be SMALL and would not noticeably alter onsite or adjacent water bodies, including Lake Erie.

4.15.3 Cumulative Impacts on Aquatic Resources

This section addresses the direct and indirect effects of license renewal on aquatic resources when added to the aggregate effects of other past, present, and reasonably foreseeable future actions. The geographic area considered in the cumulative aquatic resources analysis includes the western basin of Lake Erie, along which the Davis-Besse site is located.

Consistent with other agencies' and CEQ's (1997) NEPA guidance, the term "baseline" pertains to the condition of the resource without the action (i.e., under the no-action alternative). Under the no-action alternative, the plant would shutdown, and the resource would conceptually return to its condition without the plant (which is not necessarily the same as the condition before the plant was constructed). The baseline, or benchmark, for assessing cumulative impacts on aquatic resources takes into account the pre-operational environment as recommended by the EPA (1999) for its review of NEPA documents:

> Designating existing environmental conditions as benchmark may focus the environmental impact assessment too narrowly, overlooking cumulative impacts of past and present actions or limiting assessment to the proposed action and future actions. For example, if the current environmental condition were to serve as the condition for assessing the impacts of relicensing a dam, the analysis would only identify the marginal environmental changes between the continued operation of the dam and the existing degraded state of the environment. In this hypothetical case, the affected environment has been seriously degraded for more than 50 years with accompanying declines in flows, reductions in fish stocks, habitat loss, and disruption of hydrologic functions. If the assessment took into account the full extent of continued impacts, the significance of the continued operation would more accurately express the state of the environment and thereby better predict the consequences of relicensing the dam.

The geographic area considered in the cumulative aquatic resources analysis includes the western basis of Lake Erie, along which the Davis-Besse site is located.

Sections 2.2.5 and 2.2.7 present an overview of the condition of Lake Erie near Davis-Besse and the history and factors that led to its current condition.

<u>Invasive Species</u>. Invasive species have caused dramatic shifts in fish populations in the lake and have resulted in the extirpation of many species (see Section 2.2.5). Invasive species have irreversibly altered the Lake Erie ecosystem and will continue to affect Lake Erie fish and invertebrate populations in the foreseeable future. Ballast water releases have introduced about 30 percent of the invasive species in the Great Lakes today (EPA 2011e). The U.S. Coast Guard is in the process of developing ballast water discharge standards, which would limit the

introduction of additional exotic species in the future. However, the existing exotic species in the Lake Erie system will continue to affect the ecosystem balance in the future. Zebra mussels (*Dreissena polymorpha*) and quagga mussels (*D. rostriformis bugensis*) outcompete native species. These mussels clog the intake pipes and cooling systems of power plants and make efforts to recover native mussel and clam populations difficult. The sea lamprey is attributed to the collapse of lake trout (*Salvelinus namaycush*), whitefish (*Coregonus clupeaformis*), and chub (*Couesius plumbeus*) populations, which has negatively affected the fishing economy (GLFC 2000). The Lake Erie Lakewide Management Plan (EPA 2008) includes management objectives and measures to reduce the impact of current invasive species on the lake's ecosystem and prevent new exotic species from entering the lake.

<u>Fishing</u>. Fishing has been a major influence on commercially and recreationally sought fish species within Lake Erie. The ODNR manages the fishing of the 19 harvested fish species in the lake, which are discussed in Section 2.2.5. Many native fish species have suffered population declines due to invasive species. The most acute declines have been those of the lake trout, whitefish, and chub beginning in the 1940s and 1950s (GLFC 2000). The walleye population recovered considerably in the 1980s but has since declined. Continued fishing of these and other fish will slow the recovery of those species in decline.

<u>Energy Development</u>. Many energy-producing facilities are located near Davis-Besse (see) that affect aquatic resources. Fermi Nuclear Power Plant, the Bay Shore Plant, J.R. Whiting Power Plant, and the Detroit Edison Monroe Power Plant all use Lake Erie as a source of cooling water. Though each plant's impact on aquatic populations for impingement, entrainment, and thermal discharge is individually small, the cumulative impact may result in disproportionate loss of nearshore species and those species with pelagic (buoyant) eggs, which are more likely to be swept into the intake. Proposed energy-producing facilities—such as the proposed new unit at Fermi Nuclear Power Plant, Fremont Energy Center, and others listed in —will likely increase this cumulative impact.

<u>Urbanization and Shoreline Development</u>. About one-third of the Great Lakes population (11.6 million people) lives within the Lake Erie watershed (EPA 2008). Given that Lake Erie is also the smallest Great Lake, it has experienced the most dramatic effects from urbanization and shoreline development. Lake Erie was the first Great Lake to experience massive algal blooms and depleted oxygen levels characteristic of a eutrophic environment. Beginning in the 1950s, phosphorus and oxygen levels from developed and agricultural runoff became a major concern in the lake. In the 1970s, industrialization and chemical production became another stressor to the lake and resulted in an additional source of contaminants. Phosphorus levels decreased in the 1980s due to various control measures and monitoring but began to increase again in the 1990s (EPA 2008). Filling of Lake Erie's wetland and marshes (discussed in Section 4.11.2) exacerbated the lake's nutrient imbalances. Today, many programs and initiatives, including the Great Lakes Water Quality Agreement, are helping to restore the integrity of the lake, but Lake Erie continues to be significantly altered by past changes in land use and continued urban development.

<u>Climate Change</u>. The potential cumulative effects of climate change on Lake Erie could result in a variety of changes that would affect aquatic resources. The U.S. Global Change Research Program (USGCRP) (2009) identified higher temperatures as a major concern for the Great Lakes because it will cause more evaporation and, thus, likely reduce the Great Lakes water levels. In turn, reduced amount of lake ice would form in the winter, exacerbating the evaporation (USGCRP 2009). Lower water levels could ultimately contribute to loss of species;

loss of habitat, especially nearshore spawning areas; and increased concentrations of contaminants (USGCRP 2009).

Conclusion. The NRC staff examined the cumulative effects of historical conditions of Lake Erie's western basin and the impacts from invasive species, fishing, energy development, urbanization and shoreline development, and climate change. While the aquatic impacts associated with the continued operation of Davis-Besse are SMALL, the NRC staff believes that the factors discussed in this section—especially invasive species and urban development—have led to LARGE cumulative impacts to Lake Erie aquatic resources.

4.15.4 Cumulative Impacts on Terrestrial Resources

This section addresses the direct and indirect effects of license renewal on terrestrial resources when added to the aggregate effects of other past, present, and reasonably foreseeable future actions. The geographic area considered in this analysis is the Davis-Besse site and in-scope transmission line corridors.

Section 2.2.6 presents an overview of the current condition of the Davis-Besse site and in-scope transmission line corridors and the history and factors that led to its current condition. At present, the area is predominantly wetlands, much of which is managed by the FWS as part of the Ottawa National Wildlife Refuge. The 733 ac (297 ha) leased to the FWS connect other marsh areas within the Ottawa National Wildlife Refuge network and serve as vital habitat for migrating bird species and wetland-dependent wildlife.

Historical Conditions. Historically, the Great Black Swamp in northwestern Ohio covered an area about the size of the State of Connecticut. The USGS (1999) estimates that wetland drainage of Lake Erie marshes likely began in 1836, and Ohio's swamp forests were heavily logged for a mix of birch, ash, elm, oak, cottonwood, poplar, maple, basswood, and hickory. Settlers also cleared many of the forests and filled in wetlands to create land for building houses and cultivating crops (UT, undated). To fill in the wetlands, series of ditches were dug to drain the land, which caused a drastic reduction in wetland-dependent species' populations.

Protected Species. Sections 2.2.8 and 4.7 discuss protected species. Many protected species occur on the Davis-Besse site including many species of migratory birds and six species of Ohio-listed plants. Additionally, the Davis-Besse site and transmission line corridors have the potential to provide habitat for four Federally listed species (see Section 4.7), as well as other State-listed amphibians, reptiles, insects, and mammals. The Davis-Besse site and transmission line corridors, as well as the network of wetlands within the Ottawa National Wildlife Refuge, will continue to provide habitat for protected species. However, other factors discussed in this section—such as invasive species, habitat fragmentation, and climate change—may reduce the population sizes of some protected species and force species to compete for more limited resources in the future.

Invasive Species. Invasive species are non-native species that thrive outside of their natural range due to favorable environmental conditions and a lack of natural predators or other environmental controls. Invasive species are able to colonize and rapidly spread, threatening the success of native species populations in the process. The invasive purple loosestrife (*Lythrum salicaria*), reed canary grass (*Phalaris arundinacea*), common reed (*Phragmites australis*), and flowering rush (*Butomus umbellatus*) occur on the Davis-Besse site. Additionally, many non-native insect and other wildlife species occur in the region. As discussed in Section 2.2.6, the FWS maintains portions of the Ottawa National Wildlife Refuge, including Navarre Marsh on the Davis-Besse site, for invasive plant species through a variety of methods.

Continued efforts to control these species will help to protect native species populations in the future. However, the high number of invasive plant and pest species in Ohio—138 and 21, respectively (EFETAC 2011)—means that some invasive species that are not currently in the Davis-Besse region will likely spread to this area in the future.

Energy Development. Table 4.15-1 summarizes many energy development projects that are in operation now as well as those that are planned for future operation including, coal-fired plants, gas-fired plants, and one nuclear facility (Fermi Nuclear Power Plant). Coal-fired plants are a major source of air pollution in the U.S. because they release sulfur dioxide, nitrogen oxides, mercury, carbon dioxide, and particulates. Nitrous oxides and sulfur dioxides combine with water to form acid rain, which can lead to erosion and changes in soil pH levels. Mercury deposits onto soil and surface water, which may then be taken up by terrestrial and aquatic plant or animal species and poses the risk of bioaccumulation. Gas-fired plants also emit nitrogen oxides and carbon dioxide but at a lower rate than coal-fired plants. Gas-fired plants can also emit methane, a GHG, if the natural gas is not burned completely. Impacts on the terrestrial environment from Fermi Nuclear Power Plant can be expected to be similar to those from Davis-Besse, as discussed in Section 4.6.

Urbanization and Habitat Fragmentation. As the region surrounding Davis-Besse becomes more developed, habitat fragmentation will increase. Species that require larger ranges, especially predators, will likely suffer reductions in their populations. In contrast, herbivores will experience less predation pressure, and their populations are likely to increase. Edge species will likely benefit from the fragmentation, while species that require interior forest or swamp habitat will likely suffer. The transmission line corridors established for Davis-Besse's transmission lines represent habitat fragmentation, though many of these corridors pass through cultivated land that has already been converted from its native habitat. Habitat fragmentation of surrounding areas may increase the value of the network of wetlands within the Ottawa National Wildlife Refuge, part of which is on the Davis-Besse site, because this land will not experience fragmentation or other human-induced impacts.

Habitat Restoration. The FWS has worked to convert a total of 6,898 ac on 801 sites across northwestern Ohio to native wetlands through the FWS Private Lands Program (FWS 2011). As part of this effort, the FWS is in the process of acquiring an 800-ac parcel of farmland through a fee title adjacent to Metzger Marsh in Lucas County (GLRC 2009). The U.S. Army Corps of Engineers is developing a program to convert and restore 200 ac of Lake Erie coastal wetland habitat along Maumee Bay near Toledo (GLRC 2009). The U.S. Army Corps of Engineer's Great Lakes Habitat Restoration Database lists 32 other restoration or habitat enhancement projects within the Great Lakes region of Ohio. The cumulative effect of these programs will strengthen the overall integrity of terrestrial habitats and provide connectivity between habitat areas.

Climate Change. The U.S. Global Climate Change Research Program (USCGRP 2009) predicts that rainfall within the midwestern States will intensify in the winter and spring, which could lead to increased runoff and erosion, especially within habitat adjacent to developed, impervious surfaces and riparian areas. In contrast, rainfall will decrease in the summer months, and increased average temperatures will lead to increased evaporation rates and longer period between rainfalls (USCGRP 2009). Summer drought conditions will likely lead to a reduced area of wetland habitat. Given the high value of wetlands in the Davis-Besse region for dozens of migrating bird species, the reduction in wetland habitat could negatively affect certain migrating bird species populations as they compete with one another for limited resources within a reduced area of land. Changing climate conditions will also cause many native wildlife species to shift their ranges and allow invasive species, especially pest insects that are now controlled by harsh winters, to become more successful colonizers and grow into larger populations (USCGRP 2009).

Conclusion. As stated in Section 4.7.1, the NRC staff concluded that the impacts associated with the Davis-Besse license renewal are SMALL. However, the NRC staff examined the cumulative effects of historical conditions at the Davis-Besse site, protected species, invasive species, urbanization and habitat fragmentation, and climate change. The NRC staff believes that the cumulative impact of the historical draining of wetlands and loss of forested swamps—when added to present conditions and future impacts from urban development, habitat fragmentation, and climate change—will result in loss of habitat and a decline in species diversity of MODERATE impact to the terrestrial environment.

4.15.5 Cumulative Human Health Impacts

4.15.5.1 Radiological

The NRC and EPA established radiological dose limits for protection of the public and workers from both acute and long-term exposure to radiation and radioactive materials. As discussed in Section 4.8.1, the doses resulting from operation of Davis-Besse are below regulatory limits, and the impacts of these exposures would be SMALL. For the purposes of this analysis, the geographical area considered is the area included within an 50 mi (80 km) radius of the Davis-Besse site.

EPA regulations in 40 CFR Part 190 limit the annual cumulative radiation dose to members of the public from all sources in the nuclear fuel cycle, including nuclear power plants, fuel fabrication facilities, waste disposal facilities, and transportation of fuel and waste to 25 mrem (0.25 mSv). The NRC staff's review of radioactive releases from Davis-Besse shows that the annual radiation dose to the public has been less than 1.0 mrem (0.01 mSv). This dose is well within the NRC's and EPA's radiation protection standards. In addition, as discussed in Section 4.8.1, Davis-Besse conducts an REMP around its site. The program measures radiation and radioactive materials in the environment from Davis-Besse and all other sources (i.e., other nuclear power plants as well as other licensed users of radioactive material). Therefore, the REMP would monitor any cumulative impacts. As discussed in Section 4.8.1, the NRC staff reviewed the historical radiological environmental monitoring results for Davis-Besse and found no significant environmental impact associated with the operation of the plant.

Davis-Besse operates an independent spent fuel storage installation (ISFSI) on the plant site. There is currently one other uranium fuel cycle facility within a 50-mi (80 km) radius of Davis-Besse that can contribute to the cumulative radiological impacts. The Fermi Nuclear Power Plant, Units 1 and 2, are located near Monroe, MI, on Lake Erie, approximately 27 mi northeast of Davis-Besse. Fermi Nuclear Power Plant, Unit 1, is non-operational and undergoing decommissioning. Fermi Nuclear Power Plant, Unit 2, is a 1,098 MW operating nuclear power plant, licensed by the NRC. Proposed projects on the Fermi plant site include the construction and operation of a 1,535 MW nuclear power plant (Fermi Nuclear Power Plant, Unit 3) and an ISFSI for dry storage of spent nuclear fuel.

The currently-operating facilities and proposed new nuclear facilities at the Fermi plant site would contribute to the cumulative radiological impacts in the vicinity of the Davis-Besse site. However, as discussed above, the cumulative radiological impacts from all uranium fuel cycle facilities in proximity to each other are limited to the radiation protection standards in 10 CFR Part 20 and 40 CFR Part 190.

Based on the NRC staff's review of Davis-Besse's radioactive effluent and environmental monitoring data, the information on the refurbishment of the reactor vessel head, the proposed steam generator replacement, and the expected continued compliance with Federal radiation protection standards, the cumulative radiological impacts from the operation of Davis-Besse and its ISFSI and the present and future radiological impacts from the Fermi plant site during the renewal term would be SMALL. The NRC will regulate any future nuclear power facility construction and operation near the Davis-Besse site that could contribute to cumulative radiological impacts. In addition, the State of Ohio will regulate facilities using radioactive material licensed by the State. Therefore, the NRC staff concludes that the cumulative radiological impacts to human health from the continued operation of Davis-Besse, including the nuclear facilities discussed above, during the license renewal term would be SMALL.

4.15.5.2 Microbiological Organisms

This section addresses the direct and indirect effects of license renewal on Human Health due to the presence of microbiological organisms when added to the aggregate effects of other past, present, and reasonably foreseeable future actions. The geographic area considered in this analysis is Lake Erie.

Because of the Davis-Besse scoping process, public comments informed the NRC staff of the cyanobacterial effects occurring on Lake Erie. Although several forms of bacteria and algae exist within Lake Erie two nuisance species, *Microcystis aeruginosa* and *Lyngbya wollei*, were the species of greatest concern. Farm fertilizer runoff and sewage overflows

In the 1960s and 1970s, the cyanobacterial blooms were a yearly occurrence. The blooms were visibly apparent due to the aqua colored shoreline trim and thick blankets in offshore waters. The implementation of phosphorus controls resulted in the reduction of Lake Erie's phosphorous levels and the blooms ultimately disappeared. Suddenly and unexpectedly, in 1995, the blooms reappeared dominated by *Microcystis aeruginosa*. The blooms did not return in 1996 or 1997, but have been present every year thereafter since 1998. In 2006, blooms of *Lyngbya wollei* were present along the shoreline of Maumee Bay and have since been recurrent in various severities. *Lyngbya wollie*, although known to exist in Lake Erie, had never been documented in bloom proportions within Lake Erie prior to the initial occurrence in 2006 The origin of the blooms is not known but is likely related to farm fertilizer runoff and sewage overflows (EPA 2008).

Some species of cyanobacteria, for instance *Microcystis aeruginosa,* release toxins into the water. Humans can be affected by these toxins with symptoms such as, skin irritation, stomach cramps, vomiting, nausea, diarrhea, fever, sore throat, headache, muscle and joint pain, blisters of the mouth and liver damage. Partaking in recreational activities including and similar to swimming in water bodies, where the toxins are present, may result in allergic reactions, such as asthma, eye irritation, rashes, and blisters around the mouth and nose. The World Health Organization (WHO) has documented cases resulting in skin rashes from contact with *Microcystis aeruginosa* (WHO 1999).

Current operation of Davis-Besse has not been linked to the presence or growth of the cyanobacteria in Lake Erie. Based on the reported health effects from contact of the cyanobacteria, NRC staff concludes that the cumulative impact on human health because of the presence of microbiological organisms is MODERATE.

4.15.5.3 Electromagnetic Fields

For electromagnetic fields, the NRC staff concludes that the Davis-Besse transmission lines are operating within NESC criteria, and the impacts would be SMALL. Any additional transmission lines would be required to meet the NESC criteria.

For the effects of chronic exposure to extremely low frequency-electromagnetic fields (ELF-EMFs), although the GEIS finding of “UNCERTAIN” is appropriate for Davis-Besse, the transmission lines associated with Davis-Besse are unlikely to significantly contribute to the regional exposure to ELF-EMFs.

Therefore, the NRC staff has concluded that the cumulative impacts of continued operation of the Davis-Besse transmission lines and other lines in the area would be SMALL.

4.15.6 Cumulative Socioeconomic Impacts

This section addresses socioeconomic factors that have the potential to be directly or indirectly affected by changes in operations at Davis-Besse in addition to the aggregate effects of other past, present, and reasonably foreseeable future actions. The primary geographic area of interest considered in this cumulative analysis is Lucas, Ottawa, Sandusky, and Wood counties where approximately 87.5 percent of Davis-Besse employees reside (FENOC 2010). This area is where the economy, tax base, and infrastructure would most likely be affected since Davis-Besse employees and their families reside, spend their income, and use their benefits within these counties.

As discussed in Section 4.9 of this SEIS, continued operation of Davis-Besse during the license renewal term would have no impact on socioeconomic conditions in the region beyond those already experienced. Since FENOC has no plans to hire additional workers during the license renewal term, overall expenditures and employment levels at Davis-Besse would remain relatively constant with no additional demand for permanent housing and public services. In addition, since employment levels and tax payments would not change, there would be no population or tax revenue-related land use impacts. Based on this and other information presented in Chapter 4 of this SEIS, there would be no additional contributory effect on socioeconomic conditions in the future from the continued operation of Davis-Besse during the license renewal term beyond what is currently being experienced.

FENOC indicated in their ER that steam generators would be replaced during the license renewal term in 2017 but will be replacing the steam generators during the 2014 refueling outage. FENOC estimates that steam generator replacement would require a one-time increase in the number of refueling outage workers for up to 70 days (FENOC 2010). These additional workers would create a one-time short-term increase in the demand for temporary (rental) housing and increased use of public water and sewer services and transportation impacts on access roads in the immediate vicinity of Davis-Besse. Given the short amount of time needed to replace the steam generators, the additional number of refueling outage workers and truck material deliveries needed to support this one-time replacement of the steam generators could have a temporary cumulative effect on socioeconomic conditions in the vicinity of the nuclear plant. However, there would be no long-term cumulative socioeconomic impacts from the steam generator replacement in the region. The NRC staff concludes that the cumulative socioeconomic impacts of continued operation of Davis-Besse would be SMALL.

4.15.7 Cumulative Historic and Archaeological Impacts

It does not appear likely that the proposed license renewal would adversely affect cultural resources at Davis-Besse. Any ground-disturbing activities that would occur during the license renewal term are unlikely to result in the loss of historic and archaeological resources, provided that the existing earth-moving procedures to protect presently undiscovered resources are implemented and because the disturbance of known historic and archaeological resources in coastal or inland areas are unlikely to occur. However, as noted in Section 2.2.9, there is potential for additional cultural resources to be present in the undisturbed areas in the southern portions of the site. Therefore, prior to any ground-disturbing activity in an undisturbed area, it is expected that the applicant would evaluate the potential for impacts on historic and archaeological resources according to their procedures and in consultation with the SHPO and appropriate Native American Tribes, as required under Section 106 of the NHPA. In the vicinity of Davis-Besse and its transmission lines, some projects have the potential to affect historic and archaeological resources, such as new or expanded road systems or pipeline construction; however, linear projects have some flexibility in the siting process and can typically avoid significant cultural resources, minimizing the potential for impact.

The NRC staff concludes that, when combined with past, present, and reasonably foreseeable future actions, the cumulative impact on historic and archaeological resources by continued operation of Davis-Besse during the license renewal period would be SMALL and would not result in the loss of historic and cultural resources.

4.15.8 Cumulative Impacts of Environmental Justice

The environmental justice cumulative impact analysis assesses the potential for disproportionately high and adverse human health and environmental effects on minority and low-income populations that could result from past, present, and reasonably foreseeable future actions including Davis-Besse operations during the renewal term. Adverse health effects are measured in terms of the risk and rate of fatal or nonfatal adverse impacts on human health. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant and exceeds the risk or exposure rate for the general population or for another appropriate comparison group. Disproportionately high environmental effects refer to impacts or risk of impact on the natural or physical environment in a minority or low-income community that are significant and appreciably exceeds the environmental impact on the larger community. Such effects may include biological, cultural, economic, or social impacts. Some of these potential effects have been identified in resource areas presented in Chapter 4 of this SEIS. Minority and low-income populations are subsets of the general public residing in the area, and all would exposed to the same hazards generated from Davis-Besse operations. As previously discussed in this chapter, the impact from license renewal for all resource areas (e.g., land, air, water, ecology, and human health) would be SMALL.

As discussed in Section 4.10 of this SEIS, there would be no disproportionately high and adverse impacts to minority and low-income populations from the continued operation of Davis-Besse during the license renewal term. Since FENOC has no plans to hire additional workers during the license renewal term, employment levels at Davis-Besse would remain relatively constant with no additional demand for housing or increased traffic. Based on this information, and the analysis of human health and environmental impacts presented in Chapters 4 and 5, it is unlikely that there would be any disproportionately high and adverse contributory effect on minority and low-income populations from the continued operation of Davis-Besse during the license renewal term.

Potential impacts to minority and low-income populations from refurbishment-related plant modifications (steam generator replacement) at Davis-Besse would mostly consist of environmental and socioeconomic effects (e.g., noise, dust, traffic, employment, and housing impacts). Radiation doses from plant operations after steam generator replacement are expected to remain at current levels and well within regulatory limits.

Noise and dust impacts during steam generator replacement would be short-term and limited to onsite activities at Davis-Besse. Minority and low-income populations residing along site-access roads would experience increased commuter vehicle traffic during shift changes. In addition, increased demand for rental housing during the refueling outages and steam generator replacement at the Davis-Besse could disproportionately affect low-income populations. However, due to the short duration of this refurbishment activity and the availability of rental housing in the four-county ROI, impacts to minority and low-income populations would be short-term and limited. According to American Community Survey 3-year estimates for 2008 through 2010, there were a combined total of over 39,000 vacant housing units in Lucas, Ottawa, Sandusky, and Wood counties (USCB 2012).

Based on this information and the analysis of human health and environmental impacts presented in this SEIS, the steam generator replacement would not have any long-term cumulative disproportionately high and adverse human health and environmental operational effects on minority and low-income populations residing in the vicinity of Davis-Besse.

4.15.9 Summary of Cumulative Impacts

The NRC staff considered the potential impacts resulting from operation of Davis-Besse during the period of extended operation and other past, present, and future actions in the vicinity of Davis-Besse. The preliminary determination is that the potential cumulative impacts would range from SMALL to MODERATE depending upon the resource area (Table 4.15-4).

Table 4.15-4. Summary of Cumulative Impacts on Resource Areas

Resource Area	Impact	Discussion
Air Quality	SMALL	Considering the distance to nearby non-attainment and maintenance areas and the prevailing southwesterly wind direction in the area, GHG emissions are not anticipated to deteriorate the current nonattainment/maintenance status. Accordingly, air emissions from continued operation of the plant and associated impacts on ambient air quality would not be expected to change during the license renewal period.
Water Resources Groundwater	SMALL	Although Davis-Besse has not withdrawn groundwater since construction-phase dewatering, 60 percent of all Ottawa County residents rely on groundwater. Groundwater quality in the vicinity of the site may be affected by point source pollution, such as industries or septic tanks, and non point source pollution, such as agricultural chemical usage and lawn chemicals. Other operational or planned projects or industries, could affect groundwater quality but likely would not result in significant, widespread groundwater impacts, especially within several miles of Davis-Besse.
Water Resources	SMALL to	Precipitation is expected to increase slightly in the winter and spring, with more intense rainstorms year round. The

Resource Area	Impact	Discussion
Surface water	MODERATE	average level of Lake Erie could decrease more than a foot (more than 0.3 m) due to increased evaporation caused by the warmer temperatures, resulting in a decrease of the lake's volume. Warmer lake water would result in increased cooling water use by power plants
Aquatic Resources	LARGE	The impact on aquatic resources from only the Davis-Besse license renewal has been determined to be SMALL. However, factors, such as invasive species, fishing, energy development, urbanization and shoreline development have led to LARGE cumulative impacts to Lake Erie aquatic resources.
Terrestrial Resources	MODERATE	The cumulative impact of the historical draining of wetlands and loss of forested swamps—when added to present conditions and future impacts from urban development, habitat fragmentation, and climate change—will result in loss of habitat and a decline in species diversity.
Human Health—Radiological	SMALL	The cumulative radiological impacts from all uranium fuel cycle facilities in proximity to each other are limited to the radiation protection standards in 10 CFR Part 20 and 40 CFR Part 190.
Human Health—Microbiological Organisms	MODERATE	Some species of cyanobacteria, for instance *Microcystis aeruginosa*, release toxins into the water. Humans can be affected by these toxins with symptoms such as, skin irritation, stomach cramps, vomiting, nausea, diarrhea, fever, sore throat, headache, muscle and joint pain, blisters of the mouth and liver damage. Partaking in recreational activities including and similar to swimming in water bodies, where the toxins are present, may result in allergic reactions, such as asthma, eye irritation, rashes, and blisters around the mouth and nose.
Human Health—Electromagnetic Fields	SMALL	The cumulative impacts from Davis-Besse's transmission would be SMALL.
Socioeconomics	SMALL	FENOC has no plans to hire additional workers during the license renewal term, overall expenditures and employment levels at Davis-Besse would remain relatively constant with no additional demand for permanent housing and public services. In addition, since employment levels and tax payments would not change, there would be no population or tax revenue related land use impacts.
Historic & Archaeological	SMALL	Prior to any ground disturbing activity in an undisturbed area, it is expected that the applicant would evaluate the potential for impacts according to their procedures and in consultation with the SHPO and appropriate Native American Tribes, as required under Section 106 of the NHPA.
Environmental Justice	SMALL	FENOC has no plans to hire additional workers during the license renewal term, employment levels at Davis-Besse would remain relatively constant with no additional demand for housing or increased traffic.

4.16 References

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10 CFR Part 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, “Domestic Licensing of Production and Utilization Facilities.”

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

36 CFR Part 800. *Code of Federal Regulations*, Title 36*, Parks, Forests, and Public Property*, Part 800, “Protection of Historic Properties.”

40 CFR Part 190. *Code of Federal Regulations*, Title 40, *Protection of Environment*, Part 190, “Environmental Radiation Protection Standards for Nuclear Power Operations.”

50 CFR Part 22. *Code of Federal Regulations*, Title 50, *Wildlife and Fisheries*, Part 22, “Eagle Permits.”

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5.0 ENVIRONMENTAL IMPACTS OF POSTULATED ACCIDENTS

This chapter describes the environmental impacts from postulated accidents that might occur during the period of extended operation. The term "accident" refers to any unintentional event outside the normal plant operational envelope that results in a release or the potential for release of radioactive materials into the environment. Two classes of postulated accidents are evaluated in the generic environmental impact statement (GEIS). These are design-basis accidents (DBAs) and severe accidents. Table 5.1-1 notes the issues related to postulated accidents.

Table 5.1-1. Issues Related to Postulated Accidents.

Two issues related to postulated accidents are evaluated under National Environmental Policy Act (NEPA) in the license renewal review, DBAs, and severe accidents.

Issue	Category
DBAs	1
Severe accidents	2

5.1 Design-Basis Accidents

In order to receive U.S. Nuclear Regulatory Commission (NRC) approval to operate a nuclear power facility, an applicant for an initial operating license must submit a safety analysis report (SAR) as part of its application. The SAR presents the design criteria and design information for the proposed reactor and comprehensive data on the proposed site. The SAR also discusses various hypothetical accident situations and the safety features that are provided to prevent and mitigate accidents. The NRC staff reviews the application to determine whether the plant design meets the Commission's regulations and requirements and includes, in part, the nuclear plant design and its anticipated response to an accident.

DBAs are those accidents that both the applicant and the NRC staff evaluate to ensure that the plant can withstand normal and abnormal transients, and a broad spectrum of postulated accidents, without undue hazard to the health and safety of the public. Many of these postulated accidents are not expected to occur during the life of the plant, but are evaluated to establish the design basis for the preventive and mitigative safety systems of the facility. The acceptance criteria for DBAs are described in Title 10 of the *Code of Federal Regulations* (CFR) Part 50 (10 CFR Part 50) and 10 CFR Part 100.

The environmental impacts of DBAs are evaluated during the initial licensing process, and the ability of the plant to withstand these accidents is demonstrated to be acceptable before issuance of the operating license. The results of these evaluations are found in applicant documentation such as the applicant's final safety analysis report (FSAR), the safety evaluation report (SER), the final environmental statement (FES), and Section 5.1 of this supplemental environmental impact statement (SEIS). An applicant is required to maintain the acceptable design and performance criteria throughout the life of the plant, including any extended-life operation. The consequences for these events are evaluated for the hypothetical maximum exposed individual; as such, changes in the plant environment will not affect these evaluations. Because of the requirements that continuous acceptability of the consequences and aging management programs be in effect for the period of extended operation, the environmental impacts as calculated for DBAs should not differ significantly from initial licensing assessments over the life of the plant, including the period of extended operation. Accordingly, the design of the plant relative to DBAs during the period of extended operation is considered to remain acceptable, and the environmental impacts of those accidents were not examined further in the GEIS.

The Commission has determined that the environmental impacts of DBAs are of SMALL significance for all plants because the plants were designed to successfully withstand these accidents. Therefore, for the purposes of license renewal, DBAs are designated as a Category 1 issue. The early resolution of the DBAs makes them a part of the current licensing basis of the plant; the current licensing basis of the plant is to be maintained by the applicant under its current license and, therefore, under the provisions of 10 CFR 54.30, is not subject to review under license renewal.

No new and significant information related to DBAs was identified during the review of the Davis-Besse Nuclear Power Station's (Davis-Besse's) Environmental Report (ER) (FENOC 2010), the site audit, the scoping process, or the evaluation of other available information. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS.

5.2 Severe Accidents

Severe nuclear accidents are those that are more severe than DBAs because they could result in substantial damage to the reactor core, whether or not there are serious offsite consequences. In the GEIS, the staff assessed the impacts of severe accidents during the license renewal period, using the results of existing analyses and site-specific information to conservatively predict the environmental impacts of severe accidents for each plant during the renewal period.

Severe accidents initiated by external phenomena such as tornadoes, floods, earthquakes, fires, and sabotage have not traditionally been discussed in quantitative terms in FESs and were not specifically considered for the Davis-Besse site in the GEIS (NRC 1996). However, the GEIS did evaluate existing impact assessments performed by NRC and by the industry at 44 nuclear plants in the U.S. and concluded that the risk from beyond design basis earthquakes at existing nuclear power plants is SMALL. The GEIS for license renewal performed a discretionary analysis of terrorist acts in connection with license renewal and concluded that the core damage and radiological release from such acts would be no worse than the damage and release expected from internally initiated events. In the GEIS, the Commission concludes that the risk from sabotage and beyond design-basis earthquakes at existing nuclear power plants is SMALL and, additionally, that the risks from other external events are adequately addressed by a generic consideration of internally initiated severe accidents (NRC 1996).

Based on information in the GEIS, the staff found the following to be true:

> The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to ground water, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives.

The staff identified no new and significant information related to postulated accidents during the review of Davis-Besse's ER (FENOC 2010), the site audit, the scoping process, or the evaluation of other available information. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. However, in accordance with 10 CFR 51.53(c)(3)(ii)(L), the staff has reviewed severe accident mitigation alternatives (SAMAs) for Davis-Besse. The results of the review are discussed in Section 5.3.

5.3 Severe Accident Mitigation Alternatives

Section 51.53(c)(3)(ii)(L) requires that license renewal applicants consider alternatives to mitigate severe accidents if the staff has not previously evaluated SAMAs for the applicant's plant in an environmental impact statement (EIS) or related supplement or in an environmental assessment. The purpose of this consideration is to ensure that plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance are identified and evaluated. SAMAs have not been previously considered for Davis-Besse; therefore, the remainder of Chapter 5 addresses those alternatives.

5.3.1 Overview of SAMA Process

This section presents a summary of the SAMA evaluation for Davis-Besse conducted by FirstEnergy Nuclear Operating Company, LLC (FENOC), and the NRC staff's review of that evaluation. The NRC staff performed its review with contract assistance from Pacific Northwest National Laboratory (PNNL). The NRC staff's review is available in full in Appendix F, and the SAMA evaluation is available in full in Appendix E of the FENOC ER.

The SAMA evaluation for Davis-Besse was conducted with a four-step approach. In the first step, FENOC quantified the level of risk associated with potential reactor accidents using the plant-specific probabilistic risk assessment (PRA) and other risk models.

In the second step, FENOC examined the major risk contributors and identified possible ways (SAMAs) of reducing that risk. Common ways of reducing risk are changes to components, systems, procedures, and training. FENOC identified 167 potential SAMAs for Davis-Besse. FENOC performed an initial screening to determine if any SAMAs could be eliminated for the following reasons:

- The SAMA has design differences or has already been implemented at Davis-Besse.
- The SAMA is not applicable to Davis-Besse.
- The SAMA has estimated implementation costs that would exceed the dollar value associated with eliminating all severe accident risk at Davis-Besse.
- The SAMA is related to a non-risk significant system and, therefore, has a very low benefit.
- The SAMA is similar in nature and could be combined with another SAMA candidate.

Based on this screening, 152 SAMAs were eliminated, leaving 15 candidate SAMAs for further evaluation.

In the third step, FENOC estimated the benefits and the costs associated with each of the SAMAs. Estimates were made of how much each SAMA could reduce risk. Those estimates were developed in terms of dollars in accordance with NRC guidance for performing regulatory analyses. The cost of implementing the proposed SAMAs was also estimated.

Finally, in the fourth step, the cost and benefit of each of the remaining SAMAs were compared to determine whether the SAMA was cost-beneficial, meaning the benefits of the SAMA were greater than the cost (a positive cost benefit). FENOC concluded in its ER that SAMA AC/DC-03, adding a portable, diesel-driven battery charger to the existing DC system, would be potentially cost-beneficial. SAMA AC/DC-03 does not relate to adequately managing the effects of aging during the period of extended operation; therefore, it need not be implemented as part of license renewal pursuant to 10 CFR Part 54. FENOC's SAMA analyses and the NRC's review are discussed in more detail below.

5.3.2 Estimate of Risk

FENOC submitted an assessment of SAMAs for Davis-Besse as part of the ER. This assessment was based on the most recent Davis-Besse PRA available at that time; a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 (MACCS2) computer program; and insights from the Davis-Besse individual plant examination (IPE) (Centerior Energy 1993) and individual plant examination of external events (IPEEE) (Centerior Energy 1996).

The baseline core damage frequency (CDF) for the purpose of the SAMA evaluation is approximately $1\text{x}10^{-5}$ per year for internal events including internal flooding events. FENOC accounted for the potential risk reduction benefits associated with external events by applying a multiplier to the estimated benefits for internal events. FENOC used a multiplier of 5.6 to account for external events, which assumes a seismic CDF of 6.7×10^{-6} per year, a fire CDF of 2.9×10^{-5} per year, and a high winds, tornadoes, external floods, and other external events CDF of 1.0×10^{-5} per year (FENOC 2011).

The breakdown of CDF by initiating event is provided in Table 5.3-1. As shown in this table, loss of offsite power (LOOP), loss of component cooling water (CCW), and reactor or turbine trips are the dominant contributors to the CDF. Anticipated transient without scram (ATWS) sequences are modeled as a failure to trip after an initiating event; ATWS sequences contribute approximately 1 percent to CDF. Station blackout (SBO) sequences involve a LOOP (as the initiating event or following an initiating event), along with subsequent failure of power to both safety buses (i.e., a loss of both emergency diesel generators (EDGs) and the SBO diesel generator). SBO sequences contribute approximately 5 percent to CDF and are dominated by sequences initiated by a LOOP. Column totals in Table 5.3-2 may differ due to round off.

FENOC estimated the dose to the population within 50 miles (mi) (80 kilometers (km)) of the Davis-Besse site to be approximately 0.023 person-Sievert (Sv) (2.3 person-rem) per year for internal events (FENOC 2011). The breakdown of the total population dose by containment release mode is summarized in Table 5.3-2. SGTR and interfacing system LOCA (ISLOCA), both containment bypass events, dominate the population dose risk for internal events at Davis-Besse. Column totals in Table 5.3-2 may differ due to round off.

Table 5.3-1. Davis-Besse Internal Events Core Damage Frequency

Initiating Event	CDF (per year)	% Contribution to CDF
Loss of offsite power (LOOP)	1.9×10^{-6}	19
Loss of component cooling water (CCW) pump(s)	1.7×10^{-6}	18
Reactor or turbine trip	1.3×10^{-6}	13
Steam generator tube rupture (SGTR)	6.2×10^{-7}	6
Loss of main feedwater	5.7×10^{-7}	6
Loss of main feedwater flow control	5.1×10^{-7}	5
Reactor vessel (RV) rupture	5.0×10^{-7}	5
Small loss-of-coolant accident (LOCA)	4.3×10^{-7}	4
Flooding in CCW pump room	2.0×10^{-7}	2
Medium LOCA	1.5×10^{-7}	2
Loss of service water pump room ventilation	1.3×10^{-7}	1
Loss of direct current (DC) power from Bus d2p	1.1×10^{-7}	1
Flooding in turbine building	8.8×10^{-8}	1
Loss of non-nuclear instrumentation cabinets 1-4 (NNIX) DC power supply	8.2×10^{-8}	1
Other	$1.5x10^{-6}$	15
Total CDF (internal events)	$9.8x10^{-6}$	100

Table 5.3-2. Breakdown of Population Dose by Containment Release Mode

Containment Release Mode	POPULATION dose (person-rem per year)	% Contribution
SGTR	1.45	63
ISLOCA	0.59	26
Large containment isolation failure	0.01	1
Small containment isolation failure	0.05	2
Large early release	0.03	1
Sidewall failure (early)	0.02	1
Late containment failure	0.03	1
Basemat failure	0.10	4
No containment failure	0.02	1
Total	2.30	100

The NRC staff has reviewed FENOC's data and evaluation methods and concludes that the quality of the risk analyses is adequate to support an assessment of the risk reduction potential for candidate SAMAs. Accordingly, the NRC staff based its assessment of offsite risk on the CDF and offsite doses reported by FENOC.

5.3.3 Potential Plant Improvements

FENOC's process for identifying potential plant improvements (SAMAs) consisted of the following elements:

- review of the dominant cutsets and most significant basic events from the current, plant-specific PRA,
- review of potential plant improvements identified in the Davis-Besse IPE and IPEEE,
- review of SAMA candidates identified for license renewal applications (LRAs) for representative pressurized-water reactor (PWR) plants, and
- review of other industry documentation discussing potential plant improvements.

Based on this process, an initial set of 167 candidate SAMAs was identified. FENOC performed a qualitative screening of the initial list of SAMAs using the following criteria:

- The SAMA has design differences or has already been implemented at Davis-Besse.
- The SAMA is not applicable to Davis-Besse.
- The SAMA has estimated implementation costs that would exceed the dollar value associated with eliminating all severe accident risk at Davis-Besse.
- The SAMA is related to a non-risk significant system and, therefore, has a very low benefit.
- The SAMA is similar in nature and could be combined with another SAMA candidate.

Based on this screening, 152 SAMAs were eliminated, leaving 15 for further evaluation. A detailed cost-benefit analysis was performed for each of the remaining SAMAs.

The NRC staff concludes that FENOC used a systematic and comprehensive process for identifying potential plant improvements for Davis-Besse, and the set of SAMAs evaluated in the ER, together with those evaluated in response to NRC staff inquiries, is reasonably comprehensive and, therefore, acceptable.

5.3.4 Evaluation of Risk Reduction and Costs of Improvements

FENOC evaluated the risk-reduction potential of the remaining candidate 15 SAMAs. The SAMA evaluations were performed in a bounding fashion in that the SAMA was assumed to eliminate the risk associated with the proposed enhancement. FENOC also provided the risk-reduction potential of six additional SAMAs identified in response to requests for additional information (RAIs) using the same bounding approach. This bounding approach overestimates the benefit and is conservative.

The NRC staff reviewed FENOC's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and generally conservative (i.e., the estimated risk reduction is higher than what would actually be realized). Accordingly, the NRC staff based its estimates of averted risk for the various SAMAs on FENOC's risk reduction estimates.

The staff also reviewed the bases for the applicant's cost estimates. For certain improvements, the staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other applicants' analyses of SAMAs for other operating reactors. The staff found the cost estimates to be reasonable and generally consistent with estimates provided in support of other plants' analyses.

The staff concludes that the risk reduction and the cost estimates provided by FENOC are sufficient and appropriate for use in the SAMA evaluation.

5.3.5 Cost-Benefit Comparison

The methodology used by FENOC was based on NRC's guidance for performing cost-benefit analysis (i.e., NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997a)). The guidance involves determining the net value for each SAMA. If the net present value of a SAMA is negative, the cost of implementing the present SAMA is larger than the benefit associated with the SAMA, and it is not considered cost-beneficial. FENOC's derivation of each of the associated costs is summarized in Appendix E. Revision 4 of NUREG/BR-0058 states that two sets of estimates should be developed, one at a 3 percent discount rate and one at a 7 percent discount rate (NRC 2004). FENOC provided a base set of results using the 7 percent discount rate and a sensitivity study using the 3 percent discount rate (FENOC 2010, 2011).

FENOC developed plant-specific costs of implementing the 15 candidate SAMAs. The NRC staff asked FENOC to describe the level of detail used to develop the cost estimates and to clarify whether the cost estimates accounted for inflation, contingency costs associated with unforeseen implementation obstacles, replacement power during extended outages, and maintenance and surveillance costs during plant operation (NRC 2011a). In response to the RAI, FENOC clarified that the cost estimates conservatively did not include inflation, contingency costs associated with unforeseen implementation obstacles, or the cost of replacement power during extended outages required to implement the modifications (FENOC 2011).

The NRC staff reviewed the bases for the applicant's cost estimates. For certain improvements, the NRC staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other applicants' analyses of SAMAs for operating reactors. The NRC staff reviewed the costs and found them to be reasonable and generally consistent with estimates provided in support of other plants' analyses.

FENOC's SAMA analysis determined that SAMA AC/DC-03 would be potentially cost-beneficial. This SAMA would increase battery capacity and, therefore, increase the time available for recovery of offsite or onsite power by adding a portable, diesel-driven battery charger to the existing DC system. This SAMA candidate would provide longer battery lifetime during SBO events. FENOC states in Section E.9 of the ER that SAMA AC/DC-03, which was determined to be potentially cost-beneficial in both the baseline analysis and the sensitivity analysis, will be considered for implementation through the normal processes for evaluating possible plant modifications.

The NRC staff concludes that, with the exception of the potentially cost-beneficial SAMA discussed above, the costs of the other SAMAs evaluated would be higher than the associated benefits.

5.3.6 Conclusions

The NRC staff reviewed FENOC's analysis and concludes that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs support the general conclusion that the SAMA evaluations performed by FENOC are reasonable and sufficient for the license renewal submittal.

Based on its review of the SAMA analysis, the NRC staff agrees with FENOC's identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of the identified, potentially cost-beneficial SAMA. Given the potential for cost-beneficial risk reduction, the NRC staff agrees that further evaluation of SAMA AC/DC-03 by FENOC is warranted. However, this SAMA does not relate to adequately managing the effects of aging during the period of extended operation. Therefore, it need not be implemented as part of license renewal pursuant to 10 CFR Part 54.

5.4 References

10 CFR Part 50. *Code of Federal Regulations*, Title 10, *Energy*, Part 50, "Domestic Licensing of Production and Utilization Facilities."

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

10 CFR Part 54. *Code of Federal Regulations*, Title 10, *Energy*, Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants."

10 CFR Part 100. *Code of Federal Regulations*, Title 10, Energy, Part 100, "Reactor Site Criteria."

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[FENOC] FirstEnergy Nuclear Operating Company. 2011. Letter from Kendall W. Byrd, FENOC, to NRC Document Control Desk. Subject: Reply to Request for Additional Information for the Review of the Davis-Besse Nuclear Power Station, Unit No. 1, License Renewal Application (TAC No. ME4613) Environmental Report Severe Accident Mitigation Alternatives Analysis, and License Renewal Application Amendment No.10 (L-11-154). June 24. ADAMS Accession No. ML11180A233.

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[NRC] U.S. Nuclear Regulatory Commission. 2011b. Memo from John G. Parillo, U.S. NRC, to Travis L. Tate, U.S. NRC. Subject: Request For Additional Information Response Clarifications From Davis-Besse Nuclear Power Station In Support Of License Renewal Application Review (TAC No. ME4613). Washington, D.C. August 15, 2011. ADAMS Accession No. ML112270139.

6.0 ENVIRONMENTAL IMPACTS OF THE URANIUM FUEL CYCLE AND SOLID WASTE MANAGEMENT

6.1 The Uranium Fuel Cycle

This chapter addresses issues related to the uranium fuel cycle and solid waste management during the period of extended operation (listed in Table 6.1-1). The uranium cycle includes uranium mining and milling, the production of uranium hexafluoride, isotopic enrichment, fuel fabrication, reprocessing of irradiated fuel, transportation of radioactive materials and management of low-level wastes and high-level wastes related to uranium fuel cycle activities. The generic potential impacts of the radiological and nonradiological environmental impacts of the uranium fuel cycle and transportation of nuclear fuel and wastes are described in detail in the Generic Environmental Impact Statement (GEIS) (NRC 1996, 1999). They are based, in part, on the generic impacts provided in Title 10, Part 51.51(b) of the *Code of Federal Regulations* (10 CFR 51.51(b)), Table S-3, "Table of Uranium Fuel Cycle Environmental Data," and in 10 CFR 51.52(c), Table S-4, "Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor."

Table 6.1-1. Issues Related to the Uranium Fuel Cycle and Solid Waste Management.

There are nine generic issues related to the fuel cycle and waste management. There are no site-specific issues.

Issues	GEIS Sections	Category
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	6.1; 6.2.1; 6.2.2.1; 6.2.2.3; 6.2.3; 6.2.4; 6.6	1
Offsite radiological impacts (collective effects)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6	1
Offsite radiological impacts (spent fuel and high-level waste disposal)	6.1; 6.2.2.1; 6.2.3; 6.2.4; 6.6	1
Nonradiological impacts of the uranium fuel cycle	6.1; 6.2.2.6; 6.2.2.7; 6.2.2.8; 6.2.2.9; 6.2.3; 6.2.4; 6.6	1
Low-level waste storage and disposal	6.1; 6.2.2.2;6.4.2; 6.4.3; 6.4.3.1; 6.4.3.2; 6.4.3.3; 6.4.4; 6.4.4.1; 6.4.4.2; 6.4.4.3; 6.4.4.4; 6.4.4.5; 6.4.4.5.1; 6.4.4.5.2; 6.4.4.5.3; 6.4.4.5.4; 6.4.4.6;6.6	1
Mixed waste storage and disposal	6.4.5.1; 6.4.5.2; 6.4.5.3; 6.4.5.4; 6.4.5.5; 6.4.5.6; 6.4.5.6.1; 6.4.5.6.2; 6.4.5.6.3; 6.4.5.6.4; 6.6	1
Onsite spent fuel	6.1; 6.4.6; 6.4.6.1; 6.4.6.2; 6.4.6.3; 6.4.6.4; 6.4.6.5; 6.4.6.6; 6.4.6.7; 6.6	1
Nonradiological waste	6.1; 6.5; 6.5.1; 6.5.2; 6.5.3; 6.6	1
Transportation	6.1; 6.3.1; 6.3.2.3; 6.3.3; 6.3.4; 6.6, Addendum 1	1

The NRC staff's evaluation of the environmental impacts associated with spent nuclear fuel is addressed in two issues in Table 6.1-1, "Offsite radiological impacts (spent fuel and high-level waste disposal)" and "Onsite spent fuel." However, as explained later in this chapter, the scope of the evaluation of these two issues in this SEIS has been revised. The issue, "Offsite radiological impacts (spent fuel and high-level waste disposal)," is not evaluated in this SEIS. In addition, the issue, “Onsite spent fuel,” only evaluates the environmental impacts during the license renewal term.

For the term of license renewal, the NRC staff did not find any new and significant information related to the remaining uranium fuel cycle and solid waste management issues listed in Table 6.1-1 during its review of the Davis-Besse Environmental Report (ER) (FENOC 2010), the site visit, and the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS. For these Category 1 issues, the GEIS concludes that the impacts are SMALL, except for the issue, “Offsite radiological impacts (collective effects),” which the NRC has not assigned an impact level. This issue assesses the 100-year radiation dose to the U.S. population (i.e., collective effects or collective dose) from radioactive effluents released as part of the uranium fuel cycle for a nuclear power plant during the license renewal term compared to the radiation dose from natural background exposure. It is a comparative assessment for which there is no regulatory standard to base an impact level.

For the offsite radiological impacts resulting from spent fuel and high-level waste disposal and the onsite storage of spent fuel, which will occur after the reactors have been permanently shutdown, the NRC’s Waste Confidence Decision and Rule represented the Commission’s generic determination that spent fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation. This generic determination meant that the NRC did not need to consider the storage of spent fuel after the end of a reactor’s licensed life for operation in National Environmental Policy Act (NEPA) documents that support its reactor and spent fuel storage application reviews.

The NRC first adopted the Waste Confidence Decision and Rule in 1984. The NRC amended the decision and rule in 1990, reviewed them in 1999, and amended them again in 2010 (49 FR 34694; 55 FR 38474; 64 FR 68005; and 75 FR 81032 and 81037). The Waste Confidence Decision and Rule are codified in 10 CFR 51.23.

On December 23, 2010, the Commission published in the *Federal Register* a revision of the Waste Confidence Decision and Rule to reflect information gained from experience in the storage of spent fuel and the increased uncertainty in the siting and construction of a permanent geologic repository for the disposal of spent nuclear fuel and high-level waste (75 FR 81032 and 81037). In response to the 2010 Waste Confidence Decision and Rule, the States of New York, New Jersey, Connecticut, and Vermont—along with several other parties—challenged the Commission’s NEPA analysis in the decision, which provided the regulatory basis for the rule. On June 8, 2012, the United States Court of Appeals, District of Columbia Circuit in New York v. NRC, 681 F.3d 471 (D.C. Cir. 2012) vacated the NRC’s Waste Confidence Decision and Rule after finding that it did not comply with NEPA.

In response to the court’s ruling, the Commission, in CLI-12-16 (NRC 2012a), determined that it would not issue licenses that rely upon the Waste Confidence Decision and Rule until the issues identified in the court’s decision are appropriately addressed by the Commission. In CLI-12-16, the Commission also noted that the decision not to issue licenses only applies to final license issuance; all licensing reviews and proceedings should continue to move forward.

In addition, the Commission directed in SRM-COMSECY-12-0016 (NRC 2012b) that the NRC staff proceed with a rulemaking that includes the development of an environmental impact statement (EIS) to support a revised Waste Confidence Rule and to publish both the EIS and the revised rule in the *Federal Register* within 24 months (by September 2014). The Commission indicated that both the EIS and the revised Waste Confidence Rule should build on the information already documented in various NRC studies and reports, including the existing environmental assessment that the NRC developed as part of the 2010 Waste Confidence Decision and Rule. The Commission directed that any additional analyses should focus on the issues identified in the court's decision. The Commission also directed that the NRC staff provide ample opportunity for public comment on both the draft EIS and the proposed rule.

The revised rule and supporting EIS are expected to provide the necessary NEPA analyses of waste confidence-related human health and environmental issues. As directed by the Commission, the NRC will not issue a renewed license before the resolution of waste confidence-related issues. This will ensure that there would be no irretrievable or irreversible resource commitments or potential harm to the environment before waste confidence impacts have been addressed.

On September 13, 2013, the NRC published a proposed revision of the Waste Confidence Rule and supporting EIS for public comment. Further information on the Waste Confidence rulemaking and supporting EIS is available on the NRC's Waste Confidence website: http://www.nrc.gov/waste/spent-fuel-storage/wcd.html.

If the results of the Waste Confidence Rule and supporting EIS identify information that requires a supplement to this SEIS, the NRC staff will perform any appropriate additional NEPA review for those issues before the NRC makes a final licensing decision.

6.2 Greenhouse Gas Emissions

This section discusses the potential impacts from greenhouse gases (GHGs) emitted from the nuclear fuel cycle. The GEIS does not directly address these emissions, and its discussion is limited to an inference that substantial carbon dioxide (CO_2) emissions may occur if coal- or oil-fired alternatives to license renewal are implemented.

6.2.1 Existing Studies

Since the development of the GEIS, the relative volumes of GHGs emitted by nuclear and other electricity generating methods have been widely studied. However, estimates and projections of the carbon footprint of the nuclear power lifecycle vary depending on the type of study done. Additionally, considerable debate exists among researchers regarding the relative effects of nuclear and other forms of electricity generation on GHG emissions. Existing studies on GHG emissions from nuclear power plants generally take one of the following forms:

- qualitative discussions of the potential to use nuclear power to reduce GHG emissions and mitigate global warming or
- technical analyses and quantitative estimates of the actual amount of GHGs generated by the nuclear fuel cycle or entire nuclear power plant life cycle and comparisons to the operational or life cycle emissions from other energy generation alternatives.

6.2.1.1 Qualitative Studies

The qualitative studies consist primarily of broad, large-scale public policy or investment evaluations on whether an expansion of nuclear power is likely to be a technically, economically, or politically workable means of achieving global GHG reductions. Studies found by the U.S. Nuclear Regulatory Commission (NRC) staff during the subsequent literature search include the following:

- Evaluations determined if investments in nuclear power in developing countries should be accepted as a flexibility mechanism to assist industrialized nations in achieving their GHG reduction goals under the Kyoto Protocols (IAEA 2000; NEA 2002; Schneider 2000). Ultimately, the parties to the Kyoto Protocol did not approve nuclear power as a component under the clean development mechanism (CDM) due to safety and waste disposal concerns (NEA 2002).
- Analyses were developed to assist governments, including the U.S. Government, in making long-term investment and public policy decisions in nuclear power (Hagen et al. 2001; Keepin 1988; MIT 2003).

Although the qualitative studies sometimes reference and analyze the existing quantitative estimates of GHGs produced by the nuclear fuel cycle or life cycle, their conclusions generally rely heavily on discussions of other aspects of nuclear policy decisions and investment such as safety, cost, waste generation, and political acceptability. Therefore, these studies are typically not directly applicable to an evaluation of GHG emissions associated with the proposed license renewal for a given nuclear power plant.

6.2.1.2 Quantitative Studies

A large number of technical studies, including calculations and estimates of the amount of GHGs emitted by nuclear and other power generation options, are available in the literature and were useful to the NRC staff's efforts to address relative GHG emission levels. Examples of these studies include—but are not limited to—Mortimer (1990), Andseta et al. (1998), Spadaro (2000), Storm van Leeuwen and Smith (2005), Fritsche (2006), Parliamentary Office of Science and Technology (POST) (2006), Atomic Energy Authority (AEA) (2006), Weisser (2006), Dones (2007), and Fthenakis and Kim (2007).

Comparing these studies, and others like them, is difficult because the assumptions and components of the lifecycles that the authors evaluate vary widely. Examples of areas in which differing assumptions make comparing the studies difficult include the following:

- energy sources that may be used to mine uranium deposits in the future,
- reprocessing or disposal of spent nuclear fuel,
- current and potential future processes to enrich uranium and the energy sources that will power them,
- estimated grades and quantities of recoverable uranium resources,
- estimated grades and quantities of recoverable fossil fuel resources,
- estimated GHG emissions other than CO_2, including the conversion to CO_2 equivalents per unit of electric energy produced,
- performance of future fossil fuel power systems,
- projected capacity factors for alternatives means of generation, and
- current and potential future reactor technologies.

In addition, studies may vary with respect to whether all or parts of a power plant's lifecycle are analyzed. For example, a full lifecycle analysis will typically address plant construction, operations, resource extraction (for fuel and construction materials), and decommissioning. A partial lifecycle analysis primarily focuses on operational differences.

In the case of license renewal, a GHG analysis for that portion of the plant's lifecycle (operation for an additional 20 years) would not involve GHG emissions associated with construction because construction activities have already been completed at the time of relicensing. In addition, the proposed action of license renewal would also not involve additional GHG emissions associated with facility decommissioning because that decommissioning must occur whether the facility is relicensed or not. However, in some of the above-mentioned studies, the specific contribution of GHG emissions from construction, decommissioning, or other portions of a plant's lifecycle cannot be clearly separated from one another. In such cases, an analysis of GHG emissions would overestimate the GHG emissions attributed to a specific portion of a plant's lifecycle. Nonetheless, these studies supply some meaningful information with respect to the relative magnitude of the emissions among nuclear power plants and other forms of electric generation, as discussed in the following sections.

In Table 6.2-1, Table 6.2-2, and Table 6.2-3, the NRC staff presents the results of the above-mentioned quantitative studies to supply a weight-of-evidence evaluation of the relative GHG emissions that may result from the proposed license renewal as compared to the potential alternative use of coal-fired, natural gas-fired, and renewable generation. Most studies from Mortimer (1990) onward suggest that uranium ore grades and uranium enrichment processes are leading determinants in the ultimate GHG emissions attributable to nuclear power generation. These studies show that the relatively lower order of magnitude of GHG emissions from nuclear power, when compared to fossil-fueled alternatives (especially natural gas), could potentially disappear if available uranium ore grades drop sufficiently while enrichment processes continued to rely on the same technologies.

6.2.1.3 Summary of Nuclear Greenhouse Gas Emissions Compared to Coal

Considering that coal fuels the largest share of electricity generation in the U.S., and that its burning results in the largest emissions of GHGs for any of the likely alternatives to nuclear power generation (including Davis-Besse), most of the available quantitative studies focused on comparisons of the relative GHG emissions of nuclear to coal-fired generation. The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle—and, in some cases, the nuclear lifecycle—as compared to an equivalent coal-fired plant, are presented in Table 6.2-1. This table does not include all existing studies, but it gives an illustrative range of estimates developed by various sources.

Table 6.2-1. Nuclear GHG Emissions Compared to Coal

Source	GHG Emission Results
Mortimer (1990)	Nuclear—230,000 tons CO_2 Coal—5,912,000 tons CO_2 Note: Future GHG emissions from nuclear will increase because of declining ore grade.
Andseta et al. (1998)	Nuclear energy produces 1.4% of the GHG emissions compared to coal. Note: Future reprocessing and use of nuclear-generated electrical power in the mining and enrichment steps are likely to change the projections of earlier authors, such as Mortimer (1990).
Spadaro (2000)	Nuclear—2.5–5.7 grams (g) of carbon equivalent per kilowatt hour (C_{eq}/kWh) Coal—264–357 g C_{eq}/kWh
Storm van Leeuwen & Smith (2005)	Authors did not evaluate nuclear versus coal.
Fritsche (2006) (Values estimated from graph in Figure 4)	Nuclear—33 g C_{eq}/kWh Coal—950 g C_{eq}/kWh

Source	GHG Emission Results
POST (2006) (Nuclear calculations from AEA 2006)	Nuclear—5 g C_{eq}/kWh Coal—>1000 g C_{eq}/kWh Note: Decrease of uranium ore grade to 0.03% would increase nuclear to 6.8 g C_{eq}/kWh. Future improved technology and carbon capture and storage could reduce coal-fired GHG emissions by 90%.
Weisser (2006) (Compilation of results from other studies)	Nuclear—2.8–24 g C_{eq}/kWh Coal—950–1250 g C_{eq}/kWh
Fthenakis & Kim (2007)	Authors did not evaluate nuclear versus coal.
Dones (2007)	Author did not evaluate nuclear versus coal.

6.2.1.4 Summary of Nuclear Greenhouse Gas Emissions Compared to Natural Gas

The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle—and, in some cases, the nuclear lifecycle—as compared to an equivalent natural gas combined cycle-fired plant, are presented in Table 6.2-2. This table does not include all existing studies, but it gives an illustrative range of estimates developed by various sources.

Table 6.2-2. Nuclear GHG Emissions Compared to Natural Gas

Source	GHG Emission Results
Mortimer (1990)	Author did not evaluate nuclear versus natural gas.
Andseta et al. (1998)	Author did not evaluate nuclear versus natural gas.
Spadaro (2000)	Nuclear—2.5–5.7 g C_{eq}/kWh Natural Gas—120–188 g C_{eq}/kWh
Storm van Leeuwen & Smith (2005)	Nuclear fuel cycle produces 20–33% of the GHG emissions compared to natural gas (at high ore grades). Note: Future nuclear GHG emissions will increase because of declining ore grade.
Fritsche (2006) (Values estimated from graph in Figure 4)	Nuclear—33 g C_{eq}/kWh Cogeneration Combined Cycle Natural Gas—150 g C_{eq}/kWh
POST (2006) (Nuclear calculations from AEA 2006)	Nuclear—5 g C_{eq}/kWh Natural Gas—500 g C_{eq}/kWh Note: Decrease of uranium ore grade to 0.03% would increase nuclear to 6.8 g C_{eq}/kWh. Future improved technology and carbon capture and storage could reduce natural gas GHG emissions by 90%.
Weisser (2006) (Compilation of results from other studies)	Nuclear—2.8–24 g C_{eq}/kWh Natural Gas—440–780 g C_{eq}/kWh
Fthenakis & Kim (2007)	Authors did not evaluate nuclear versus natural gas.
Dones (2007)	Author analyzed methods and assumptions of Storm van Leeuwen and Smith (2005) and concluded that the nuclear fuel cycle produces 15–27% of the GHG emissions of natural gas.

6.2.1.5 Summary of Nuclear Greenhouse Gas Emissions Compared to Renewable Energy Sources

The quantitative estimates of the GHG emissions associated with the nuclear fuel cycle, as compared to equivalent renewable energy sources, are presented in Table 6.2-3. Calculation of GHG emissions associated with these sources is more difficult than the calculations for nuclear energy and fossil fuels because of the large variation in efficiencies due to their different sources and locations. For example, the efficiency of solar and wind energy is highly dependent on the location in which the power generation facility is installed. Similarly, the range of GHG emissions estimates for hydropower varies greatly depending on the type of dam or reservoir involved (if used at all). Therefore, the GHG emissions estimates for these energy sources have a greater range of variability than the estimates for nuclear and fossil fuel sources. As noted in Section 6.2.1.2, the following table does not include all existing studies, but it gives an illustrative range of estimates developed by various sources.

Table 6.2-3. Nuclear GHG Emissions Compared to Renewable Energy Sources

Source	GHG Emission Results
Mortimer (1990)	Nuclear—230,000 tons CO_2 Hydropower—78,000 tons CO_2 Wind power—54,000 tons CO_2 Tidal power—52,500 tons CO_2 Note: Future GHG emissions from nuclear will increase because of declining ore grade.
Andseta et al. (1998)	Author did not evaluate nuclear versus renewable energy sources.
Spadaro (2000)	Nuclear—2.5–5.7 g C_{eq}/kWh Solar Photovoltaic (PV)—27.3–76.4 g C_{eq}/kWh Hydroelectric—1.1–64.6 g C_{eq}/kWh Biomass—8.4–16.6 g C_{eq}/kWh Wind—2.5–13.1 g C_{eq}/kWh
Storm van Leeuwen & Smith (2005)	Author did not evaluate nuclear versus renewable energy sources.
Fritsche (2006) (Values estimated from graph in Figure 4)	Nuclear—33 g C_{eq}/kWh Solar PV—125 g C_{eq}/kWh Hydroelectric—50 g C_{eq}/kWh Wind—20 g C_{eq}/kWh
POST (2006) (Nuclear calculations from AEA 2006)	Nuclear—5 g C_{eq}/kWh Biomass—25–93 g C_{eq}/kWh Solar PV—35–58 g C_{eq}/kWh Wave/Tidal—25–50 g C_{eq}/kWh Hydroelectric—5–30 g C_{eq}/kWh Wind—4.64–5.25 g C_{eq}/kWh Note: Decrease of uranium ore grade to 0.03% would increase nuclear to 6.8 g C_{eq}/kWh.
Weisser (2006) (Compilation of results from other studies)	Nuclear—2.8–24 g C_{eq}/kWh Solar PV—43–73 g C_{eq}/kWh Hydroelectric—1–34 g C_{eq}/kWh Biomass—35–99 g C_{eq}/kWh Wind—8–30 g C_{eq}/kWh
Fthenakis & Kim (2007)	Nuclear—16–55 g C_{eq}/kWh Solar PV—17–49 g C_{eq}/kWh
Dones (2007)	Author did not evaluate nuclear versus renewable energy sources.

6.2.2 Conclusions: Relative Greenhouse Gas Emissions

The sampling of data presented in Table 6.2-1, Table 6.2-2, and Table 6.2-3 demonstrates the challenges of any attempt to determine the specific amount of GHG emission attributable to nuclear energy production sources, as different assumptions and calculation methods will yield differing results. The differences and complexities in these assumptions and analyses will further increase when they are used to project future GHG emissions. Nevertheless, several conclusions can be drawn from the information presented.

First, the various studies show a consensus that nuclear power currently produces fewer GHG emissions than fossil-fuel-based electrical generation. The GHG emissions from a complete nuclear fuel cycle currently range from 2.5 to 55 g C_{eq}/kWh, as compared to the use of coal plants (264 to 1,250 g C_{eq}/kWh) and natural gas plants (120 to 780 g C_{eq}/kWh). The studies also give estimates of GHG emissions from five renewable energy sources based on current technology. These estimates included solar-photovoltaic (17 to 125 g C_{eq}/kWh), hydroelectric (1 to 64.6 g C_{eq}/kWh), biomass (8.4 to 99 g C_{eq}/kWh), wind (2.5 to 30 g C_{eq}/kWh), and tidal (25 to 50 g C_{eq}/kWh). The range of these estimates is wide, but the general conclusion is that current GHG emissions from the nuclear fuel cycle are of the same order of magnitude as from these renewable energy sources.

Second, the studies show no consensus regarding future relative GHG emissions from nuclear power and other sources of electricity. There is substantial disagreement among the various authors about the GHG emissions associated with declining uranium ore concentrations, future uranium enrichment methods, and other factors to include changes in technology. Similar disagreement exists about future GHG emissions associated with coal and natural gas for electricity generation. Even the most conservative studies conclude that the nuclear fuel cycle currently produces fewer GHG emissions than fossil-fuel-based sources, and it is expected to continue to do so in the near future. The primary difference between the authors is the projected cross-over date (the time at which GHG emissions from the nuclear fuel cycle exceed those of fossil-fuel-based sources) or whether cross-over will actually occur.

Considering the current estimates and future uncertainties, it appears that GHG emissions associated with the proposed Davis-Besse relicensing action are likely to be lower than those associated with fossil-fuel-based energy sources. The NRC staff bases this conclusion on the following rationale:

- As shown in Table 6.2-1and Table 6.2-2, the current estimates of GHG emissions from the nuclear fuel cycle are far below those for fossil-fuel-based energy sources.
- License renewal of a nuclear power plant like Davis-Besse will involve continued GHG emissions due to uranium mining, processing, and enrichment, but it will not result in increased GHG emissions associated with plant construction or decommissioning (as the plant will have to be decommissioned at some point whether the license is renewed or not).
- Few studies predict that nuclear fuel cycle emissions will exceed those of fossil fuels within a timeframe that includes the Davis-Besse period of extended operation. Several studies suggest that future extraction and enrichment methods, the potential for higher-grade resource discovery, and technology improvements could extend this timeframe.

With respect to comparison of GHG emissions among the proposed Davis-Besse license renewal action and renewable energy sources, it appears likely that there will be future technology improvements and changes in the type of energy used for mining, processing, and constructing facilities of all types. Currently, the GHG emissions associated with the nuclear fuel cycle and renewable energy sources are within the same order of magnitude. Because nuclear fuel production is the most significant contributor to possible future increases in GHG emissions from nuclear power—and because most renewable energy sources lack a fuel component—it is likely that GHG emissions from renewable energy sources would be lower than those associated with Davis-Besse at some point during the period of extended operation.

The NRC staff also supplies an additional discussion about the contribution of GHG to cumulative air quality impacts in Section 4.11.2 of this supplemental environmental impact statement (SEIS).

6.3 References

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7.0 ENVIRONMENTAL IMPACTS OF DECOMMISSIONING

Environmental impacts from the activities associated with the decommissioning of any reactor before, or at the end of, an initial or renewed license are evaluated in the *Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities: Supplement 1, Regarding the Decommissioning of Nuclear Power Reactors*, NUREG 0586, Supplement 1 (NRC 2002). The U.S. Nuclear Regulatory Commission (NRC) staff's evaluation of the environmental impacts of decommissioning—presented in NUREG 0586, Supplement 1—notes a range of impacts for each environmental issue.

Additionally, the incremental environmental impacts associated with decommissioning activities resulting from continued plant operation during the renewal term are discussed in NUREG-1437, *Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants* (NRC 1996, 1999). The GEIS includes a determination of whether the analysis of the environmental issues could be applied to all plants and whether additional mitigation measures would be warranted. Issues were then assigned a Category 1 or a Category 2 designation. Section 1.4 in Chapter 1 explains the criteria for Category 1 and Category 2 issues and defines the impact designations of SMALL, MODERATE, and LARGE. The NRC staff analyzed site-specific issues (Category 2) for the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse) and assigned them a significance level of SMALL, MODERATE, or LARGE, or not applicable to Davis-Besse because of site characteristics or plant features. There are no Category 2 issues related to decommissioning.

Regarding the offsite radiological impacts resulting from spent fuel and high-level waste disposal and the onsite storage of spent fuel, which will occur after the reactors have been permanently shut down, the NRC's Waste Confidence Rule (i.e., 10 CFR 51.23) represented the Commission's generic determination that spent fuel can continue to be stored safely and without significant environmental impacts for a period of time after the end of the licensed life for operation. This generic determination meant that the NRC did not need to consider the storage of spent fuel after the end of a reactor's licensed life for operation in National Environmental Policy Act (NEPA) documents that support its reactor and spent fuel storage application reviews.

However, as discussed in Chapter 6 of this SEIS, the Commission's Waste Confidence Rule was vacated on June 8, 2012, by the United States Court of Appeals, District of Columbia. In response to the court's ruling, the Commission directed the NRC staff to proceed with a rulemaking that includes the development of a generic environmental impacts statement (EIS) to support a revised Waste Confidence Rule. The revised rule and supporting EIS are expected to provide the necessary NEPA analyses of waste confidence-related human health and environmental issues related to decommissioning.

The issue of spent nuclear fuel and the Waste Confidence Rule is discussed in more detail in Chapter 6 of this SEIS.

Table 7.1-1. Issues Related to Decommissioning

Issues	GEIS Sections	Category
Radiation doses	7.3.1; 7.4	1

Issues	GEIS Sections	Category
Waste management	7.3.2; 7.4	1
Air quality	7.3.3; 7.4	1
Water quality	7.3.4; 7.4	1
Ecological resources	7.3.5; 7.4	1
Socioeconomic impacts	7.3.7; 7.4	1

Decommissioning would occur regardless of whether Davis-Besse, is shut down at the end of its current operating license or at the end of the period of extended operation. There are no site-specific issues related to decommissioning.

A brief description of the NRC staff's review and the GEIS (NRC 1996, 1999) conclusions—as codified in Table B-1 of 10 CFR Part 51—for each of the issues follows:

- Radiation doses. Based on information in the GEIS, the NRC noted that "[d]oses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 person rem (1 person mSv) caused by buildup of long lived radionuclides during the license renewal term."
- Waste management. Based on information in the GEIS, the NRC noted that "[d]ecommissioning at the end of a 20 year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected."
- Air quality. Based on information in the GEIS, the NRC noted that "[a]ir quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term."
- Water quality. Based on information in the GEIS, the NRC noted that "[t]he potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20 year license renewal period or after the original 40 year operation period, and measures are readily available to avoid such impacts."
- Ecological resources. Based on information in the GEIS, the NRC noted that "[d]ecommissioning after either the initial operating period or after a 20 year license renewal period is not expected to have any direct ecological impacts."
- Socioeconomic Impacts. Based on information in the GEIS, the NRC noted that "[d]ecommissioning would have some short term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20 year relicense period, but they might be decreased by population and economic growth."

The NRC staff has not identified any new and significant information during the review of the FirstEnergy Nuclear Operating Company's (FENOC's) environmental report (ER) (FENOC, 2010), the site audit, or the scoping process. Therefore, there are no impacts related to these issues beyond those discussed in the GEIS (NRC 1996, 1999). For the issues listed in Table 7.1-1 above, the GEIS concluded that the impacts are SMALL.

7.1 References

10 CFR Part 51. *Code of Federal Regulations*, Title 10, *Energy*, Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions."

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[NRC] U.S. Nuclear Regulatory Commission. 1999. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants, Main Report*, NUREG-1437, Section 6.3, Table 9.1, Volume 1, Addendum 1, Washington, D.C.

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8.0 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

The National Environmental Policy Act (NEPA) requires that Federal agencies consider reasonable alternatives to the proposed action in an environmental impact statement (EIS). In this case, the proposed action is issuance of a renewed license for the Davis-Besse Nuclear Power Station (Davis-Besse), which will allow the plant to operate for 20 years beyond its current license expiration date.

An operating license, however, is just one of many authorizations that an applicant must obtain in order to operate a nuclear plant. Energy-planning decisionmakers and the owners of the nuclear power plant ultimately decide whether the plant will continue to operate, and economic and environmental considerations play important roles in this decision. In general, the U.S. Nuclear Regulatory Commission's (NRC's) responsibility is to ensure the safe operation of nuclear power facilities and not to formulate energy policy or encourage or discourage the development of alternative power generation.

The license renewal review process is designed to assure safe operation of the nuclear power plant during the license renewal term. Under the NRC's environmental protection regulations in Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51), which implement Section 102(2) of NEPA, renewal of a nuclear power plant operating license also requires the preparation of an EIS.

To support the preparation of these EISs, the NRC prepared the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)*, NUREG-1437, in 1996. The NRC prepared the 1996 GEIS to assess the environmental impacts associated with the continued operation of nuclear power plants during the license renewal term, disposition environmental issues that result in essentially the same impact at all nuclear power plants (or all plants with similar characteristics), and identify issues that require a plant-specific analysis to determine impacts. The NRC addressed plant-specific issues in a supplemental environmental impact statement (SEIS).

NRC regulations in 10 CFR 51.71(d) require that the NRC staff document does the following in a SEIS:

> ….include a preliminary analysis that considers and weighs the environmental effects of the proposed action [license renewal]; the environmental impacts of alternatives to the proposed action; and alternatives available for reducing or avoiding adverse environmental effects.

In this chapter, the NRC staff examines the potential environmental impacts of alternatives to license renewal for Davis-Besse and, where applicable, considers alternatives that may reduce or avoid adverse environmental impacts from the proposed license renewal.

While the 1996 GEIS reached generic conclusions regarding many environmental issues associated with license renewal, it did not determine which alternatives are reasonable, and it did not reach conclusions about site-specific environmental impact levels for alternatives. As such, the NRC must evaluate the environmental impacts of alternatives on a site-specific basis.

As stated in Chapter 1 of this document, alternatives to the proposed action of license renewal for Davis-Besse must meet this purpose and need for the proposed action; they must do the following (NRC 1996):

> provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by State, utility, and, where authorized, Federal (other than NRC) decisionmakers.

The NRC ultimately makes no decision about which alternative (or the proposed action) to carry out because that decision falls to utility, state, or other Federal officials. Comparing the environmental effects of these alternatives, however, will help the NRC decide whether the adverse environmental impacts of license renewal are so great as to deny the option of license renewal for energy-planning decisionmakers (10 CFR 51.95(c)(4)). If the NRC acts to issue a renewed license, then all of the alternatives, including the proposed action, will be available to energy-planning decisionmakers. If the NRC decides not to renew the license (or takes no action at all), then energy-planning decisionmakers may no longer elect to continue operating Davis-Besse and will have to resort to another alternative—which may or may not be one of the alternatives considered in this section—to meet their energy needs now being satisfied by Davis-Besse.

Alternatives Evaluated In-Depth:

- Natural gas-fired combined-cycle (NGCC);
- combination alternative (wind, solar, NGCC, and compressed air energy storage); and
- coal-fired power.

Other Alternatives Considered:

- wind power,
- wind power with compressed air energy storage,
- solar power,
- solar power with compressed air energy storage,
- wood waste,
- conventional hydroelectric power,
- ocean wave and current energy,
- geothermal power,
- municipal solid waste (MSW),
- biofuels,
- oil-fired power,
- fuel cells,
- energy conservation and energy efficiency, and
- purchased power.

In evaluating alternatives to license renewal, the NRC staff considers energy technologies or options that are currently in commercial operation, as well as some technologies not currently in commercial operation but likely to be commercially available by the time the current Davis-Besse operating license expires on April 22, 2017. Reasonable alternatives must be available (constructed, permitted, and connected to the grid) by the time the current license expires to be considered likely to become available. Because the applicant submitted the license renewal application more than 5 years prior to the expiration date of the current operating license as specified in 10 CFR Part 2, then the current operating license will remain in effect, and thus will be deemed not to have expired, until the NRC has completed the review and made the final decision to either deny the application or issue a new operating license for the period of extended operation. Alternatives that cannot meet future system needs by providing amounts of baseload power equivalent to Davis-Besse's current generating capacity and, in some cases, those alternatives whose costs or benefits do not justify inclusion in the range of reasonable alternatives were eliminated from detailed study. The remaining alternatives were evaluated and are discussed in depth in this chapter. Each alternative eliminated from detailed study is briefly discussed, and a basis for its removal is provided at the end of this section. In total, 17 energy technology options and alternatives to the proposed action were considered (see text box) and then narrowed to the 3 alternatives considered in Sections 8.1 through 8.3. A summary of these alternatives considered in depth is provided in Table 8.0-1.

The 1996 GEIS presents an overview of some energy technologies but does not reach any conclusions about which alternatives are most appropriate for a given license renewal. Since 1996, many energy technologies have evolved significantly in capability and cost while regulatory structures have changed to either promote or impede development of particular alternatives.

As a result, the analyses include updated information from the following sources:

- Energy Information Administration (EIA),
- other offices within the Department of Energy (DOE),
- U.S. Environmental Protection Agency (EPA),
- industry sources and publications, and
- information submitted by FirstEnergy Nuclear Operating Company (FENOC) in its Environmental Report (ER).

The evaluation of each alternative considers the environmental impacts across seven impact categories: (1) air quality, (2) groundwater use and quality, (3) surface water use and quality, (4) ecology, (5) human health, (6) socioeconomics, and (7) waste management. A three-level standard of significance—SMALL, MODERATE, or LARGE—is used to indicate the intensity of environmental effects for each alternative undergoing in depth evaluation. The order of presentation is not meant to imply increasing or decreasing level of impact, and it does not imply that an energy-planning decisionmaker would select one or another alternative.

In some cases, the NRC considers the environmental effects of locating an alternative at the existing plant site. Selecting the existing plant site allows for the maximum use of existing transmission and cooling system infrastructures and minimizes the overall environmental impact. However, in the case of Davis-Besse, there may not be sufficient land available to site some of the alternatives evaluated here while, at the same time, allowing the continued operation of the reactor until its license expiration date.

To ensure that the alternatives analysis was consistent with state or regional energy policies, the NRC reviewed energy related statutes, regulations, and policies within the State of Ohio, including, for example, State renewable portfolio standards (RPS).

The Ohio Edison Company, the Cleveland Electric Illuminating Company, and the Toledo Edison Company are FENOC Service Company's electric utility operating companies that provide electric service in the State of Ohio. The NRC staff considered the current generation capacity and electricity production within these three service areas as well as the rest of the State of Ohio. Ohio is much more dependent on coal-fired generation than the U.S. as a whole. In 2010, coal-fired generators produced 82.1 percent of electricity in Ohio, compared to 44.7 percent nationwide. Other forms of generation were smaller contributors than in the rest of the U.S., with natural gas providing 5 percent of production in the State, versus 23.9 percent nationwide. Nuclear accounted for 11 percent in Ohio (versus 19.6 percent in the nation as a whole). Production from renewable sources was the area in which Ohio diverged most as a proportion from national averages—renewable generation provided 0.49 percent of electricity in the State compared to 4.1 percent nationwide. Electricity production from petroleum-fired generators was virtually the same for both Ohio and the nation at 1 percent (EIA 2012a).

Although it is one of the nation's top generators of electricity, Ohio is a net importer of power. Ohio's total electricity consumption is high due to the State's energy-intensive industrial sector, which accounts for more than one-third of the State's electricity consumption (EIA 2012a). The NRC concludes that since a loss of power from the Davis-Besse reactor would potentially impact electricity consumers throughout Ohio, but the power would ultimately be replaced by FENOC's three electric operating companies, the evaluation of alternatives to the continued operation of the Davis-Besse reactor should consider alternatives located throughout these companies' service areas.

The State of Ohio has established an RPS that requires electricity providers to obtain a minimum percentage of their power through renewable energy resources or energy efficiency measures or both. The RPS requirement for Ohio was adopted in 2008 and requires at least 25 percent of all electricity sold in the State to come from renewable sources by 2025, at least half of which must be generated within the State. Half of the standard (12.5 percent of the electricity sold) must be met using renewable sources such as wind, solar, hydroelectric power, geothermal, and biomass. The other half can be met through alternative energy resources such as third-generation nuclear power plants, fuel cells, energy-efficiency programs, and clean coal technology (DSIRE 2013). In a compliance report filed with the Public Utilities Commission of Ohio on April 15, 2010, FENOC reported it had met its revised 2010 benchmarks for renewable energy credits (RECs) and out-of-state solar RECs, but fell slightly short in meeting its Ohio solar benchmark due to the insufficiency of Ohio-based solar energy resources (PUCO 2011).

Sections 8.1 through 8.5 describe the environmental impacts from alternatives to license renewal. These alternatives include a natural gas-fired combined-cycle (NGCC) in Section 8.1; a combination alternative that includes wind power, solar power, compressed air energy storage, and NGCC capacity in Section 8.2; and a coal-fired alternative in Section 8.3. In Section 8.4, alternatives considered but dismissed from detailed consideration are identified. Finally, the environmental effects that may occur if NRC takes no action and does not issue a renewed license for Davis-Besse are discussed in Section 8.5. Section 8.6 summarizes the impacts of each of the alternatives considered.

Table 8.0–1. Summary of Alternatives Considered in Depth

	Natural Gas (NGCC) Alternative	Combination Alternative	Supercritical Pulverized Coal (SCPC) Alternative
Summary of alternative	Two NGCC units for a total of 910 MW	Wind: 1,500 MW of installed wind capacity (315 MW for baseload; 360 MW to power CAES facility) Solar: 400 MW of installed solar PV (75 MW for baseload; 75 MW to power CAES) NGCC: One 305 MW unit	Two to three SCPC units for a total of 910 MW
Location	Davis-Besse; maximum use of existing transmission and cooling system infrastructures; Some pipeline transmission system upgrades may be required	Wind: Onshore wind projects would be spread across multiple sites throughout Ohio and CAES would be located at Norton Energy Storage Project in Norton, Ohio Solar: PV facility would likely be located on agricultural land in Ohio; CAES would be located at Norton Energy Storage Project in Norton, Ohio	Alternative location due to space limitations at Davis-Besse site (FENOC 2011); Preferably an existing power plant site or brownfield site

	Natural Gas (NGCC) Alternative	Combination Alternative	Supercritical Pulverized Coal (SCPC) Alternative
		NGCC: Plant would be located at Davis-Besse site and use existing transmission and cooling system infrastructures	
Cooling System	Closed-cycle with one natural draft cooling tower; Consumptive water use would be less than Davis-Besse (FENOC 2011)	Wind/Solar: CAES would use small-scale cooling towers; NGCC: Plant would use closed-cycle cooling with one natural draft cooling tower; Total: Consumptive water use from CAES and NGCC unit considerably less than Davis-Besse	Closed-cycle cooling system with one natural draft cooling tower; Consumptive water use would be similar to Davis-Besse (FENOC 2011)
Land Requirements	110 ac (40.5 ha) land needed for the plant; 150 ac (61 ha) land needed for 25-mi pipeline (NRC 1996)	Wind: 75,000 ac (30,000 ha), with construction disturbance of 3,750 ac (1,517 ha) (FENOC 2011) Solar: 2,400 ac (970 ha) (NREL 2008) NGCC: Plant would require approximately 1/3 less than NGCC alternative; Pipeline would require 150 ac (61 ha)	1,547 ac (626 ha) for the plant (FENOC 2011)
Work Force	1,092 to 2,275 during construction; 137 during operations (FENOC 2011)	Wind: 200 during construction; 50 during wind farm operations Solar: 200 during construction; 50 for PV facility operations CAES: 50 to 100 workers for CAES facility operations (FENOC 2011) NGCC: 150 to 500 during construction; 91 during operations	1,092 to 2,275 during construction; 228 during operations (FENOC 2011)

8.1 Natural Gas-Fired Combined-Cycle (NGCC) Alternative

Natural gas-fired combined-cycle (NGCC) systems represent the large majority of the total number of plants currently under construction or planned in the United States. Factors that contribute to NGCCs popularity include high capacity factors, low relative construction cost, low gas prices, and low air emissions. Development of new natural gas-fired plants may be affected by uncertainties regarding the continued availability and price of natural gas (though less so than in the recent past) and future regulations that may limit greenhouse gas (GHG) emissions. A gas-fired power plant, however, produces markedly fewer GHGs per unit of electrical output than a coal-fired plant of the same electrical output.

Combined cycle power plants differ significantly from most coal-fired and all existing nuclear power plants. Combined cycle plants derive the majority of their electrical output from a gas turbine and then generate additional power—without burning any additional fuel—through a second, steam turbine cycle. The exhaust gas from the gas turbine is still hot enough to boil water to steam. Ducts carry the hot exhaust to a heat recovery steam generator, which produces steam to drive a steam turbine and produce additional electrical power. The combined cycle approach is significantly more efficient than any one cycle on its own; thermal efficiency can exceed 60 percent versus 38 percent (NETL 2010; Siemens 2012). In addition, because the natural gas-fired alternative derives much of its power from a gas-turbine cycle, and because it wastes less heat than the existing Davis-Besse unit, it requires significantly less cooling water.

While nuclear reactors, on average, operate with capacity factors above 90 percent, an NGCC power plant would operate with roughly an 85 percent capacity factor. Nonetheless, a similarly sized NGCC facility would be capable of providing adequate replacement power for the purposes of this NEPA analysis. Typical power trains for large-scale combined cycle power generation would involve one, two, or three combined cycle units, available in a variety of standard sizes. Appropriately sized units could produce electrical power in amounts equivalent to the Davis-Besse reactor. The combined cycle units are presumed to each be similar in operation to General Electric's (GE's) Advanced F Class design, equipped with dry-low-nitrogen oxide combustors to suppress nitrogen oxide formation and selective catalytic reduction (SCR) of the exhaust with ammonia for post-combustion control of nitrogen oxide emissions.

For the purpose of this analysis, the NRC staff will evaluate the impacts of a new 910 MW NGCC alternative. Installing the NGCC alternative on the Davis-Besse site would allow for the fullest use of existing infrastructure, such as transmission lines and cooling systems, and minimize construction impacts. Only a limited amount of buildable vacant land is available on the Davis-Besse site while allowing the reactor to continue operating until license expiration. However, the relatively modest footprint of an NGCC power plant, together with the expectation that the existing cooling tower and substation would be used to support the NGCC alternative, supports the conclusion that an NGCC facility could be installed on the Davis-Besse site. An NGCC alternative would also require a pipeline to deliver natural gas to the site. Depending on the availability of pipeline capacity, the existing pipeline transmission system may require some upgrades to support the new facility.

Natural gas fired power plants are feasible, commercially available options for providing electric generating capacity beyond Davis-Besse's current license expiration. Environmental impacts from the NGCC alternative are summarized in Table 8.1-1 and discussed in depth in Section 8.1.1-9.

Table 8.1-1. Summary of Environmental Impacts of the NGCC Alternative Compared to Continued Operation of the Existing Davis-Besse

	New NGCC at the Davis-Besse Site	Continued Operation of the Davis-Besse Reactor
Air quality	SMALL to MODERATE	SMALL
Groundwater	SMALL	SMALL
Surface water	SMALL	SMALL
Aquatic resources	SMALL	SMALL
Terrestrial resources	SMALL	SMALL
Human health	SMALL	SMALL
Land use	SMALL to MODERATE	SMALL
Socioeconomics	SMALL to MODERATE	SMALL

	New NGCC at the Davis-Besse Site	Continued Operation of the Davis-Besse Reactor
Transportation	SMALL to MODERATE	SMALL
Aesthetics	SMALL	SMALL
Historic & archeological resources	SMALL to MODERATE	SMALL to MODERATE
Waste management	SMALL	SMALL

8.1.1 Air Quality

Various Federal and State regulations aimed at controlling air pollution would impact a fossil fuel-fired power plant, including the NGCC alternative Davis-Besse is located in Ottawa County, which is part of the Sandusky Intrastate Air Quality Control Region. Ottawa County is designated as an attainment area for carbon monoxide (CO), ozone (O_3), and particulate matter less than 2.5 μm ($PM_{2.5}$). The county is designated as an unclassifiable area for particulate matter less than 10 μm (PM_{10}), not designated for lead (Pb), better than the national air quality standards for sulfur dioxide (SO_2) and cannot be classified or is better than national standards for nitrogen dioxide (NO_2) (40 CFR 81.336). A new gas-fired 910 MWe (net) generating plant developed at the Davis-Besse site would qualify as a new major source of criteria pollutants (one with the potential to release more than 100 tons per year of any criteria pollutant) and require a New Source Review (NSR)/Prevention of Significant Deterioration (PSD) of Air Quality Review. The natural gas-fired plant would need to comply with the standards of performance for stationary gas turbines set forth in 40 CFR Part 60, Subpart KKKK.

Section 169A of the Clean Air Act (CAA) (42 USC 7401) establishes a national goal of preventing future and remedying existing impairment of visibility in mandatory Class I Federal areas when impairment results from anthropogenic air pollution (pollution resulting from human activities). The Regional Haze Rule, promulgated by EPA in 1999 and last amended in October 2006 (71 FR 60631), requires states to demonstrate reasonable progress toward the national visibility goal established in 1977 to prevent future impairment of visibility due to anthropogenic pollution in Class I areas. The visibility protection regulatory requirements are contained in 40 CFR Part 51, Subpart P, including the review of the new sources that would be constructed in the attainment or unclassified areas and may affect visibility in any Federal Class I area. If a gas-fired alternative were located close to a mandatory Class I area, additional air pollution control requirements would potentially apply; however, there are no Class I areas within 50 mi of the Davis-Besse site (EPA 2013).

EPA first promulgated the Clean Air Interstate Rule (CAIR) in 2005, permanently capping sulfur dioxide and nitrogen oxide emissions from stationary sources located in 28 states, including Ohio. However, the D.C. Circuit Court vacated the Federal rule on February 8, 2008. In December 2008, the U.S. Court of Appeals for the D.C. Circuit Court reinstated the rule, allowing it to remain in effect but also requiring EPA to revise both the rule and its implementation plan. On July 6, 2010, EPA instead proposed replacing CAIR with the Cross-State Air Pollution Rule (CSARP) for control of sulfur dioxide and nitrogen oxide emissions that cross State lines. On July 16, 2011, the EPA finalized the CSARP that requires 28 states to improve air quality by reducing power plant emissions that cross state lines. CASRP required that the state of Ohio reduce annual SO_2, NOx, and ozone emissions to assist in attaining clean air standards. However, on August 21, 2012, the U.S. Court of Appeals vacated the 2011 Cross-State Air Pollution rule and the 2005 CAIR rule remains in effect. A new NGCC source constructed in Ohio would be subject to emission limits for sulfur dioxide and nitrogen oxide promulgated under CAIR.

Under the Federal Acid Rain Program, a new natural gas-fired plant would have to comply with Title IV of the CAA reduction requirements for sulfur dioxide and nitrogen oxide, which are the main precursors of acid rain and the major cause of reduced visibility. Title IV establishes maximum sulfur dioxide and nitrogen oxide emission rates from the existing plants and a system of the sulfur dioxide emission allowances that can be used, sold, or saved for future use by new plants.

Ohio is subject to nitrogen oxide State Implementation Plan (SIP) call regulations designed to reduce transport of ground-level ozone across State lines. A new NGCC alternative located in those states would be required to comply with those regulations limiting nitrogen oxide emissions (EPA 2009b).

In response to the Consolidated Appropriations Action of 2008 (Public Law 110-161), EPA promulgated final mandatory greenhouse gas (GHG) reporting regulations for major sources (emitting more than 25,000 tons/year (22,680 metric tons (MT)/year) of all GHGs), effective in December 2009 (EPA 2010a). This new NGCC plant would be subject to those reporting regulations.

A natural gas-fired plant capable of producing utility-scale amounts of power would qualify as a major generator of GHGs under the “Tailoring Rule” promulgated by EPA. The Tailoring Rule established thresholds to regulate GHG emissions from stationary sources under the Clean Air Act (CAA), Prevention of Significant Deterioration (PSD), and Title V Operating Permit programs. Operating permits issued to major sources of GHG under the PSD or Title V Federal permit programs must contain provisions requiring the use of best available control technology (BACT) to limit the emissions of GHGs if those sources would be subject to PSD or Title V permitting requirements due to their non-GHG pollutant emission potentials and their estimated GHG emissions are at least 75,000 tons per year of carbon dioxide equivalents (CO_2e).[1] Meeting permit limitations for GHG emissions may require installation of carbon capture and sequestration (CCS) devices on any new natural gas-fired power plant. Ohio EPA has adopted regulations equivalent to the Federal GHG Tailoring Rules (OEPA 2012).

8.1.1.1 Construction Impacts

Activities associated with the construction of the new natural gas-fired plant at the Davis-Besse site would cause air impacts as a result of emissions from construction equipment and fugitive dust from operation of the earth-moving and material handling equipment. Gas-fired power plants are constructed relatively quickly; construction lead times for NGCC plants are around 2 to 3 years (EIA 2011d; OECD/IEA, 2005).

Analogous impacts would occur in association with offsite pipeline construction. All such impacts would be temporary. Workers’ vehicles and motorized construction equipment would generate temporary criteria pollutant emissions. Dust-control practices would reduce fugitive dust, which would be temporary in nature. Given the expected, relatively short construction period for both the NGCC facility and the pipeline, the NRC concludes that the impact of vehicle

[1] Carbon dioxide equivalents (CO_2e) is a metric used to compare the emissions of GHG based on their Global warming potential (GWP). GWP is a measure used to compare how much heat a GHG traps in the atmosphere. GWP is the total energy that a gas absorbs over a period of time, compared to carbon dioxide. Carbon dioxide equivalents is obtained by multiplying the amount of the GHG by the associated GWP. For example, the GWP of CH_4 is estimated to be 21; therefore, one ton of CH_4 emission is equivalent to 21 tons of CO_2 emissions.

exhaust emissions, construction equipment, and fugitive dust from operation of earth-moving and material-handling equipment would be SMALL.

8.1.1.2 Operating Impacts

Using data and algorithms published by EPA and EIA and performance guarantees provided by pollution control equipment vendors, the NRC staff projects the following emissions for an NGCC alternative to the Davis-Besse reactor:

- sulfur oxides—70 tons (64 MT) per year,
- nitrogen oxides—204 tons (185 MT) per year,
- particulate matter less than or equal to 10 µm—136 tons (123 MT) per year,
- carbon monoxide—309 tons (280 MT) per year, and
- carbon dioxide—2,270,000 tons (2,060,000 MT) per year.

Sulfur and Nitrogen Oxides. As stated above, the new natural gas-fired alternative would produce 70 tons (64 MT) per year of sulfur oxide and 204 tons (185 MT) per year of nitrogen oxide based on the use of the dry low nitrogen oxide combustion technology and use of selective catalytic reduction (SCR) in order to significantly reduce nitrogen oxide emissions.

The new plant would be subjected to the continuous monitoring and reporting requirements of sulfur dioxide, nitrogen oxides, and carbon dioxide specified in 40 CFR Part 75.

Particulates. The new natural gas-fired alternative would produce 136 tons (123 MT) per year of particulates, all of which would be emitted as PM_{10}. In addition to particulate emissions from the NGCC facility, small amounts of particulate would be released as drift from the cooling tower that supports the steam cycle. However, because the NGCC facility would have a smaller heat rejection demand than the reactor, the amount of drift presently being released from the tower as it supports the reactor is considered to be a bounding condition. FENOC estimated the release of particulates contained in cooling tower drift during reactor operation is 1.4 tons per year, assuming calculation of particulate emissions contained in drift based on an average total dissolved solids (TDS) concentration of 228 parts per million (ppm) (TRC 1995).

Carbon Monoxide. Based on EPA emission factors (EPA 1998), the NRC staff estimates that the total CO emissions would be approximately 309 tons (280 MT) per year.

Carbon Dioxide. The NRC estimates that uncontrolled emissions of CO_2 from operation of the NGCC alternative would amount to 2.27 million tons per year (2.06 MMT per year). Although natural gas combustion in the combustion turbines would be the primary source, other miscellaneous ancillary sources—such as truck and rail deliveries of materials to the site and commuting of the workforce—would make minor contributions.

The Tailoring Rule will require that BACT be applied to control CO_2 emissions. Carbon capture and sequestration (CCS) technologies can capture and remove as much as 90 percent of the CO_2 from the exhausts of combustion turbines (CT) (NETL 2010). However, such equipment imposes a significant parasitic load that will result in a power production capacity decrease of approximately 14 percent, a reduction in net overall thermal efficiency of the CTs studied from 50.8 percent to 43.7 percent, and a potential increase in the levelized cost of electricity produced in NGCC units so equipped by as much as 30 percent (NETL 2010). This can result in an increase in other air pollutants because more generation capacity would be necessary to supply the same electrical demand.

Hazardous Air Pollutants. In December 2000, the EPA issued regulatory findings (EPA 2000b) on emissions of hazardous air pollutants (HAPs) from electric utility steam-generating units, which identified that natural gas-fired plants emit hazardous air pollutants such as arsenic, formaldehyde, and nickel. The EPA stated that "[t]he impacts due to HAP emissions from natural gas-fired electric utility steam generating units were negligible based on the results of the study. The Administrator finds that regulation of HAP emissions from natural gas-fired electric utility steam generating units is not appropriate or necessary." As a result, the NRC staff will not further address HAPs here.

In addition to the air quality impacts associated with operation of the NGCC facility, additional air quality impacts would result from vehicles used by the commuting operating workforce. However, the NGCC workforce is smaller than the current operating workforce at Davis-Besse, so a change to an NGCC alternative will result in reductions in commuting-related air emissions.

The impact from SO_2, CO, PM, and NO_X emissions during operation would be noticeable. Based on this information, the overall air quality impacts of operation of an NGCC plant located at the Davis-Besse site would be SMALL to MODERATE.

8.1.2 Groundwater Use and Quality

8.1.2.1 Construction

As described in Section 2.1.7.2, groundwater at the Davis-Besse site is unsuitable as a drinking water source. Private wells within 2 to 3 mi of the site are not used for drinking water, but rather for irrigation and sanitary purposes. The impacts associated with groundwater use during construction would be similar to those associated with the construction of Davis-Besse. All open excavations will require dewatering, which would have a minor, localized impact on groundwater levels and flow rate at the site. The NRC assumes that during construction, liquid construction wastes will either temporarily be retained in lined evaporation ponds or will be stored in drums for shipment to offsite disposal facilities. With the application of best management practices and the controls established in a General Stormwater Permit, no noticeable impacts on groundwater quality due to the construction of the NGCC alternative are expected. As a result, impacts to groundwater quality would be SMALL.

8.1.2.2 Operation

Groundwater is not used at the Davis-Besse facility. The NRC presumes groundwater will not be used to operate the NGCC alternative; thus, the impacts to the groundwater resource would be SMALL.

8.1.3 Surface Water Use and Quality

8.1.3.1 Construction

A minimal amount of surface water is expected to be used to construct the NGCC, primarily for fugitive dust control, cleaning, and concrete mixing. Some impacts on surface water quality may result in increased sediment loading to stormwater runoff from active construction zones or from the dewatering of excavations; however, the NRC expects that a Stormwater General Permit would require best management practices that would prevent or significantly mitigate such impacts. Best management practices include controlling drainage by ditches, berms, and sedimentation basins; prompt revegetation to control erosion; stockpiling and reusing excavated topsoil; and various other techniques used to control soil erosion and water pollution. As a result, surface water use and quality impacts during construction at Davis-Besse would be SMALL.

8.1.3.2 Operation

The gas-fired alternative would require much less cooling water than the existing Davis-Besse facility, because it operates at a higher thermal efficiency (nearly 60 percent) and because it requires much less water for steam cycle condenser cooling. The existing closed loop cooling system now supporting the reactor would be able to support a natural gas alternative on the Davis-Besse site without any increase in its current capacity. It would be supported by using freshwater recovered from the existing cooling water intake canal and discharging the blowdown water through the existing cooling system discharge pipe into Lake Erie. Under such a configuration, the rate of withdrawal of freshwater to support steam cycle cooling would be reduced. In conclusion, the impacts on surface water due to the operation of an NGCC plant would be less than the impacts associated with the continued operation of Davis-Besse (as discussed in Section 2.4, “Surface Water Resources”) and, thus, are considered to be SMALL.

8.1.4 Aquatic Ecology

8.1.4.1 Construction

Construction activities for the NGCC alternative would cause minimal impacts on aquatic resources in Lake Erie because construction would occur far enough inland to remove the likelihood of the erosion and sedimentation. Additionally, stormwater control measures, which would be required to comply with Ohio’s NPDES permitting, would minimize the flow of disturbed soils into aquatic habitats.

8.1.4.2 Operation

During operations, the NGCC alternative would require less cooling water to be withdrawn from and discharged to Lake Erie than required for Davis-Besse. Therefore, thermal impacts would be less for the NGCC alternative than Davis-Besse. The cooling system for a new NGCC plant would have similar chemical discharges as Davis-Besse. Air emissions from the NGCC plant would emit particulates that would settle onto the lake surface and introduce a new source of pollutants. However, lake tides would likely dissipate and dilute the concentration of pollutants resulting in minimal exposure to aquatic biota.

Consultation under the ESA would be required to assess the occurrence and potential impacts to Federally protected aquatic species and habitats within affected surface waters. Coordination with State natural resource agencies would further ensure that the NGCC operator would take appropriate steps to avoid or mitigate impacts to State-listed species, habitats of conservation concern, and other protected species and habitats. The NRC relies on these consultations to, or eliminate, potential impacts to protected aquatic species and habitats.

The impacts on aquatic ecology would be minor because construction activities would require BMPs and stormwater management permits. Also, surface water discharge for this alternative would be less than for Davis-Besse. Deposition of pollutants into aquatic habitats from the plant’s air emissions would be minimal because the concentration of pollutants would be diluted with the lake tides. Therefore, the NRC staff concludes that impacts on aquatic ecology would be SMALL.

8.1.5 Terrestrial Ecology

8.1.5.1 Construction

Construction of an NGCC alternative would occur on the Davis-Besse site and would use existing transmission lines. Because the onsite land requirement is relatively small, the entire NGCC alternative construction footprint would likely be sited in already developed areas of the Davis-Besse site, which would minimize impacts to terrestrial habitats and species. However, the level of direct impacts would vary based on the specific location of new buildings and infrastructure on the site. Offsite construction would occur mostly on land where gas extraction is already occurring. Erosion and sedimentation, fugitive dust, and construction debris impacts would be minor with implementation of BMPs. Construction noise could modify wildlife behavior; however, these effects would be temporary. Road improvements or construction of additional service roads to facilitate construction could result in the temporary or permanent loss of terrestrial habitat. Construction of gas pipelines along existing, previously disturbed utility corridors would result in temporary noise and displacement of wildlife, but would minimize the removal or destruction of undisturbed habitats. Impacts to terrestrial habitats and species from transmission line operation and corridor vegetation maintenance, and operation of the cooling towers would be similar in magnitude and intensity as those resulting from GGNS and would, therefore, be SMALL.

As discussed under aquatic ecology impacts, consultation with the FWS under the ESA would ensure that the construction and operation of an NGCC alternative would not adversely affect any Federally listed species or adversely modify or destroy designated critical habitat. Coordination with state natural resource agencies would further ensure that the NGCC operator would take appropriate steps to avoid or mitigate impacts to state-listed species, habitats of conservation concern, and other protected species and habitats. The NRC assumes that these consultations would result in avoidance or mitigation measures that would minimize or eliminate potential impacts to protected terrestrial species and habitats. Consequently, the impacts of construction and operation of a new nuclear alternative on protected species and habitats would be SMALL.

8.1.5.2 Operation

Impacts on terrestrial species due to the operation of an NGCC plant would be similar to the impacts associated with the present operation of Davis-Besse. The monitoring of cooling-tower drift effects on terrestrial vegetation has shown no visible damage. In addition, where lines cross croplands and little or no vegetation control is required, impacts due to right-of-way (ROW) management on wildlife has all been determined to be small. As a result, the impacts on terrestrial resources from the operation of the NGCC alternative on the Davis-Besse site would be SMALL.

8.1.6 Human Health

8.1.6.1 Construction

Impacts on human health from construction of the NGCC alternative would be similar to impacts associated with the construction of any major industrial facility. Compliance with worker protection rules would control those impacts on workers at acceptable levels. Impacts from construction on the general public would be minimal since limiting active construction area access to authorized individuals is expected. Impacts on human health from the construction of the NGCC alternative would be SMALL.

8.1.6.2 Operation

Human health effects of gas-fired generation are generally low. However, in Table 8-2 of the GEIS (NRC 1996), the NRC staff identified cancer and emphysema as potential health risks from gas-fired plants. NO_x emissions contribute to ozone formation, which contributes to human health risks. Emission controls on the NGCC alternative can be expected to maintain NO_x emissions well below air quality standards established for the purposes of protecting human health, and emissions trading or offset requirements mean that overall NO_x releases in the region will not increase. Health risks for workers may also result from handling spent catalysts used for NO_x control that may contain heavy metals; however, appropriate handling precautions are expected to be followed. Impacts on human health from the operation of the NGCC alternative would be SMALL.

8.1.7 Land Use

The GEIS generically evaluates the impacts of constructing and operating various replacement power plant alternatives on land use, both on and off each power plant site. The analysis of land use impacts focuses on the amount of land area that would be affected by the construction and operation of a natural gas-fired combined-cycle power plant at the Davis-Besse site. Locating the new NGCC power plant at the Davis-Besse site would maximize the availability of support infrastructure and reduce the need for additional land.

8.1.7.1 Construction

Based on GEIS estimates, approximately 110 ac (40.5 ha) of land would be needed to support a new NGCC power plant (NRC 1996). This amount of land use would include other plant structures and associated infrastructure. Depending on the location and availability of existing natural gas pipelines, an additional 150 ac (61 ha) of land could be needed for a new 25-mi (41-km) gas supply pipeline.

In addition to onsite land requirements, land would be required offsite for natural gas wells and collection stations. Scaling from GEIS estimates, approximately 3,275 ac (1,325 ha) (based on 3,600 ac per 1,000 MWe and 910 MWe for NGCC) (NRC 1996) would be required for wells, collection stations, and pipelines to bring the gas to the plant. Most of this land requirement would occur on land where gas extraction already occurs. Therefore, land use impacts from land acquisition would be SMALL to MODERATE, depending on location of a new gas supply pipeline and off-site wells and collection stations.

8.1.7.2 Operation

The elimination of uranium fuel for Davis-Besse would partially offset some, but not all, of the land requirements for an NGCC alternative. Scaling from GEIS estimates, approximately 635 ac (256 ha) (based on 35 ac/yr disturbed per 1,000 MWe for 20 years) would no longer be needed for mining and processing uranium during the operating life of the plant (NRC 1996). Operational land use impacts from an NGCC power plant would be SMALL.

8.1.8 Socioeconomics

Socioeconomic impacts are defined in terms of changes to the demographic and economic characteristics and social conditions of a region. For example, the number of jobs created by the construction and operation of a new NGCC power plant could affect regional employment, income, and expenditures. Two types of jobs would be created by this alternative:(1)

construction jobs, which are transient, short in duration, and less likely to have a long-term socioeconomic impact; and (2) power plant operations jobs, which have the greater potential for permanent, long-term socioeconomic impacts. Workforce requirements for the construction and operation of the NGCC power plant were evaluated to measure their possible effects on current socioeconomic conditions.

8.1.8.1 Construction

FENOC estimates a construction workforce ranging from 1,092 to 2,275 workers, which is consistent with GEIS estimates (FENOC 2011). During construction of the NGCC power plant, the communities surrounding the power plant site would experience increased demand for rental housing and certain public services. The relative economic impact of this many workers on the local economy and tax base would vary, with the greatest impacts occurring in the communities where the majority of construction workers would reside and spend their income. As a result, local communities could experience a short term economic “boom” from increased tax revenue and income generated by construction expenditures and the increased demand for temporary (rental) housing and business services. Some construction workers could relocate in order to be closer to the construction work site. However, given the proximity of Davis-Besse to the Toledo metropolitan area, workers could commute to the construction site, thereby reducing the need for rental housing.

After completing the installation of the NGCC plant, local communities could experience a return to pre-construction economic conditions. The rental housing market could experience increased vacancies and decreased prices. Based on this information and given the number of construction workers, socioeconomic impacts during construction in communities near the new NGCC at the Davis-Besse site could range from SMALL to MODERATE.

8.1.8.2 Operation

FENOC estimates an operations workforce of 137 employees (FENOC 2011). FENOC’s estimate appears to be reasonable and is consistent with trends toward lowering labor costs by reducing the size of power plant operations workforces. The reduction in employment at Davis-Besse from reactor shutdown and decommissioning could affect property tax revenue and income in local communities and businesses. In addition, the permanent housing market could also experience increased vacancies and decreased prices if operations workers and their families move out of the region. However, the amount of taxes paid under the NGCC alternative may increase if additional land is required offsite to support this alternative. Based on the above discussion, socioeconomic impacts during operations could range from SMALL to MODERATE.

8.1.9 Transportation

Commuting workers and truck deliveries of materials and equipment to the Davis-Besse site would cause transportation impacts during the construction and operation of the NGCC power plant.

8.1.9.1 Construction

During construction, 1,092 to 2,275 workers could be commuting daily to the construction site. Arriving by site access roads, the volume of traffic on nearby roads could increase substantially during shift changes. In addition to commuting workers, trucks would be transporting construction materials and equipment to the worksite, thus increasing the amount of traffic on local roads. Traffic volumes would peak during shift changes, resulting in temporary levels of service impacts and delays at intersections. Pipeline construction and modifications to existing natural gas pipeline systems could also have a temporary traffic impact. Some power plant components and materials could be delivered by train or barge. Train deliveries could cause additional traffic delays at railroad crossings. Overall, traffic-related transportation impacts during construction likely would be MODERATE.

8.1.9.2 Operation

Traffic-related transportation impacts would be greatly reduced after completing the installation of the NGCC alternative. Transportation impacts would include daily commuting by the operating workforce, equipment and materials deliveries, and the removal of commercial waste material by truck to offsite disposal or recycling facilities. Since fuel is transported by pipeline, the transportation infrastructure would experience little to no increased traffic from fuel operations. Overall, transportation impacts would be SMALL during plant operations.

8.1.10 Aesthetics

The analysis of aesthetic impacts focuses on the degree of contrast between the NGCC alternative and the surrounding landscape and the visibility of the new NGCC plant at the Davis-Besse site.

8.1.10.1 Construction

During construction, all of the clearing and excavation would occur on the existing Davis-Besse power plant site. These activities could be visible from offsite roads. Since the existing power plant site would already appear industrial, construction of the NGCC power plant would appear similar to other ongoing onsite activities. Aesthetic changes during construction would be limited to the immediate vicinity of the existing Davis-Besse site, and overall impacts would be SMALL.

8.1.10.2 Operation

The facility would be visible offsite during daylight hours, and some structures, such as the approximately 150 ft (45 m) high exhaust stacks or natural draft cooling tower, may require aircraft warning lights (FENOC 2011). During certain weather conditions, the plume from the cooling tower would be visible for long distances. In general, given the industrial appearance of the Davis-Besse site, an NGCC alternative would blend in with the surroundings if the existing Davis-Besse facility remains. In addition, the visible appearance of the NGCC power block could look similar to the existing Davis-Besse power block. Since the new NGCC power plant would appear similar to the existing Davis-Besse power plant, overall operational impacts would be SMALL.

8.1.11 Noise

Ambient noise conditions in the vicinity of Davis-Besse would be affected by the construction and operation of a new NGCC power plant.

8.1.11.1 Construction

Noise levels at the Davis-Besse site would increase during the construction of the new NGCC power plant. Noise during construction, however, would be intermittent and limited to the peak periods of activity and would diminish over distance. Noise impacts during construction of the NGCC power plant could range from SMALL to MODERATE.

8.1.11.2 Operation

Noise during NGCC power plant operations would be similar to noise generated during reactor operations and would be limited to those caused by normal industrial processes and communications. Pipelines delivering natural gas fuel could be audible near gas compressor stations. Noise impacts during NGCC power plant operations would be SMALL.

8.1.12 Historic and Archaeological Resources

The potential for impacts on historic and archaeological resources from the NGCC alternative would vary greatly depending on the location of the proposed plant on the Davis-Besse site. As the parcel of land on which Davis-Besse is situated has not been surveyed for historic and archaeological resources, plant operators would need to survey all areas associated with operation of the alternative (e.g., a new pipeline, roads, transmission corridors, other ROWs). If a previously disturbed area of the site was used, an inventory would still be necessary to verify the level of disturbance and evaluate the potential for intact subsurface resources. Any resources found in these surveys would need to be evaluated for eligibility on the National Register of Historic Properties (NRHP), and mitigation of adverse effects would need to be addressed if eligible resources were encountered. Areas with the greatest sensitivity should be avoided. Visual impacts on significant cultural resources—such as the viewsheds of historic properties near the site—also should be assessed.

As the Davis-Besse site has not been previously surveyed, the level of impact to historic and archaeological resources would vary depending on the specific resources found to be present in the area of potential effect. However, given that the majority of the site is unusable marsh land and the preference is to use previously disturbed areas of the site and existing infrastructure, avoidance of significant historic and archaeological resources should be possible. Therefore, the impacts on historic and archaeological resources from the NGCC alternative would be SMALL to MODERATE.

8.1.13 Environmental Justice

The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health, environmental, and socioeconomic effects on minority and low-income populations that could result from the construction and operation of a new power plant. Minority and low-income populations are subsets of the general public living near the proposed power plant site.

Adverse health effects are measured in terms of the risk and rate of fatal or non-fatal adverse impacts on human health. Disproportionately high and adverse human health effects occur when the risk or rate of exposure to an environmental hazard for a minority or low-income population is significant and exceeds the risk or exposure rate for the general population or for another appropriate comparison group. Disproportionately high environmental effects refer to impacts or risk of impact on the natural or physical environment in a minority or low-income community that are significant and appreciably exceed the environmental impact on the larger community. Such effects may include biological, cultural, economic, or social impacts. For example, increased demand for rental housing during replacement power plant construction could disproportionately affect low-income populations that rely on the previously inexpensive rental housing market.

8.1.13.1 Construction

Potential impacts to minority and low-income populations would mostly consist of environmental and socioeconomic effects during construction (e.g., noise, dust, traffic, employment, and housing impacts). Noise and dust impacts during construction would be short term and primarily limited to onsite activities. Minority and low-income populations residing along site access roads would be directly affected by increased commuter vehicle and truck traffic. However, because of the temporary nature of construction, these effects are unlikely to be high and adverse and would be contained to a limited time period during certain hours of the day. Increased demand for rental housing during construction could cause rental costs to rise disproportionately affecting low-income populations living near the site who rely on inexpensive housing. However, given the proximity of Davis-Besse to the Toledo metropolitan area, workers could commute to the construction site, thereby reducing the need for rental housing.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.1 of this chapter, the construction of a new NGCC power plant would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.1.13.2 Operation

Emissions from the operation of an NGCC plant could affect minority and low-income populations as well as the general population living in the vicinity of the new power plant. However, all would be exposed to the same potential effects from NGCC power plant operations, and any impacts would depend on the magnitude of the change in ambient air quality conditions. Permitted air emissions are expected to remain within regulatory standards.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.1 of this chapter, the construction and operation of a new NGCC power plant would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.1.14 Waste Management

8.1.14.1 Construction

During the construction stage of this alternative, land clearing and other construction activities would generate waste that can be recycled, disposed of onsite, or shipped to an offsite waste disposal facility. Because the NGCC alternative would most likely be constructed on the previously disturbed portions of the Davis-Besse site, the amounts of wastes produced during land clearing would be minimal. As a result, construction related impacts due to the construction of the NGCC alternative due to waste management would be SMALL.

8.1.14.2 Operation

This NGCC alternative would produce relatively little waste, primarily in the form of spent SCR catalysts used for control of NO_x emissions. The NRC staff presumes that the SCR technology employed would involve introducing ammonia into the exhaust ducts of the cooling towers where it combines with NO_x in a nickel catalyst bed to form zero valent nitrogen and water. Based on data provided by the Institute of Clean Air Companies, EPA acknowledges that typical SCR devices can demonstrate removal efficiencies of 70 to 90 percent (EPA 2000a).

Because the specific NO_x emission control equipment cannot be specified at this time, the amount of spent catalysts that would be generated during each year of operation of the NGCC alternative also cannot be calculated with precision. However, the amount would be modest. Domestic and sanitary wastes would be expected to decrease from amounts now generated during the operation of the reactors due to a reduced operational workforce for the NGCC alternative. According to the 1996 GEIS, a natural gas-fired plant would generate minimal waste; therefore, waste impacts from an NGCC facility at Davis-Besse would be SMALL.

8.1.15 Climate Change-Related Impacts of a Natural Gas-Fired Combined Cycle Alternative

Combustion of fossil fuels, including natural gas, is the greatest anthropogenic source of GHG emissions in the U.S. After a thorough examination of the scientific evidence and careful consideration of public comments, the EPA announced on December 7, 2009, that GHGs threaten the public health and welfare of the American people and meet the CAA definition of air pollutants. Carbon dioxide (CO_2) is the largest GHG emitted during fossil fuel combustion and is of primary concern for global climate change. Climate changes (in the U.S. and globally) have been observed over the past 50 years and future climate changes are expected to continue (USGCRP 2009). The observed global climate-related changes are primarily due to human-induced emissions of GHGs (USGCRP 2009). The extent and nature of climate change is not specific to where GHGs are emitted, as these emissions are transported and mixed in the atmosphere. However, an NGCC alternative would contribute GHG emissions. This section presents an assessment of the potential impacts the construction and operation of an NGCC alternative will have on climate change.

8.1.15.1 Construction

Impacts to climate change from the construction of an NGCC alternative would result primarily from the consumption of fossil fuels in the engines of construction vehicles and equipment, workforce vehicles used in commuting to and from the work site, and delivery vehicles. Analogous impacts would occur in association with offsite pipeline construction. All such impacts, however, would be temporary.

Although natural gas combustion in the combustion turbines would be the primary source, other miscellaneous ancillary sources such as truck and rail deliveries of materials to the site and commuting of the workforce would make minor contributions.

Given an expected relatively short construction period for both the NGCC facility and the pipeline, the overall impact on climate change from the releases of GHGs during construction of the NGCC alternative would be SMALL.

8.1.15.2 Operation

The NRC estimates that emissions of CO_2e from operation of the NGCC alternative would amount to 2.07 MMT (2.29 million tons) per year. GHG emissions resulting from operation would be noticeable. Estimated GHG emissions would be three times larger than the threshold in EPA's tailoring rule for GHG (75,000 tons (68,000 MT) per year of carbon dioxide equivalent). EPA reported that, in 2010, the total amount of carbon dioxide equivalent (CO_2e) emissions related to electricity generation was 2,277.3 teragrams (2,277.3 MMT) (EPA 2012). EIA reported that, in 2010, electricity production in Ohio was responsible for 121 MMT of CO_2 emissions (123 MMT CO_2e) (EIA 2012). The estimated CO_2e emitted from operation of the NGCC alternative amount represents 0.099 percent and 1.7 percent, respectively, of 2010 U.S.

and Ohio CO_2e emissions. This amount represents an increase of 1.7 percent over the 2010 Ohio CO_2e emissions. Although natural gas combustion in the combustion turbines would be the primary source, other miscellaneous ancillary sources—such as truck and rail deliveries of materials to the site and commuting of the workforce—would make minor GHG contributions.

As previously discussed, CCS will capture and remove as much as 90 percent of the CO_2 from the exhausts of combustion turbines (NETL 2010). With CCS in place, the NGCC alternative would release 0.21 MMT per year (0.23 million tons) of CO_2, and the impact on climate change from this alternative would be further reduced.

The impact of the operation of an NGCC facility on climate change would be SMALL to MODERATE.

8.2 Combination Alternative

The combination alternative consists of 1,500 MW of installed wind capacity spread out over multiple sites—315 MW effective capacity for baseload generation and 360 MW to power CAES facility, 400 MW of installed solar photovoltaic (PV) capacity (75 MW effective capacity for baseload generation and 75 MW to power CAES facility), and 305 MW of NGCC capacity to provide the balance needed to replace Davis-Besse. All wind projects would be land-based because there are currently no operating offshore wind projects in the U.S.

The feasibility of wind as a baseload power source depends on the availability, accessibility, and constancy of the wind resource within the region of interest. Ohio has approximately 55,000 MW of wind power potential (NREL 2011) and has approximately 449 MW of operating wind projects, 802 MW of OPSB-approved projects that have not yet started operations, and 524 MW of wind projects in review for a Certificate of Environmental Compatibility and Public Need (OPSB 2013). The largest wind project in Ohio history, Blue Creek Wind Farm, was recently completed in March 2012 and has an installed capacity of 304 MW.

Wind power installations, which may consist of several hundred turbines, produce variable amounts of electricity. Davis-Besse, however, produces electricity almost constantly. Because wind power installations deliver variable output when wind conditions change, wind power cannot substitute for existing baseload generation on a one-to-one basis. A study by Archer and Jacobsen (2007) found that an array of 19 sites spread across the American southwest (with approximately 850 km (530 mi) distance from east to west and north to south) could provide 21 percent of installed capacity 79 percent of the time. In other words, 21 percent of the array's capacity was essentially available as baseload generation. While wind power installations in Archer and Jacobsen's study, in most cases, accessed higher power-class wind resources than are available onshore in Ohio, the NRC staff will adopt Archer and Jacobsen's approach for the purpose of this analysis. For the combination alternative analysis, the NRC staff assumes that an array containing 1,500 MW installed wind capacity could potentially replace a portion—315 MW—of Davis-Besse's capacity. (The NRC staff is unable to find any determination for effective capacity factors from regional transmission organizations or independent system operators that are based on an interconnected array of wind installations, as none currently exists. The NRC staff also notes that it is possible that no interconnected arrays will exist in any state by 2017.)

Wind power, in general, cannot be stored without first being converted to electrical energy. There are limited energy storage opportunities available to overcome the variability of wind resource availability. CAES is a commercially viable technology for energy storage, though it is seldom used on a utility scale. In CAES, an electric motor uses excess electricity to pump air intro an underground, pressurized cavity. When electricity is needed, the compressed air is released through a gas turbine generator. The compressed air provides some power to the generator (essentially, reducing the need for compression by the turbine), and burning natural gas provides head to increase the pressure and power the turbine. Thus, CAES is not solely an energy storage technology, but it also relies on additional fossil fuel. This technology is currently in use at one site in the U.S. and one site in Germany, with capacities of 110 MWe and 290 MWe, respectively.

For the combination alternative, the remaining 24 percent of the total 1,500 MW installed wind capacity—equivalent to 360 MW—will provide power to the Norton Energy Storage Project, a CAES facility that can supply power to the grid when the wind is not blowing. FENOC indicates that the Norton Energy Storage facility could have a maximum of 536 MW of capacity available by 2017 (although it has not committed to install this capacity in that time period) and the maximum potential storage capacity at the facility is 2,700 MWe. The NRC staff recognizes that wind dynamics, daily and seasonal variation, and Norton's operational characteristics may limit the ability to store and release energy to offset the wind's variability. CAES is less effective at offsetting seasonal wind variation than it is at offsetting intra-day or day-to-day variation. Offsetting month-to-month variations or seasonal variations would require very large air reservoirs. However, for the purposes of this analysis, the NRC staff will assume that Norton Energy Storage is capable of capturing the extra energy produced for purposes of this analysis and releasing it when needed.

In addition, the NRC staff considers 400 MW of installed PV capacity (150 MW effective capacity) as part of this combination alternative. Solar PV systems use the sun's energy to produce electricity at a utility scale, converting the energy contained in the photons of sunlight incident to direct current electricity that is aggregated, converted to alternating current, and connected to the high-voltage transmission grid. Currently, Ohio's largest completed solar PV installation, the Wyandot Solar Farm, has 12 MW of capacity (PSEG Solar 2010), though the Turning Point Solar Facility is currently under construction, and will ultimately have 49.9 MW of solar capacity. Turning Point and Ohio Air Quality claim the Turning Point facility will be the largest solar facility east of the Mississippi, with the first 20 MW scheduled to come on-line in 2013 (OAQDA undated). In its supplement to the ER, FENOC indicated that the average capacity factors for solar projects were 24 percent based on an NREL publication from 2002 (FENOC 2011). The NRC staff notes that PJM Interconnection (PJM) (the regional transmission operator that manages most of Ohio's electricity market, though not the First Energy service territories) published more recent information that indicates that solar power within the PJM system has an effective capacity factor of 38 percent (PJM 2010). In order to achieve an effective capacity of 150 MW and relying on PJM's capacity factor, 400 MW of new installed solar PV capacity would be required by 2017. While this amount of PV capacity exceeds planned utility-scale installations in Ohio, this capacity may be achievable by 2017 given the short lead times necessary for PV installation and experience with facilities like Wyandot and Turning Point. Of the 150 MW effective capacity, 75 MW would be used immediately, and 75 MW would be used to power the Norton Energy Storage project, which could then run during times when the sun is not shining or is otherwise less intense.

Finally, this combination alternative contains a 305-MW NGCC unit capable of within-day cycling to provide the remaining 158 MW of Davis-Besse's capacity and to provide back-up capacity to the wind and solar installations with the remaining capacity. As needed, this alternative also provides additional output to the Norton Energy Storage project during times when the unit would otherwise function in a spinning-reserve or hot-standby mode. Such a unit is commercially available and operates with a relatively high thermal efficiency of 57 percent (Siemens 2011). The NRC staff notes that this NGCC unit would spend a substantial amount of time either generating electricity to account for variable wind and solar outputs or functioning as spinning reserve.

The NRC staff notes that Norton Energy Storage has an additional 29 MW of capacity that is not expressly accounted for in this alternative, but it is likely that this capacity would be fully used at some times given the variability of wind and solar energy outputs. The NRC staff also notes that Norton Energy Storage provides power from a mix of natural gas combustion and compressed air. The Norton Energy Storage Project, by using stored energy, acts like a natural gas combustion turbine with a 78 percent thermal efficiency. The stored energy in the Norton Energy Storage Project, however, cannot be released without combustion of natural gas.

Table 8.2-1 summarizes the environmental impacts of the combustion alternative compared to the continued operation of Davis-Besse.

Table 8.2-1. Summary of Environmental Impacts of the Combination Alternative Compared to Continued Operation of the Existing Davis-Besse

	Combination Alternative	Continued Operation of the Davis-Besse Reactor
Air quality	SMALL	SMALL
Groundwater	SMALL	SMALL
Surface water	SMALL	SMALL
Aquatic resources	SMALL	SMALL
Terrestrial resources	SMALL to MODERATE	SMALL
Human health	SMALL	SMALL
Land use	SMALL to LARGE	SMALL
Socioeconomics	SMALL to MODERATE	SMALL
Transportation	SMALL to MODERATE	SMALL
Aesthetics	SMALL to LARGE	SMALL
Historic & archeological resources	SMALL to LARGE	SMALL to MODERATE
Waste management	SMALL	SMALL

8.2.1 Air Quality

Air quality impacts from this alternative come primarily from the operation of the NGCC and Norton Energy Storage Project portions. Wind and solar power produce no direct air emissions during operations. During construction, wind and solar installations have the potential to create fugitive dust and emissions from equipment used during construction and installation. These impacts are limited in duration, however, and dust would be controlled by best management practices on construction sites. This section, then, focuses on the impacts that result from the NGCC portion of the alternative and from the Norton Energy Storage Project.

Various Federal and State regulations aimed at controlling air pollution would impact a fossil fuel-fired power plant, including the NGCC portion of this alternative located anywhere within

FENOC's three Ohio service areas, and to the Norton Energy Storage Project. A new gas-fired 305 MWe (net) generating plant developed at the Davis-Besse site would qualify as a new major source of criteria pollutants (one with the potential to release more than 100 tons per year of any criteria pollutant) and require an New Source Review (NSR)/Prevention of Significant Deterioration (PSD) of Air Quality Review. The natural gas-fired plant would need to comply with the standards of performance for stationary gas turbines set forth in 40 CFR Part 60, Subpart KKKK.

Compressed air energy storage creates operational air-quality impacts because the Norton Energy Storage Project relies on gas-fired turbines to heat the air released from underground storage and, thus, provide some of the energy produced by the compressed air storage system. FENOC estimated emissions for the Norton Energy Storage Project based on a six combustion trains and one cooling tower, to match the amounts permitted by the Norton Energy Storage Project's air emissions permit. The NRC staff notes that this overestimates the air quality impacts from the four trains that FENOC indicates could be operational at the Norton Energy Storage Project by 2017. The NRC staff has scaled the air emissions from the Norton Energy Storage Project to provide an estimate for four trains rather than six, while acknowledging that this estimate may slightly over or underestimate impacts of four trains, depending on their operational characteristics and whether additional trains benefit from efficiencies of scale or require additional support services. The Norton Energy Storage project would also be subject to the standards of performance for stationary gas turbines set forth in 40 CFR Part 60, Subpart KKKK.

Section 169A of the CAA (42 USC 7401) establishes a national goal of preventing future, and remedying existing, impairment of visibility in mandatory Class I Federal areas when impairment results from anthropogenic air pollution. The Regional Haze Rule, promulgated by EPA in 1999 and last amended in October 2006 (71 FR 60631), requires states to demonstrate reasonable progress toward the national visibility goal established in 1977 to prevent future impairment of visibility due to anthropogenic pollution in Class I areas. The visibility protection regulatory requirements are contained in 40 CFR Part 51, Subpart P, including the review of the new sources that would be constructed in the attainment or unclassified areas and may affect visibility in any Federal Class I area. If the gas-fired portion or the Norton Energy Storage project were located close to a mandatory Class I area, additional air pollution control requirements would potentially apply; however, there are no Class I areas within 50 mi of the Davis-Besse site or Norton, Ohio (EPA 2013).

A newly constructed natural gas-fired plant and the Norton Energy Storage project in Ohio would be subject to emission limits for sulfur dioxide and nitrogen oxide promulgated under CAIR.

Under the Federal Acid Rain Program, the NGCC and the Norton Energy Storage project would have to comply with Title IV of the CAA reduction requirements for SO_2 and NO_x, which are the main precursors of acid rain and the major cause of reduced visibility. Title IV establishes maximum SO_2 and NO_x emission rates from the existing plants and a system of the SO_2 emission allowances that can be used, sold, or saved for future use by new plants.

Ohio is subject to NO_x SIP call regulations designed to reduce transport of ground-level ozone across state lines. A new NGCC alternative located in those states would be required to comply with those regulations limiting NO_x emissions (EPA 2009b).

In response to the Consolidated Appropriations Action of 2008 (Public Law 110-161), EPA promulgated final mandatory GHG reporting regulations for major sources (emitting more than

25,000 tons per year (22,680 MT per year) of all GHGs), effective in December 2009 (EPA 2010a). This new NGCC plant and Norton Energy Storage project would be subject to those reporting regulations. Future regulations may require control of CO_2 emissions.

The NGCC and the Norton Energy Storage capable of producing utility-scale amounts of power would qualify as a major generator of GHGs under the “Tailoring Rule” promulgated by EPA. The Tailoring Rule established thresholds to regulate GHG emissions from stationary sources under the Clean Air Act (CAA), Prevention of Significant Deterioration (PSD), and Title V Operating Permit programs. Operating permits issued to major sources of GHG under the PSD or Title V Federal permit programs must contain provisions requiring the use of best available control technology (BACT) to limit the emissions of GHGs if those sources would be subject to PSD or Title V permitting requirements due to their non-GHG pollutant emission potentials and their estimated GHG emissions are at least 75,000 tons per year of carbon dioxide equivalents. Meeting permit limitations for GHG emissions may require installation of carbon capture and sequestration (CCS). Ohio EPA has adopted regulations equivalent to the Federal GHG Tailoring Rules (OEPA 2012).

8.2.1.1 Construction Impacts

Activities associated with the construction of all portions of this alternative would result in emissions from construction equipment, installation, and fugitive dust from operation of the earth-moving material. Dust-control practices would reduce fugitive dust. Offsite pipeline construction activity would be temporary. Workers’ vehicles and motorized construction equipment would generate criteria pollutant emissions. Given the expected relatively short construction period, the overall air quality impacts would be SMALL.

8.2.1.2 Operating Impacts

Operation of the NGCC and Norton Energy Storage project are the primary portions of the combination alternative that will result in emissions. Beyond maintenance of the wind turbines and solar PV (e.g., serving equipment or repairs), there would be no direct air emissions associated with operations from wind generation or from solar PV.

Using data and algorithms published by EPA and EIA and performance guarantees provided by pollution control equipment vendors, the NRC staff projects the following emissions for the NGCC portion of this alternative:

- sulfur oxide—24 tons (22 MT) per year,
- nitrogen oxide—105 tons (95 MT) per year,
- particulate matter less than or equal to 10 μm—47 tons (43 MT) per year,
- carbon monoxide—106 tons (96 MT) per year, and
- carbon dioxide—825,000 tons (748,000 MT) per year.

The NRC staff estimates that the Norton Energy Storage project would have the following emissions:

- sulfur oxide—28 tons (25 MT) per year,
- nitrogen oxide—62 tons (57 MT) per year,
- particulate matter less than or equal to 10 μm—31 tons (28 MT) per year,
- carbon monoxide—60 tons (55 MT) per year, and
- carbon dioxide—450,000 tons (410,000 MT) per year.

Sulfur and Nitrogen Oxides. The combination of the NGCC portion of this alternative and the Norton Energy Storage project would produce a combined 52 tons (47 MT) per year of SO_x and 167 tons (152 MT) per year of NO_x based on the use of the dry low NO_x combustion technology and the use of SCR in order to significantly reduce NO_x emissions.

The new plant would be subjected to the continuous monitoring and reporting requirements of SO_2, NO_x, and CO_2 specified in 40 CFR Part 75.

Particulates. The combination of the NGCC portion of this alternative and the Norton Energy Storage project would produce a combined 78 tons (71 MT) per year of particulates, all of which would be emitted as PM_{10}. In addition to particulate emissions from the NGCC facility, small amounts of particulate would be released as drift from the cooling tower that supports the NGCC facility and the Norton Energy Storage project. The amount of drift released by the NGCC portion and Norton Energy Storage (which does not require water for steam condensing) would be less than that presently being released from the Davis-Besse tower as it supports the reactor since the cooling tower for a nuclear reactor has higher heat rejection demands and is considered to be a bounding condition.

Carbon Monoxide. Based on EPA emission factors (EPA 1998), NRC staff estimates that the total CO emissions would be approximately 166 tons (151 MT) per year.

Carbon Dioxide. The NRC estimates that uncontrolled emissions of CO_2 from operation of the NGCC alternative and Norton Energy Storage would amount to 1.28 million tons (approximately 1.16 million MT) per year. Although natural gas combustion in the combustion turbines at the NGCC facility and the Norton Energy Storage project would be the primary source, other miscellaneous ancillary sources—such as truck and rail deliveries of materials to the site and commuting of the workforce—would make minor contributions.

The Tailoring Rule will require that BACT be applied to control CO_2 emissions. Carbon capture and sequestration (CCS) technologies will eventually capture and remove as much as 90 percent of the CO_2 from the exhausts of combustion turbines (NETL 2010). However, NETL estimates that such equipment imposes a significant parasitic load that will result in a power production capacity decrease of approximately 14 percent, a reduction in net overall thermal efficiency of the CTs studied from 50.8 percent to 43.7 percent, and a potential increase in the levelized cost of electricity produced in NGCC units so equipped by as much as 30 percent (NETL 2010). The reduced efficiencies that would come with CCS, however, would necessitate that the facilities consume more fuel and emit larger amounts of other pollutants to provide the same output.

Hazardous Air Pollutants. In December 2000, the EPA issued regulatory findings (EPA 2000b) on emissions of HAPs from electric utility steam-generating units, which identified that natural gas-fired plants emit hazardous air pollutants such as arsenic, formaldehyde, and nickel. The EPA stated that "[t]he impacts due to HAP emissions from natural gas-fired electric utility steam generating units were negligible based on the results of the study. The Administrator finds that regulation of HAP emissions from natural gas-fired electric utility steam generating units is not appropriate or necessary." As a result, the NRC staff will not further address HAPs here.

In addition to the air quality impacts associated with operation of the NGCC facility and Norton Energy Storage project, additional air quality impacts would result from vehicles used by the commuting operating workforce. However, the workforce employed by this combination alternative is smaller than the current operating workforce at Davis-Besse, so this alternative will result in reductions in commuting-related air emissions.

Based on this information, the overall air quality impacts of the combination alternative would be SMALL.

8.2.2 Groundwater Use and Quality

8.2.2.1 Construction

FENOC (2011) indicated that groundwater would be used during construction of wind turbines only if other potable water supplies are limited and that “minor” amounts may be necessary during operation if other supplies are unavailable. In addition, FENOC indicates that solar PV installation would not use groundwater for any purpose. The impacts from construction of wind and solar construction would be SMALL.

FENOC (2011) also indicates that a CAES facility would not rely on groundwater for cooling and that regulations for groundwater extraction for potable water would limit impacts. Further, state-level bodies would regulate potential impacts to groundwater resources. The NRC staff finds that impacts during construction of the Norton Energy Storage project would be SMALL.

The impacts associated with groundwater use during construction of the NGCC portion would be similar to, but smaller than, those discussed in Section 8.1 for the full NGCC alternative, which the NRC staff considered to be SMALL.

8.2.2.2 Operation

As the NRC staff indicated in the preceding section, wind turbines and solar PV installations do not rely on water for cooling, and the lack of onsite crews at wind installations means that installations do not generally require water to support staff activities (e.g., drinking, washing, sanitation). As a result, the NRC staff does not expect any noticeable impacts to groundwater from the wind or solar PV portions of this alternative; thus, the impact is SMALL.

As noted above, FENOC (2011) also indicates that a compressed air energy storage facility would not rely on groundwater for cooling and that regulations for groundwater extraction for potable water would limit impacts. The NRC staff agrees that groundwater would likely not be used for cooling and that consumption of groundwater for potable water supply would have a SMALL impact.

The NRC staff presumed that the NGCC alternative in Section 8.1 would not rely on groundwater for any purposes. The NRC staff notes that the NGCC portion of this combination alternative could rely on groundwater for some onsite usage but would likely not rely on groundwater for cooling or service water. The NRC staff finds that impacts to the groundwater resources from the NGCC portion of this alternative would be SMALL.

The NRC staff finds that the overall impact of this combination alternative on groundwater use and quality would be SMALL, and the widely scattered wind and solar PV sites would likely not impose noticeably cumulative effects on groundwater resources.

8.2.3 Surface Water Use and Quality

8.2.3.1 Construction

The use of minimal amounts of surface water is expected in the construction of all portions of this alternative, primarily for fugitive dust control, cleaning, and concrete mixing. Some impacts on surface water quality may result in increased sediment loading to stormwater runoff from active construction zones; however, the NRC expects that Stormwater General Permits would require best management practices that would prevent or significantly mitigate such impacts. Best management practices include controlling drainage by ditches, berms, and sedimentation basins; prompt revegetation to control erosion; stockpiling and reusing excavated topsoil; and various other techniques used to control soil erosion and water pollution. As a result, surface water use and quality impacts during construction would be SMALL.

8.2.3.2 Operation

The NGCC and Norton Energy Storage project are the primary users of surface water in this alternative. The NRC staff notes that the wind and solar PV portions of this alternative do not rely on water for cooling or operations and only affect surface water as a result of potential surface runoff and water consumption by crews during construction and during maintenance.

FENOC (2011) indicates that the Norton Energy Storage project would rely on cooling towers to dissipate the heat that the gas turbines and compressors create, though the cooling towers would be much smaller than those typically used for coal and gas generation plants. FENOC (2011) indicates that cooling water makeup losses would be considerably less than those from Davis-Besse or an NGCC alternative, as would discharge flows. The NRC staff concludes that water consumption from the Norton Energy Storage Project will have a SMALL impact.

The gas-fired alternative would require much less cooling water than Davis-Besse because it operates at a higher thermal efficiency (nearly 60 percent) and because it requires much less water for steam cycle condenser cooling. In Section 8.1, the NRC staff noted that an NGCC alternative constructed at the Davis-Besse site would have SMALL impacts, and the NGCC portion of this alternative would use approximately one-sixth of the cooling water of the full NGCC replacement considered in the full-NGCC alternative. The impact to surface water from the operation of the NGCC portion of this alternative is SMALL.

Overall, the impacts from the combination of alternatives on surface water use and quality are SMALL.

8.2.4 Aquatic Ecology

8.2.4.1 Construction

Impacts from construction of wind installations and solar PV installations would be spread over wide areas and would have the ability to affect surface water as a result of runoff from disturbed lands. Impacts would likely be controlled by permit conditions and application of good management practices. Impacts to aquatic ecology would be short-lived and would cease after construction ceases. Impacts are likely to be SMALL.

Impacts on aquatic ecosystems from construction of the NGCC and Norton Energy Storage project portions of this alternative would be controlled through adherence to provisions of the aforementioned Stormwater General Permits and, as a result, would be SMALL.

Overall, the impact from the combination alternative on aquatic ecology during construction is SMALL.

8.2.4.2 Operation

Impacts from the wind installations and solar PV installations would not be noticeable as neither portion of the combination alternative would use water during operation, except for limited quantities during periodic maintenance. Impacts to aquatic ecology from the wind and solar portions would be SMALL.

FENOC (2011) indicated that water consumption and discharges at the Norton Energy Storage project would be regulated by NPDES limitations and provisions under Sections 316(a) and (b) of the Clean Water Act. As NRC staff established in the surface water use and quality discussion above, the Norton Energy Storage project would not have a noticeable effect on surface water and would use much less water than the NGCC alternative. Impacts from the Norton Energy Storage project would be SMALL

Aquatic ecosystems subject to blowdown from the NGCC's and Norton Energy Storage's cooling systems would be affected by the thermal and chemical characteristics of the discharge water, all of which would be controlled at accepted levels by an NPDES permit issued by State or local authorities. Aquatic ecology impacts during operations of the NGCC portion of this alternative would be SMALL.

Overall, the impact from the combination alternative on aquatic ecology during operation is SMALL.

8.2.5 Terrestrial Ecology

8.2.5.1 Construction

FENOC (2011) indicates that interconnected wind installations could have a LARGE impact on ecological resources, especially during construction as a result of land areas used by wind projects. Further, FENOC notes that wind installations could have noticeable impacts on migratory birds, eagles and raptors, and bats. FENOC indicates that wind installations in some parts of the U.S. have minor impacts, although FENOC also asserts that one cannot assume that similar impacts would occur in Ohio, particularly if any wind turbines are sited in or near Lake Erie. Given development efforts to date, the NRC staff does not expect offshore wind to significantly contribute to the wind power portion of this alternative.

FENOC (2011) indicates that best management practices and awareness of habitats would minimize impacts to ecological resources. The NRC staff notes that most land on which wind installations would be sited is likely to already be in agricultural use, given the predominant land use patterns in Ohio. As a result, surface disruptions and equipment are likely to affect only those ecological resources that exist on agricultural lands, which have already been substantially modified by human activities. Terrestrial impacts during construction are likely to be SMALL.

The NRC staff notes that most land on which solar installations would be sited is also likely to already be in agricultural use, given the predominant land use patterns in Ohio, so surface disruption and equipment are likely to affect only those ecological resources that exist on agricultural lands, which have already been substantially modified by human activities. The impact from the solar PV portion of this alternative is likely to be SMALL during construction.

FENOC (2011) indicates that the impacts from constructing the Norton Energy Storage project would be SMALL, given that it would only affect 92 ac of land surface. As this land has already been disturbed by historic mining activities, the NRC staff finds that the Norton Energy Storage project portion of this alternative would have a SMALL impact on terrestrial ecology during construction.

As indicated in Section 8.1, the NRC presumes that an NGCC alternative could be constructed on the existing Davis-Besse property. The reduced NGCC portion of this alternative (roughly one-third of the alternative considered in the previous section) could be located on previously disturbed industrialized portions currently maintained as parking lots or other paved surface or as landscaped areas that are regularly mowed. Because of this, no undisturbed terrestrial habitat would be affected by the construction of the NGCC plant at the Davis-Besse site. Some sediment transport or erosion may occur and some wildlife in neighboring marsh and grassland habitat would likely avoid habitat margins during construction due to increased noise and lighting. Edge species would be affected more than interior species. Offsite impacts will occur at the locations affected by the construction of the natural gas pipeline connecting the site to existing infrastructure, though long-linear projects can often be sited to minimize important resources. Dependent on the timing of construction activities, the nesting behavior of certain species could be adversely affected. NRC presumes protective measures, similar to those implemented by FENOC regarding the bald eagle, would continue during construction to prevent further impacts. Impacts on terrestrial resources from the construction of the NGCC alternative on the Davis-Besse site would be SMALL.

Overall, the construction impacts of this alternative are likely to be SMALL.

8.2.5.2 Operation

Interconnected wind installations could have operational impacts to birds and bats. Generally, however, the NRC staff finds that impacts will not destabilize any resources. The impact to ecological resources from an interconnected array of wind installations is, thus, SMALL to MODERATE.

FENOC (2011) indicates that development of solar PV installations could have major impacts on land resources, which could have significant impacts on terrestrial ecological resources. The NRC staff notes that most land on which solar installations would be sited is likely to already be in agricultural use given the predominant land use patterns in Ohio. As a result, operational impacts are likely to affect only those ecological resources that exist on agricultural lands. These impacts are unlikely to be noticeable on the scale of the solar PV portion of this alternative; thus, they are SMALL.

Air emissions from the Norton Energy Storage project, which have a SMALL impact to air quality, are unlikely to have a noticeable impact to terrestrial resources during operations. Further, operations at the Norton site will take place on area previously disturbed by mining activities. As a result, the impacts from the Norton Energy Storage project portion of this alternative are SMALL.

Impacts on terrestrial species due to the operation of an NGCC plant would be similar to the impacts associated with the present operation of Davis-Besse. The monitoring of cooling-tower drift effects on terrestrial vegetation has shown no visible damage. In addition, where lines cross croplands and little or no vegetation control is required, impacts due to ROW management on wildlife has also been determined to be small. As a result, the impacts on terrestrial resources from the operation of the NGCC alternative on the Davis-Besse site would be SMALL.

Overall operational impacts from this alternative are SMALL to MODERATE.

8.2.6 Human Health

8.2.6.1 Construction

FENOC (2011) indicates that the only major human health risk from construction and operation of an interconnected array of wind installations is accidents. FENOC indicated that compliance with applicable occupational safety and health regulations (those implemented by the Occupational Safety and Health Administration (OSHA)) would ensure that impacts are SMALL. The NRC staff agrees that impacts from construction and operation of an array of wind installations would be SMALL.

FENOC (2011) indicates that human health impacts from construction of solar PV installations would be regulated by OSHA; thus, they would be SMALL.

The Norton Energy Storage project poses some unique challenges, such as construction of an energy facility within and near a cavern, though OSHA standards would still apply. The NRC staff further finds that impacts on human health from the compressed air energy storage facility's air emissions would also not be noticeable. As a result, the NRC staff finds that human health impacts from this portion of the alternative would be SMALL.

Impacts on human health from construction of the NGCC alternative would be similar to impacts associated with the construction of any major industrial facility. Compliance with worker protection rules would control those impacts on workers at acceptable levels. Impacts from construction on the general public would be minimal since limiting active construction area access to authorized individuals is expected. Impacts on human health from the construction of the NGCC alternative would be SMALL.

8.2.6.2 Operation

FENOC (2011) indicates that human health impacts from operation of solar PV would be regulated by the OSHA and would be SMALL. FENOC also indicates that accidents, the only potential human health impact from operation of wind turbines, would be mitigated by OSHA regulations and would be SMALL

FENOC (2011) indicates that OSHA regulation of the Norton Energy Storage project would prevent noticeable impacts on human health. The NRC staff further notes that human health effects of gas-fired generation are generally low, although in Table 8-2 of the GEIS (NRC 1996), the NRC staff identified cancer and emphysema as potential health risks from gas-fired plants. NO_x emissions contribute to ozone formation, which contributes to human health risks. Emission controls on the NGCC alternative can be expected to maintain NO_x emissions well below air quality standards established for the purposes of protecting human health, and emissions trading or offset requirements mean that overall NO_x releases in the region will not increase. Health risks for workers may also result from handling spent catalysts used for NO_x control that may contain heavy metals. Impacts on human health from the operation of the NGCC portion of the alternative would be SMALL.

8.2.7 Land Use

As discussed in Section 8.1.7, the GEIS (NRC 1996) generically discusses the impact of constructing and operating various replacement power plant alternatives on land use, both on and off each power plant site. The analysis of land use impacts here focuses on the amount of land area that would be affected by the construction and operation of a combination of wind turbines, solar PV installations, and an NGCC power plant at Davis-Besse.

8.2.7.1 Construction

Most of the wind farms would be located on an open agricultural cropland, which would remain largely unaffected by the presence of the wind turbines. As wind turbines require ample spacing between one another to avoid air turbulence, the footprint of a utility scale wind farm could be quite large. Under the wind portion of this alternative, land-based turbines would be located on multiple wind farms spread across approximately 75,000 ac (30,000 ha) of land as 50 ac (20 ha) of land would be required for each MW of capacity. (FENOC 2011). A portion of this land, approximately 3,750 ac (1,517 ha), would be directly affected by the placement of the wind turbines (FENOC 2011). This land would be temporarily affected during the installation of the turbines and the construction of support facilities, and about one-third of the land across a very wide area would be permanently impacted during the operation. This amount of land disturbance would occur primarily on agriculture land and would be widely spread across Ohio (and perhaps into neighboring states to allow for adequate geographic dispersal).

Delivering heavy and oversized wind turbine components would also require the construction of temporary site access roads, some of which may require a circuitous route to their destination. However, once construction is completed, many temporary access roads can be reclaimed and replaced with more direct access to the wind turbines for maintenance purposes. Likewise, land used for equipment and material lay down areas, turbine assembly, and installation could be returned to its original state or some other compatible use, such as farming or grazing. As wind farms would require a substantial amount of open land, though only a small portion would be used for wind turbines, access roads, and infrastructure, land use impacts from the wind portion of this alternative would range from MODERATE to LARGE.

The solar PV portion of this alternative requires approximately 2,400 ac (970 ha) (NREL 2008). As indicated for the wind-powered portion of this alternative, the solar PV installations are also likely to occur on agricultural land. Land required for a standalone solar PV installation would alter the existing land use to energy production, and would preclude most other land uses from coexisting. Land would also be needed for transmission lines to connect solar PV installations to the electrical power grid and site access roads for maintenance purposes. Installing solar PV technologies on building rooftops would reduce the amount of land required for standalone solar. Based on this information, overall land-use impacts from the solar PV portion of this alternative would range from SMALL to LARGE, depending on the extent to which PV installations occur on existing buildings rather than standalone sites.

Land use impacts from the CAES portion of this alternative would be similar to the impacts described for an NGCC power plant (see Section 8.1.7). Only a minor amount of land would be needed above the geologic storage formation; however, additional land might be needed to connect the CAES to the electrical power grid, site access roads, or construction of a gas supply pipeline. If the Norton Energy Storage Project is used, no construction of an underground storage facility would be necessary. Therefore, land use impacts from the CAES portion of this alternative would be SMALL to MODERATE depending on location.

A new 305-MW NGCC plant would require approximately 74 ac (30 ha) of land and could be constructed largely within the existing developed industrial footprint of the Davis-Besse site. This amount of land use would include other plant structures and associated infrastructure. Similar to the NGCC replacement alternative considered in Section 8.1.7, an additional 150 ac

(61 ha) of land could be needed for a new 25-mi (41-km) gas supply pipeline. In addition to onsite land requirements, land would be required offsite for natural gas wells and collection stations. Scaling from GEIS estimates, approximately 1,098 ac (444 ha) (based on 3,600 ac per 1,000 MWe and 305 MWe for NGCC) (NRC 1996) would be required for wells, collection stations, and pipelines to bring the gas to the plant. Most of this land requirement would occur on land where gas extraction already occurs. Therefore, land use impacts from the NGCC portion of this combination alternative at the Davis-Besse site could range from SMALL to MODERATE.

Based on this information, overall land use impacts from the construction and operation of a combination of wind turbine, solar, PV, CAES, and NGCC components of the combination alternative would range from SMALL to LARGE.

8.2.7.2 Operation

The elimination of uranium fuel for Davis-Besse would partially offset some, but not all, of the land requirements for this combination alternative. Scaling from GEIS estimates, approximately 635 ac (256 ha) (based on 35 ac/yr disturbed per 1,000 MWe for 20 years) would no longer be needed for mining and processed uranium during the operating life of the plant (NRC 1996). Operational land use impacts caused by the components of the combination alternative would be SMALL.

8.2.8 Socioeconomics

As previously explained in Section 8.1.8, two types of jobs would be created by this alternative: (1) construction jobs, which are transient, short in duration, and less likely to have a long-term socioeconomic impact; and (2) operations jobs, which have the greater potential for permanent, long-term socioeconomic impacts. Workforce requirements for the construction and operation of a combination of wind turbines, solar PV, NGCC and a CAES facility were evaluated in order to measure their possible effects on current socioeconomic conditions.

8.2.8.1 Construction

FENOC estimates that approximately 1,200 workers would be needed during construction of the wind turbine component of this alternative (FENOC 2011). FENOC's estimate appears to be overly conservative for the small size and megawattage of this construction project and inconsistent with recent license renewal reviews. Exelon's wind farm construction workforce estimate for a similar combination alternative to replace Limerick, Units 1 and 2, appears to be more reasonable and in line with current construction trends. Therefore, Exelon's estimate of approximately 200 construction workers (Exelon 2011) is used in this analysis.

In addition to constructing the wind farms, solar PV installations would also create temporary construction jobs, economic activity, and increased demand for short-term rental housing and public services in communities nearest to the construction sites. Exelon estimated 200 construction workers would be needed to install solar PV for a similar combination alternative to replace Limerick, Units 1 and 2 (Exelon 2011). However, given the smaller scale and megawattage of the wind farm and solar PV components, an even smaller construction workforce would likely be required than what was estimated for the Limerick, Units 1 and 2, combination alternative. Given the relatively small number of construction workers scattered over a large area at various construction sites, the relative socioeconomic impact of this many construction workers for these two components would be SMALL.

FENOC estimated approximately 728 to 1,517 workers would also be needed to construct the NGCC component of this alternative (FENOC 2011). FENOC's estimate appears to be overly conservative for the small size and megawattage of this construction project and inconsistent with recent license renewal reviews. Exelon's wind farm construction workforce estimate for a similar combination alternative to replace Limerick, Units 1 and 2, appears to be more reasonable and in line with current construction trends. Therefore, Exelon's estimate of approximately 200 construction workers (Exelon 2011) is used in this analysis.

The relative economic impact of this many workers on the local economy and tax base would vary, with the greatest impacts occurring in the communities where the majority of construction workers would reside and spend their income. As a result, local communities could experience a short-term economic "boom" from increased tax revenue and income generated by construction expenditures and the increased demand for temporary (rental) housing and business services. Some construction workers could relocate in order to be closer to the construction work site. However, given the proximity of Davis-Besse to the Toledo metropolitan area, workers could commute to the construction site, thereby reducing the need for rental housing. Given the small number of construction workers, socioeconomic impacts would be SMALL.

Construction of the CAES portion of this alternative would temporarily increase employment in the vicinity of the Norton Energy Storage project (approximately 85 mi east-southeast of Davis-Besse). Similar to the NGCC portion of this alternative, the relative economic impact of this many workers on the local economy and tax base would vary, with the greatest impacts occurring in the communities where the majority of construction workers would reside and spend their income. Some construction workers could relocate in order to be closer to the construction work site. However, given the proximity of the site to Akron and Cleveland, workers could commute to the construction site, thereby reducing the need for rental housing.

Given that the small number of construction workers would be scattered over a large area at various construction sites under this combination alternative, socioeconomic impacts would be SMALL and localized near the construction sites. After the installation of each component is completed, local communities could experience a return to pre-construction economic conditions. Based on this information, the combined overall socioeconomic impacts of construction under the combination alternative could range from SMALL to MODERATE, due to overlapping effects should more than one construction activity occur within the same area.

8.2.8.2 Operation

FENOC (2011) estimated that 150 to 200 workers would be required to operate the wind power portion of this alternative (FENOC 2011). FENOC's estimate appears to be overly conservative for the small size and megawattage of this construction project and inconsistent with recent license renewal reviews. Exelon's wind farm construction workforce estimate for a similar combination alternative to replace Limerick, Units 1 and 2, appears to be more reasonable and in line with current construction trends. Therefore, Exelon's estimate of approximately 50 operations workers (Exelon 2011) is used in this analysis. Given the relatively small number of operations workers and potentially large area (i.e., 75,000 ac (30,000 ha)) covered by the wind power and solar PV installations at standalone sites and other locations, the relative economic impact of this many workers on local communities and the tax base would be SMALL and spread over a large region.

FENOC estimated the operations workforce for the NRCC portion of this alternative workforce to be approximately 91 workers (FENOC 2011). This estimate, while very conservative, appears to be reasonable. FENOC estimates that 50 to 100 workers would be needed for operations at the CAES facility. Increased demand for housing and public services caused by the relatively small number of operations workers would have a SMALL socioeconomic impact on the region around Davis-Besse.

The reduction in employment at Davis-Besse could affect property tax revenue and income in local communities and businesses. This alternative would result in the loss of approximately 825 relatively high-paying jobs at Davis-Besse, with a corresponding reduction in purchasing activity and tax contributions to the regional economy. In addition, the permanent housing market could also experience increased vacancies and decreased prices if operations workers and their families move out of the Davis-Besse region. However, the amount of property taxes paid by wind farms, solar PV installations, and CAES may offset some of the lost tax revenues from Davis-Besse because of the large amount of land required for wind farm and solar PV installations.

Overall, the socioeconomics of operation of this alternative would range from SMALL to MODERATE because of the small number of operations workers required to operate each component of this combination alternative and because of the reduction in employment at Davis-Besse and the potential overall net reduction of tax revenue from this combination alternative.

8.2.9 Transportation

Commuting workers and truck deliveries of materials and equipment would cause transportation impacts during the construction and operation of the wind farm, solar PV installations, CAES, and NGCC power plant.

8.2.9.1 Construction

Transportation impacts during the construction and operation of the wind, solar PV, NGCC, and CAES components of this combination alternative would be less than the overall impacts from the construction of a single replacement power plant (i.e., NGCC power plant). This is because the construction workforce for each component and the volume of materials and equipment needing to be transported to each respective construction site would be smaller than the concentrated effects at one power plant site. In other words, the transportation impacts would not be as concentrated at Davis-Besse under the NGCC alternative (see Section 8.1.9), but spread out over a wider area under this combination alternative.

Commuting workers to each construction site would arrive by site access roads, and traffic volumes on nearby roads could increase during shift changes. In addition to commuting workers, trucks would be transporting construction materials and equipment to the worksite, thus increasing the amount of traffic on local roads near the construction site. The increase in vehicular traffic would peak during shift changes, resulting in temporary levels of service impacts and delays at intersections. Transporting heavy and oversized wind turbine components on local roads could have a noticeable impact over a larger area. Some components and materials could also be delivered by train or barge, depending on location. Train deliveries could cause additional traffic delays at railroad crossings. Based on this information, traffic-related transportation impacts during construction could range from SMALL to MODERATE depending on the location and concentration of wind farms, solar PV installations, NGCC power plant, and CAES; and road capacities.

8.2.9.2 Operation

During operations, transportation impacts would be less noticeable during shift changes and maintenance activities. Given the small number of operations workers needed for each component, the levels of service traffic impacts on local roads from the combination alternative would be SMALL.

8.2.10 Aesthetics

The analysis of aesthetic impacts focuses on the degree of contrast between the components of the combination alternatives and the surrounding landscape. In general, aesthetic changes would be limited to the immediate vicinity of the wind farms, solar PV installations, NGCC, and CAES facility.

8.2.10.1 Construction

During construction, all of the clearing and excavating would occur on the existing construction site. These activities could be visible from offsite roads. Wind turbines would have the greatest potential visual impact; wind turbines often dominate the view and become the major focus of attention. On flat terrain, wind turbines would be visible from miles away and would be the tallest man-made structures in rural settings. Because wind farms are generally located in rural or remote areas, the introduction of wind turbines will be in sharp contrast to the visual appearance of the surrounding environment. Similarly, the footprint of a solar PV installation would be quite large and could create a noticeable visual impact. Spread across a large site, a solar PV installation could dominate the view and would likely become the major focus of attention. The introduction of a solar PV installation would be in sharp contrast to the visual appearance of the surrounding environment. Installing solar PV technologies on building rooftops, although noticeable to a lesser degree, would reduce the amount of land required for standalone solar sites.

Aesthetic impacts from the NGCC plant component of the combination alternative would be essentially the same as those described for the NGCC alternative in Section 8.1.7.4., except there would be one unit rather than two. As the CAES component of this alternative would be sited at former industrial (mining) site, the aesthetic impacts would be similar to those of the NGCC alternative.

Construction of exhaust stacks and mechanical draft cooling towers would, however, impact the surrounding landscape.

The overall aesthetic impact would be SMALL to LARGE, depending on the location of wind farms, type of solar PV installation, and location of the NGCC and CAES component at industrial sites.

8.2.10.2 Operation

Wind turbines and solar PV technologies would be visible offsite during daylight hours, and some structures may require aircraft warning lights. During certain weather conditions, the plume from the NGCC cooling tower would be visible for long distances. In general, given the industrial appearance of the Davis-Besse site, an NGCC power plant would blend in with the surroundings if the existing Davis-Besse facility remains. In addition, the visual appearance of the NGCC power block could look similar to the existing Davis-Besse power block. Since the new NGCC power plant would appear similar to the existing Davis-Besse power plant, overall operational impacts would be SMALL.

8.2.11 Noise

Ambient noise conditions would be affected by the construction and operation of wind farms, solar PV installations, and the construction and operation of a single-unit NGCC power plant.

8.2.11.1 Construction

Noise levels would increase during wind farm, solar PV technology, and CAES installation and NGCC construction. Noises during construction, however, would be intermittent and limited to the peak periods of activity and would diminish over distance. Noise impacts during construction could range from SMALL to MODERATE.

8.2.11.2 Operation

Noise during wind farm, solar PV, and CAES component operations would be limited to those caused by normal industrial processes and communications. Wind turbines would also generate noise. Pipelines delivering natural gas fuel to the NGCC or CAES component could be audible offsite near gas compressor stations, but all noise would be within EPA established limits. Overall noise impacts would be SMALL.

8.2.12 Historic and Archaeological Resources

To consider effects on historic and archaeological resources, any areas potentially affected by the construction of the wind, solar PV, CAES, and NGCC components of this alternative would need to be surveyed to identify and record historic and archaeological resources. Any resources found in these surveys would need to be evaluated for eligibility on the NRHP, and mitigation of adverse effects would need to be addressed if eligible resources were encountered. The owner of the wind farms would need to survey all areas associated with operation of the alternative (e.g., roads, transmission corridors, other ROWs). Areas with the greatest sensitivity should be avoided. Visual impacts on significant cultural resources—such as the viewsheds of historic properties near the sites—also should be assessed.

The potential for impacts on historic and archaeological resources from the wind component of this alternative would vary greatly, depending on the location of the proposed sites. Areas with the greatest sensitivity could be avoided or effectively managed under current laws and regulations. However, construction of wind farms and their support infrastructure have the potential to notably impact historic and archaeological resources because of earthmoving activities (e.g., grading and digging) and the aesthetic changes they may bring to the viewshed of historic properties located nearby. Therefore, depending on the resource richness of the site chosen for the wind farms and associated infrastructure, the impacts could range from SMALL to LARGE.

The impacts of the construction of a new solar PV alternative on historic and archaeological resources will vary depending on the form of the solar capacity installed. Rooftop installations minimize land disturbance and the modifications necessary to the transmission system, thereby minimizing impacts to historic and archaeological resources. Land-based installations are larger than rooftop installations and will require some degree of land disturbance for installation purposes, potentially causing greater impacts to historic and archaeological resources. Aesthetic changes caused by the installation of both forms could have a noticeable effect on the viewshed of nearby historic properties. Using previously disturbed sites for land-based installations and collocating any new transmission lines with existing right-of-ways could minimize impacts to historic and archaeological resources. Areas with the greatest sensitivity could be avoided or effectively managed under current laws and regulations. Therefore, depending on the resource richness of the sites chosen and the type of solar technology installed, the impacts could range from SMALL to LARGE.

The impacts to historic and archaeological resource are expected to be similar to the discussion of the NGCC alternative in Section 8.1.12. The NRC staff assumes that prior mining and industrial use of the 92-ac (37-ha) Norton Energy Storage site has removed or otherwise affected the historic and archaeological resources at the former mine site. As a result, the Norton Energy Storage project is likely to have SMALL impact on historic and archaeological resources.

Overall impacts to historic and archaeological resources for this alternative range from SMALL to LARGE.

8.2.13 Environmental Justice

The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health, environmental, and socioeconomic effects on minority and low-income populations that could result from the construction and operation of wind turbines, solar PV installations, an NGCC plant and a CAES facility. As previously discussed in Section 8.1.13, such effects may include human health, biological, cultural, economic, or social impacts. Some of these potential effects have been identified in resource areas discussed in this SEIS.

8.2.13.1 Construction

Potential impacts to minority and low-income populations would mostly consist of environmental and socioeconomic effects during construction of all components of this alternative (e.g., noise, dust, traffic, employment, and housing impacts). Noise and dust impacts during construction would be short term and primarily limited to onsite activities. Minority and low-income populations residing along site access roads would be affected by increased commuter vehicle and truck traffic. However, because of the temporary nature of construction, these effects would only occur during certain hours of the day and are unlikely to be high and adverse and would be contained to a limited time period during certain hours of the day. During construction, increased demand for rental housing in the vicinity of the site could affect low-income populations living near the alternatives. However, given the small number of construction workers and the possibility that workers could commute to the construction site, the need for rental housing would not be significant.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.2 of this chapter, the construction of wind turbines, solar PV installations, an NGCC plant, and CAES facility would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.2.13.2 Operation

Minority and low-income populations living in close proximity to the wind farms, solar PV installations, and CAES facility could be disproportionately affected by operations. However, operational impacts would mostly be limited to noise and aesthetic effects. The general public living near the wind farms, solar PV installations, and CAES facility would also be exposed to the same effects. As discussed in Section 8.1.13, emissions from the operation of an NGCC plant could affect minority and low-income populations as well as the general population living in the vicinity of the new power plant. However, all would be exposed to the same potential effects from NGCC power plant operations, and any impacts would depend on the magnitude of the change in ambient air quality conditions. Permitted air emissions are expected to remain within regulatory standards.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.2 of this chapter, the construction and operation wind turbines, solar PV installations, an NGCC plant, and CAES facility would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.2.14 Waste Management

8.2.14.1 Construction

FENOC (2011) indicates that hazardous materials, such as cadmium and lead, are used in the manufacture of solar PV panels; thus, solar PV could create environmental impacts during manufacture and disposal. The NRC staff notes that no waste is generated during the lifetime of a solar PV project from the PV installation itself and that some land-clearing debris may be generated during installation. The NRC staff finds it likely that solar manufacturers would employ best practices to minimize release and disposal of hazardous wastes and recycle any commercially valuable quantities of waste items. Further, site crews are likely to manage land-clearing debris in accordance with best practices. As agricultural sites are likely already cleared and graded, the NRC staff expects impacts from the solar PV portion of this alternative to SMALL.

FENOC (2011) indicates that construction of an interconnected array of wind installations could result in generation of large amounts of land-clearing debris, but proper waste management activities would minimize these impacts. The NRC staff notes that most land used for wind installations is likely to already be in agricultural use; thus, it is already cleared and, in many cases, relatively flat. As such, the NRC staff finds that the impacts from waste management would be SMALL.

During construction of the NGCC portion of this alternative, land clearing and other construction activities would generate waste that can be recycled, disposed of onsite, or shipped to an offsite waste disposal facility. Because the NGCC portion of this alternative would likely be constructed on the previously disturbed portions of the Davis-Besse site, the amounts of wastes produced during land clearing would be minimal. As a result, construction related impacts due to the construction of the NGCC alternative due to waste management would be SMALL.

Construction of the Norton Energy Storage project would generate similar wastes to the NGCC portion of this alternative. Some wastes may be generated as a result of reservoir-preparation activities at the Norton site, though it is unlikely that these wastes will require offsite disposal. In general, the Norton Energy Storage project portion of this alternative will have SMALL waste disposal impacts.

8.2.14.2 Operation

Wind turbine installations and solar PV installations generate no appreciable waste during operations, except for occasional component replacements, wash water, and—for wind turbines—lubricants. Waste management effects from solar PV and wind installations are SMALL.

The NGCC portion of this alternative would produce relatively little waste, primarily in the form of spent SCR catalysts used to control NO_x emissions from the natural gas-fired plants. Domestic and sanitary wastes would be expected to decrease from amounts now generated during the operation of the reactors due to a reduced operational workforce for the NGCC portion of this alternative. The NRC staff established, in Section 8.1.8, that impacts from a full NGCC alternative would be SMALL, and the waste generated by the NGCC portion of this alternative will be smaller; therefore, waste impacts from an NGCC facility at Davis-Besse would be SMALL.

FENOC (2011) indicates that operation of the Norton Energy Storage project would generate minimal waste during operation, like other gas-fired facilities, and that its impact would also be SMALL. The NRC staff notes that the primary types of waste generated by gas-fired power plants are SCR catalysts and other operational wastes.

Overall, the NRC staff finds that a combination would have SMALL waste management impacts.

8.2.15 Climate Change-Related Impacts of the Combination Alternative

Combustion of fossil fuels, including natural gas, is the greatest anthropogenic source of GHG emissions in the U.S. After a thorough examination of the scientific evidence and careful consideration of public comments, the EPA announced on December 7, 2009, that GHGs threaten the public health and welfare of the American people and meet the CAA definition of air pollutants. Carbon dioxide (CO_2) is by far the largest GHG emitted during fossil fuel combustion. This section presents an assessment of the potential impacts the construction and operation of the combination alternative will have on climate change

8.2.15.1 Construction

Impacts to climate change from the construction of components of this alternative would result primarily from the consumption of fossil fuels in the engines of construction vehicles and equipment, workforce vehicles used in commuting to and from the work site, and delivery vehicles. However, all such impacts would be temporary. Given the expected relatively short construction period for constructing the alternatives' components, the overall impact on climate change from the releases of GHGs during construction of the combination alternative would be SMALL.

8.2.15.2 Operation

Although natural gas combustion in the combustion turbines (at both the NGCC facility and Norton Energy Storage project) would be the primary source of GHG emissions, maintenance activities of wind turbines and solar PV, and other miscellaneous ancillary sources such as truck and rail deliveries of materials to the site and commuting of the workforce would make minor contributions.

The NRC estimates that operation of the NGCC alternative and Norton Energy Storage would amount to 1.29 million tons of carbon dioxide equivalent (CO_2e) (1.17 million MT of CO_2e) per year. EPA reported that, in 2010, the total amount of CO_2e emissions related to electricity generation was 2,277.3 teragrams (2,277.3 MMT) (EPA 2012). The EIA reported that, in 2010, electricity production in Ohio was responsible for 121 MMT of CO_2 emissions (123 MMT CO_2e)

(EIA 2012). Operation of the NGCC alternative and Norton Energy Storage would amount to less than 1 percent of Ohio's 2010 GHG emissions.

NETL estimates that CCS will capture and remove as much as 90 percent of the CO_2 from the exhausts of combustion turbines (NETL 2010). With CCS in place, the NGCC alternative would release 0.116 MMT per year (0.128 million tons) of CO_2, and the impact on climate would be further reduced. The impact on climate change from the operation of the combination alternative would be SMALL.

8.3 Coal-Fired Alternative

In this section, NRC evaluates the environmental impacts of a coal-fired alternative to Davis-Besse. In the State of Ohio, over 83 percent of electricity was generated using coal-fired power plants in 2009. As noted by EIA in its Annual Energy Outlook (EIA 2013), coal-fired generation has historically been the largest source of electricity and is expected to remain a large source through 2040, though coal's share of total U.S. generation is expected to decline from 42 percent in 2011 to 35 percent in 2040. Baseload coal units have proven their reliability and can routinely sustain capacity factors as high as 85 percent. Among the various boiler designs that are available, pulverized coal boilers producing supercritical steam (SCPC boilers) are the most likely variant for a coal-fired alternative given their generally high thermal efficiencies and overall reliability.

While nuclear reactors, on average, operate with capacity factors above 90 percent, the new SCPC coal-fired alternative would operate with roughly an 85 percent capacity factor. Despite the slightly lower capacity factor, an SCPC plant would be capable of providing adequate replacement power for a nuclear plant for the purposes of this NEPA analysis. The NRC staff notes that the lower capacity factor slightly reduces the level of air emissions and fuel consumption estimated for the coal-fired alternative. However, the NRC staff determined that none of the slight underestimates are significant enough to result in impact levels that are different from those described below for the coal-fired alternative. Further, the NRC staff notes that the average capacity factor from Davis-Besse has been lower in recent years than the nuclear fleet average, and by applying this capacity-factor approximation, the NRC staff avoids assigning excessive impacts to the coal-fired alternative.

A myriad of sizes of pulverized coal boilers and steam turbine generators are available; however, the NRC staff presumes that two equally sized boiler/STG powertrains, operating independently and simultaneously, would likely be used to match the power output of Davis-Besse. To complete this analysis, the NRC staff presumes that both powertrains would have the same features, operate at generally the same conditions, have similar impacts on the environment, and be equipped with the same pollution-control devices such that once all parasitic loads are overcome, the net power collectively available would be roughly equal to 908 MWe. The NETL has estimated that approximately 7.5 percent of an SCPC boiler's gross MW capacity is needed to supply typical parasitic loads (plant operation plus control devices for criteria pollutants to meet New Source Performance Standards). Introducing controls for GHG emissions (i.e., CCS) would cause the parasitic load to increase to 27 percent of the boiler's gross rated capacity (NETL 2010). NRC has elected to introduce a 5.2 percent performance penalty (50 MW in this case) on the MW rating of SCPC boilers to account for typical parasitic loads while still allowing net capacity equivalent to Davis-Besse. However, because of uncertainty regarding future GHG regulations and the limited real-world experience in CCS at utility-scale power plants, parasitic loads associated with CCS are not considered. Thus, the gross power required of the coal-fired alternative is 958 MWe.

Various bituminous coal sources are available to coal-fired power plants in Ohio. EIA reports that, in 2008, the State of Ohio produced electricity from coal with heating values of 11,444 British thermal units per pound (Btu/lb), sulfur content of 1.96 percent, and ash of 9.42 percent (EIA 2010b). For the purpose of this evaluation, NRC presumes that coal burned in 2008 will be representative of coal that would be burned in a coal-fired alternative regardless of where it was located. Approximately one-third of the coal burned in Ohio in 2008 came from mines in the Appalachian basin in the eastern part of the State. The remaining coal was brought in primarily by railcar and river barge from West Virginia, Wyoming, Kentucky, and Pennsylvania (EIA 2011b). Bituminous coals from Appalachian mines have CO_2 emission factors ranging from 202.8 to 210.2 lb per million Btu of heat input (Hong and Slatick 1994). As a conservative estimate, NRC used a CO_2 emission factor of 210.2 lb per million Btu for carbon dioxide calculations in this evaluation.

The boilers comprising the supercritical coal-fired alternative are presumed to have the following characteristics and be equipped with the following pollution control devices:

- dual wall-fired, dry-bottom boilers, configured to be New Source Performance Standards (NSPS)-compliant;
- overall thermal efficiency of 39 percent;
- capacity factor of 85 percent;
- collective rating of 976 MWe (gross), 908 MWe (net);
- supercritical steam (see text box);
- bituminous coal from Appalachian mines; caloric value 11,444 Btu/lb, ash 9.42 percent, sulfur 1.96 percent, CO_2 emission factor of 210.2 lb/million Btu, pulverized to more than 70 percent passing a 200-mesh sieve;
- fabric filter for particulate control, operating at 99.9 percent removal efficiency;
- wet calcium carbonate SO_2 scrubber operating at 95 percent removal efficiency; and
- low-NO_x burners with overfire air and selective catalytic reduction for nitrogen oxide controls capable of attaining a NO_x removal of 86 percent (or an emission rate less than or equal to 2.5 parts per million per volume (ppmv) (dry basis)).

In its ER, FENOC determined that the current Davis-Besse site was not viable to accommodate a coal-fired alternative with net generating capacity sufficient to meet the power production of Davis-Besse due to limited space on the Davis-Besse site, as explained in Chapter 8 (FENOC 2010). The NRC staff concurs with that assessment and its analysis of the impacts of the coal-fired alternative presumes that the SCPC coal-fired power plant would operate only at an alternative site.

> **Supercritical Steam**
>
> "Supercritical" refers to the thermodynamic properties of the steam being produced. Steam whose temperature and pressure is below water's "critical point" (3,200 pounds per square inch absolute (psia) and 705 °F) is subcritical. Subcritical steam forms as water boils and both liquid and gas phases are observable in the steam. The majority of coal boilers currently operating in the U.S. produce subcritical steam with pressures around 2,400 psia and temperatures as high as 1,050 °F. Above the critical point pressure, water expands rather than boils, and the liquid and gaseous phases of water are indistinguishable in the supercritical steam that results. More than 150 coal boilers currently operating in the U.S. produce supercritical steam with pressures between 3,300 and 3,500 psia and temperatures between 1,000 and 1,100 °F. Ultrasupercritical boilers produce steam at pressures above 3,600 psia and temperatures exceeding 1,100 °F. There are only a few of these boilers in operation worldwide, and none in the U.S.

It is reasonable to assume that a coal-fired alternative would use supercritical steam (see text box). Supercritical steam technologies are increasingly common in new coal-fired plants. Supercritical plants operate at higher temperatures and pressures than older subcritical coal-fired plants and, therefore, can attain higher thermal efficiencies. While supercritical facilities are more expensive to construct than subcritical facilities, they consume less fuel for a given output, reducing environmental impacts throughout the fuel life cycle. The NRC staff expects that a new, supercritical coal-fired plant beginning operation in 2017 would operate at a heat rate of 9,069 Btu/kWh, or approximately 38 to 39 percent thermal efficiency. However, heat inputs could be less, depending on the coal source and whether fuel blending is practiced in order to remain compliant with emission limitations.

In an SCPC coal-fired power plant, burning coal heats pressurized water. As the supercritical steam and water mixture moves through plant pipes to a turbine generator, the pressure drops and the mixture flashes to steam. The heated steam expands across the turbine stages, spinning them, and driving the generator to produce electricity. After passing through the turbine, any remaining steam is condensed back to water and recycled back to the boiler for additional steam production.

SCPC coal-fired power plants are currently commercially available and currently feasible alternatives to Davis-Besse license renewal. The overall environmental impacts of a coal-fired alternative, as well as the environmental impacts of the proposed Davis-Besse license renewal, are shown in Table 8.3-1. Additional details of the impacts on individual resources of the coal-fired alternative are provided in subsequent sections.

Table 8.3-1. Summary of Environmental Impacts of the Supercritical Coal-Fired Alternative Compared to Continued Operation of Davis-Besse

	Supercritical Coal-Fired Generation	Continued Davis-Besse Operation
Air quality	MODERATE	SMALL
Groundwater	SMALL	SMALL
Surface water	SMALL	SMALL
Aquatic resources	SMALL to LARGE	SMALL

	Supercritical Coal-Fired Generation	Continued Davis-Besse Operation
Terrestrial resources	SMALL	SMALL
Human health	SMALL	SMALL
Land use	SMALL to MODERATE	SMALL
Socioeconomics	SMALL to MODERATE	SMALL
Transportation	SMALL to LARGE	SMALL
Aesthetics	SMALL	SMALL
Historic & archeological resources	SMALL to MODERATE	SMALL to MODERATE
Waste management	MODERATE	SMALL

8.3.1 Air Quality

8.3.1.1 Construction

Activities associated with the construction of the coal-fired power plant would cause air impacts as a result of emissions from construction equipment and fugitive dust from operation of the earth-moving and material handling equipment. Impacts result from the consumption of fossil fuels in the engines of construction vehicles and equipment, workforce vehicles used in commuting to and from the work site, and delivery vehicles. All such impacts would be temporary. Construction lead times for coal power plants are typically 4-5 years (OECD/IEA 2005). Workers' vehicles and motorized construction equipment would generate temporary criteria pollutant emissions. Dust-control practices would reduce fugitive dust, which would be temporary in nature. Given the expected workforces and a relatively short construction period for both the coal-fired power plant, the NRC concludes that the impact of vehicle exhaust emissions and fugitive dust from operation of earth-moving and material handling equipment would be SMALL.

The overall air quality impacts associated with construction of a new coal-fired power plant would be SMALL.

8.3.1.2 Operation

Section 8.1.1 discusses the various state and Federal regulations that would control the construction and operation of an NGCC facility. Although this alternative examines the impact of a coal-fired power plant, many of the same regulatory controls would apply to pollutant releases. Air quality impacts from coal-fired generation can be substantial, resulting from the emissions of significant quantities of SO_x, NO_x, PM, CO, and HAPs such as mercury. Coal combustion is also a major source of the greenhouse gas CO_2. However, many of these pollutants can be effectively controlled by various technologies, albeit with performance penalties that result in reductions in net power-generating capacity.

There are many major regulatory controls applicable to large fossil fuel external combustion sources. Air pollution control regulations promulgated under authority of the CAA would apply throughout FENOC's service area. Emission limits for criteria pollutants would be reflective of existing ambient air quality at the selected location. Additionally, Ohio is subject to NO_x SIP call regulations designed to reduce transport of ground-level ozone across State lines (EPA 2011b).

A new coal-fired alternative located in Ohio would also be required to comply with those regulations.

This coal-fired alternative would be subject to New Source Performance Standards (NSPS) and New Source Review (NSR)/PSD reviews, leading to an operating permit that would specify limits to emissions of all criteria pollutants. The coal-fired plant would need to comply with the standards of performance set forth in 40 CFR Part 60 Subpart D and limits for particulate matter and opacity (40 CFR 60.42(a)), sulfur dioxide (40 CFR 60.43(a)), and NO_x (40 CFR 60.44(a)). The Regional Haze Rule, promulgated by EPA in 1999 and last amended in October 2006 (71 FR 60631), requires states to demonstrate reasonable progress toward the national visibility goal established in 1977 to prevent future impairment of visibility due to anthropogenic pollution in Class I areas. The visibility protection regulatory requirements are contained in 40 CFR Part 51, Subpart P, including the review of the new sources that would be constructed in the attainment or unclassified areas and may affect visibility in any Federal Class I area. If a gas-fired alternative were located close to a mandatory Class I area, additional air pollution control requirements would potentially apply; however, there are no Class I areas in Ohio (EPA 2013). Regulations promulgated under the Acid Rain Program would cap SO_2 and NO_x emissions from the coal-fired alternative and may require participation in an emissions trading program if sufficient reductions were not possible through the use of pollution control devices, fuel blending, or other strategies. In addition to being major sources of criteria pollutants, coal-fired plants can also be sources of HAPs as a result of hazardous constituents contained in the coal. Consequently, coal-fired plants would be subject to EPA's mercury and air toxic standards (MATS) for power plants. A new coal-fired plant would be subject to emission limits for sulfur dioxide and nitrogen oxide promulgated under the Clean Air Interstate Rule (CAIR).

In response to the Consolidated Appropriations Action of 2008 (Public Law 110-161), EPA promulgated final mandatory GHG reporting regulations on October 30, 2009, that became effective in December 2009 (EPA 2010a). Section 8.1.1 provides additional discussion regarding reporting regulations. A coal-fired plant capable of producing utility-scale amounts of power would qualify as a major generator of GHGs under the "Tailoring Rule," recently promulgated by EPA (Section 8.1.1).

Estimated Quantities of Pollutants Emitted. Although the NRC staff has identified the primary features and operating parameters of the supercritical pulverized coal boiler represented in this coal-fired alternative, many more aspects of system design, boiler firing conditions, and operating procedures can influence the quantity of criteria pollutants ultimately released to the environment. Consequently, the quantifications of pollutant emissions appearing below should be considered only as estimates. Algorithms and emission coefficients developed by EPA (EPA 1998) or empirical data from other relevant sources were used to estimate the amounts of pollutants that would result from operation of the coal-fired alternative. With a collective gross generating capacity of 960 MWe, the coal-fired alternative, operating at a capacity factor of 85 percent, would produce 7,130,000 MWh of electricity per year to the grid. With an overall power plant thermal efficiency of 39 percent and an average caloric value of bituminous coal of 12,886 Btu/lb, the amount of coal consumed annually would be approximately 2.88 million tons per year or (2.61 million MT per year).

Sulfur Oxides. The coal-fired alternative at an alternate site would likely use wet, limestone-based scrubbers to remove SO_2. The NETL indicates that this technology can remove 95 to 98 percent of SO_2 from flue gases (gases that exit to the atmosphere via a pipe or channel) (NETL 2007). SO_2 emissions from a new coal-fired power plant would be subject to the requirements of Title IV of the CAA. Title IV was enacted to reduce emissions of SO_2 and

NO_x, the two principal precursors of acid rain, by restricting emissions of these pollutants from power plants. Title IV caps aggregate annual power plant SO_2 emissions and imposes controls on SO_2 emissions through a system of marketable allowances.

Nitrogen Oxides. A coal-fired alternative at an alternate site would most likely employ various available NO_x control technologies, which can involve combustion modifications, post-combustion controls, or both. Combustion modifications include low-NO_x burners, over-fire air, and operational modifications. Post-combustion processes include selective catalytic reduction and selective non-catalytic reduction. An effective combination of the combustion modifications and post-combustion processes allow the reduction of NO_x emissions by up to 95 percent (EPA 1998). As discussed above, the most likely NO_x control would involve a combination of low-NO_x burners and selective catalytic reduction technologies to reduce NO_x emissions from this alternative by approximately 86 percent.

Particulates. The new coal-fired power plant would use fabric filters to remove particulates from flue gases with an expected 99.9 percent removal efficiency (NETL 2007). When present, wet SO_2 scrubbers further reduce particulate matter emissions (EPA 2008). Coal-handling equipment would introduce fugitive dust emissions when fuel is transferred to onsite storage and then reclaimed from storage for use in the plant. FENOC estimated the release of particulates contained in cooling tower drift during reactor operation is 1.4 tons per year (TRC 1995). The cooling tower drift from the coal-fired alternative would be less than that released by Davis-Besse, since the cooling tower for a nuclear reactor has higher heat rejection demands and is considered to be a bounding condition.

Carbon Monoxide. Based on firing conditions and the boiler's overall firing efficiency, supercritical pulverized coal boilers will emit carbon monoxide in limited quantities. Emission limits for CO will be based on heat input and typically expressed as pounds per million Btu input.

Carbon Dioxide. The amount of CO_2 released per unit of power produced would be dependent on the quality of the fuel, the firing conditions, and the overall firing efficiency of the boiler. As discussed above, NRC presumes a CO_2 emission factor of 210.2 lb/million Btu for the coal-fired alternative.

Hazardous Air Pollutants. The EPA has determined that coal- and oil-fired electric utility steam-generating units are significant emitters of the following HAPs: arsenic, beryllium, cadmium, chromium, dioxins, hydrogen chloride, hydrogen fluoride, lead, manganese, and mercury (EPA 2000b). The EPA concluded that mercury is the HAP of greatest concern and that the following is true (EPA 2000b):

- A link exists between coal combustion and mercury emissions.
- Electric utility steam-generating units are the largest domestic source of mercury emissions.
- Certain segments of the U.S. population (e.g., the developing fetus and subsistence fish-eating populations) are believed to be at potential risk of adverse health effects resulting from mercury exposures caused by the consumption of contaminated fish.

Using data and algorithms published by EPA and EIA and performance guarantees provided by pollution-control equipment vendors, the estimated annual emissions of criteria pollutants and CO_2 from the operation of the coal-fired alternative are presented below.

- sulfur oxide—5,356 tons (4,860 MT) per year with 95 percent-efficient scrubbing,

- nitrogen oxide—1,490 tons (1,350 MT) per year with 86 percent-efficient control,
- particulate matter less than or equal to 10 μm—27.4 tons (24.9 MT) per year with 99.9 percent-efficient control,
- all particulate matter—135 tons (123 MT) per year with 99.9 percent percent-efficient control,
- carbon monoxide—719 tons (652 MT) per year,
- carbon dioxide—6,920,000 tons (6,280,000 MT) per year, and
- mercury—0.12 tons (0.11 MT) per year.

The above analysis shows that emissions of air pollutants—including SO_x, NO_x, CO, $PM_{2.5}$, and PM_{10}—far exceed those produced by the existing nuclear power plant during operation, as well as those of the other fossil fuel alternatives considered in this section. Adverse human health effects, such as cancer and emphysema, have also been associated with air emissions from coal combustion and are discussed further in Section 8.4.5.

The NRC analysis of air quality impacts for a coal-fired alternative at an alternate site indicates that impacts would have clearly noticeable effects. However, given existing regulatory regimes, permit requirements, and emissions controls, the coal-fired alternative would not destabilize air quality. Therefore, NRC characterizes air impacts from a coal-fired plant located at an alternative site as MODERATE. Federal and state regulations would require the installation of pollution-control equipment to meet applicable local requirements and permit conditions and may eventually require participation in emissions trading schemes.

8.3.2 Groundwater Use and Quality

8.3.2.1 Construction

The use of groundwater is not expected in the construction of the coal-fired alternative at the alternative location. The alternative location may result in a greater area of impervious surface; thus, water that previously infiltrated the soil would instead become stormwater runoff. Groundwater recharge could be reduced, and resulting aquifer recharge rates may be reduced.

Dewatering of all open excavations would likely consume a small amount of groundwater. The NRC staff assumes that, during construction, liquid construction wastes would either be temporarily retained in lined evaporation ponds or stored in drums for shipment to offsite disposal facilities. With the application of best management practices and the controls established in a General Stormwater Permit, no impacts on groundwater quality due to the construction of the coal-fired alternative are expected. As a result, impacts to groundwater quality would be SMALL.

8.3.2.2 Operation

Impacts to the groundwater may result from the use of chemicals and fuels. The NRC presumes that a Groundwater Monitoring Program would be implemented, and any groundwater contamination from chemical spills would be detected and mitigated to restore the groundwater quality. As a result, no changes in the groundwater quality are likely to result from operation of the coal-fired alternative; thus, the impacts to the groundwater resource would be SMALL.

8.3.3 Surface Water Use and Quality

8.3.3.1 Construction

Minor impacts on surface water would occur during construction of the coal-fired alternative due to ground disturbances, alteration of natural drainage patterns, and from dewatering of excavations. A sitewide stormwater plan would be established for the construction period and would include controls and mitigations that would limit adverse impacts on surface water quality. The elements of that plan would be incorporated into a General Stormwater Permit, enforceable under the NPDES program authority, and would result in impacts on surface water during construction being SMALL.

8.3.3.2 Operation

During operation, surface water would be used for cooling and a water withdrawal, and NPDES permits would be required to regulate the thermal and chemical character of blowdown water from the cooling tower that would be discharged back to that surface water resource. Discharges of all other wastewaters associated with plant operation would also require an NPDES permit. Compliance with NPDES permits would assure that the operational impacts of the coal-fired alternative to surface water would remain SMALL.

8.3.4 Aquatic Ecology

8.3.4.1 Construction

Construction activities for the coal-fired alternative would cause minimal impacts on aquatic resources in Lake Erie because construction would occur far enough inland to remove the likelihood of the erosion and sedimentation. Additionally, stormwater control measures, which would be required to comply with Ohio's NPDES permitting, would minimize the flow of disturbed soils into aquatic habitats. Depending on the available infrastructure at the selected site, the coal-fired alternative may require modification or expansion of the existing intake or discharge structures, or construction of new intake and discharge structures. Construction of new or modified intake and discharge structures may require dredging. Dredging activities would require BMPs for in-water work to minimize sedimentation and erosion. Due to the short-term nature of the dredging activities, the hydrological alterations to aquatic habitats would likely be localized and temporary. Therefore, the impacts to the aquatic ecology during construction would be SMALL.

8.3.4.2 Operation

During operations, the coal-fired alternative would require a similar amount of cooling water as Davis-Besse. Impingement and entertainment would be minimized because NRC assumes that the plant would use a closed-cycle cooling system. However, the effects to particular species would vary based on site selection and surface water source. A similar amount of water would be discharged as at Davis-Besse. However, thermal impacts would also vary based on site selection and surface water source. The cooling system for a new coal-fired plant would have similar chemical discharges as Davis-Besse. While air emissions from the coal-fired plant would emit ash and particulates that could settle onto surface waters and introduce a new source of pollutants, lake or river tides would likely dissipate and dilute the concentration of pollutants resulting in minimal exposure to aquatic biota. Although the coal-fired alternative would have similar surface water usage, cooling system discharges, and chemical discharges as Davis-Besse, the impacts on aquatic ecology could range from SMALL to MODERATE because the impacts would vary substantially based on site selection for this alternative.

In addition, consultation under the ESA would be required to assess the occurrence and potential impacts to Federally protected aquatic species and habitats within affected surface waters. Coordination with State natural resource agencies would further ensure that the plant operator would take appropriate steps to avoid or mitigate impacts to state-listed species, habitats of conservation concern, and other protected species and habitats. The NRC assumes that these consultations would result in avoidance or mitigation measures that would minimize or eliminate potential impacts to protected aquatic species and habitats.

8.3.5 Terrestrial Ecology

8.3.5.1 Construction

Construction of a coal-fired plant would require land for both the plant site as well as land for coal mining and processing. Additionally, land would be required for disposal of ash and scrubber sludge. Because of the relatively large land requirement for the site, a portion of the site would likely be land that had not been previously disturbed, which would directly affect terrestrial habitat by removing existing vegetative communities and displacing wildlife. The level of direct impacts would vary substantially based on site selection. Offsite construction would occur mostly on land where coal extraction is ongoing. Erosion and sedimentation, fugitive dust, and construction debris impacts would be minor if appropriate BMPs are implemented. Impacts to terrestrial habitats and species from transmission line operation and corridor vegetation maintenance, and operation of the cooling system would be similar in magnitude and intensity as those resulting from operating nuclear reactors and would, therefore, be SMALL. Because of the potentially large area of undisturbed habitat that could be affected from construction of a coal-fired plant, the impacts of construction on terrestrial habitats and species could range from SMALL to MODERATE depending on the specific site location.

8.3.5.2 Operation

During operation, cooling towers could deposit chemically treated water on surrounding land areas as drift that could affect existing vegetation. Drift impacts would be confined to the immediate vicinity of the cooling tower. Coal-mining operation would also affect terrestrial ecology in offsite coal mining areas, although the coal is likely to be provided from existing mines where land disturbances have already occurred. The operation of a coal-fired alternative would result in the generation of substantial amounts of solid and liquid wastes. It is not reasonable to conclude that disposal of those operational wastes would take place on the alternative site. Any offsite waste disposal by landfilling of coal combustion residues (CCR) would affect terrestrial ecology, at least throughout the active life of the disposal facility and until the land was reclaimed through a closure action. Deposition of acid rain resulting from NO_x or SO_x emissions, as well as the deposition of other pollutants, could also affect terrestrial ecology. Because of the expected controls on emissions in necessary operating permits, air deposition impacts might be noticeable but would not likely be destabilizing. Primarily because of the potential habitat disturbances, impacts on terrestrial resources from a coal-fired alternative would be SMALL and would occur mostly during construction. Section 8.3.8 provides an additional analysis of waste management.

As discussed under aquatic ecology impacts, consultation with FWS under the ESA would avoid potentially adverse impacts to Federally listed species or adverse modification or destruction of designated critical habitat. Coordination with State natural resource agencies would further ensure that the plant operator would take appropriate steps to avoid or mitigate impacts to state-listed species, habitats of conservation concern, and other protected species and habitats. The NRC assumes that these consultations would result in avoidance or mitigation measures that would minimize or eliminate potential impacts to protected aquatic species and habitats. Consequently, the impacts operation of a coal-fired alternative on protected species and habitats would be SMALL.

8.3.6 Human Health

8.3.6.1 Construction

Construction of a coal-fired alternative would carry the same risks as construction of any major industrial facility. Federal and state regulations for worker protection would adequately control impacts on construction workers, and it is reasonable to assume that access to the active construction site would be limited to authorized, adequately trained personnel equipped with appropriate personal protection equipment. Impacts on the public would depend on existing land uses in parcels adjacent to the active construction zone but are expected to be SMALL.

8.3.6.2 Operation

Coal-fired power plants introduce worker risks from coal and limestone mining, from coal and limestone transportation, and from disposal of coal combustion residues and scrubber wastes. In addition, there are public risks from inhalation of stack emissions and the secondary effects of eating foods grown in areas subject to deposition from plant stacks.

Human health risks of coal-fired power plants are described, in general, in Table 8-2 of the GEIS (NRC 1996). Cancer and emphysema, as a result of the inhalation of toxins and particulates, are identified as potential health risks to occupational workers and members of the public (NRC 1996). The human health risks associated with coal-fired power plants, both for occupational workers and members of the public, are greater than those of the current Davis-Besse reactor, due to exposures to chemicals such as mercury; SO_x; NO_x; radioactive elements such as uranium and thorium contained in coal and coal ash; and polycyclic aromatic hydrocarbon (PAH) compounds.

Regulations restricting emissions, enforced by either EPA or delegated state agencies, have reduced potential health effects but have not entirely eliminated them. These agencies also impose site-specific emission limits, as needed, to protect human health. Even if the coal-fired alternative were located in a non-attainment area, emission controls and trading or offset mechanisms could prevent further regional degradation; however, local effects could be visible. Many of the byproducts of coal combustion responsible for health effects are largely controlled, captured, or converted in modern power plants, although some level of health effects may remain.

Aside from emissions impacts, the coal-fired alternative introduces the risk of coal pile fires and, for those plants that manage coal combustion residue liquids and sludge in waste impoundments, the release of the waste may result due to a failure of the impoundment. Good housekeeping practices to control coal dust greatly reduce the potential for coal dust explosions or coal pile fires. Although there have been several instances in recent years, sludge impoundment failures are still rare. Free water could also be recovered from such waste streams and recycled, and the solid or semi-solid portions could be removed to permitted offsite disposal facilities.

Overall, given extensive health-based regulation and controls likely to be imposed as permit conditions applicable to waste handling and disposal, the NRC staff expects human health impacts from operation of the coal-fired alternative at an alternate site to be SMALL.

8.3.7 Land Use

The GEIS generically evaluates the impact of constructing and operating various replacement power plant alternatives on land use, both on and off each power plant site. The analysis of land-use impacts focuses on the amount of land area that would be affected by the construction and operation of an SCPC power plant at an alternate brownfield site.

8.3.7.1 Construction

Based on FENOC estimates, 1,547 ac (626 ha) of land could be needed to support a coal-fired alternative to replace Davis-Besse, along with 10 miles of transmission lines. It is expected that the SCPC alternative would be located at an existing power plant site or an industrial brownfield site with existing infrastructure, thus minimizing land requirements and construction impacts. Depending on existing power plant infrastructure, additional land may be needed for frequent coal and limestone deliveries by rail or barge. Therefore, land use impacts from land acquisition and construction would be SMALL to MODERATE.

8.3.7.2 Operation

Offsite land use would be affected by coal mining during power plant operations. Using the GEIS estimate, the SCPC alternative might require up to 20,020 ac (8,101 ha) of land for coal mining and ash and scrubber sludge disposal during power plant operations, based on an assumption of 22,000 ac (8,903 ha) of land required per 1,000 MWe and 910 MWe of generating capacity (NRC 1996). However, much of the land in existing coal mining areas has already experienced some level of disturbance.

The elimination of uranium fuel for Davis-Besse would partially offset some of the land requirements for the SCPC alternative. Scaling from GEIS estimates, approximately 635 ac (256 ha) (based on 35 ac/yr disturbed per 1,000 MWe for 20 years) would no longer be needed for mining and processing uranium during the operating life of the plant (NRC 1996).

Based on this preference to site the SCPC alternative on a previously disturbed industrial site, land use impacts from an NGCC power plant would range from SMALL to MODERATE depending on the amount on land needed to support coal mining and processing uranium during the operating life of the SCPC plant.

8.3.8 Socioeconomics

As previously discussed in Section 8.1.8, two types of jobs would be created by this alternative: (1) construction jobs, which are transient, short in duration, and less likely to have long-term socioeconomic impacts; and (2) power plant operation jobs, which have a greater potential for permanent, long-term socioeconomic impacts. Workforce requirements for the construction and operation of the coal-fired alternative were evaluated to measure their possible effects on current socioeconomic conditions.

8.3.8.1 Construction

FENOC projected a construction workforce ranging from 1,092 to 2,275 workers would be required to construct the SCPC alternative at an alternative site. The relative economic impact of this many workers on the local economy and tax base would vary, with the greatest impacts occurring in the communities where the majority of construction workers would reside and spend their income. As a result, local communities could experience a short-term “boom” from increased tax revenue and income generated by construction expenditures and the increased demand for temporary (rental) housing and business services. After construction, local communities could experience a return to pre-construction economic conditions. Based on this information, and given the number of construction workers, socioeconomic impacts during construction in local communities could range from SMALL to MODERATE.

8.3.8.2 Operation

FENOC estimated an operational workforce of 228 workers. This alternative would result in a loss of approximately 825 relatively high-paying jobs at Davis-Besse, with a corresponding reduction in purchasing activity and tax contributions to the regional economy. In addition, the permanent housing market could also experience increased vacancies and decreased prices if operations workers and their families move out of the region. However, the amount of property taxes paid to local jurisdictions under the SCPC alternative may increase if additional land is required to support this alternative. Based on the above discussion, socioeconomic impacts during operations could range from SMALL to MODERATE.

8.3.9 Transportation

Commuting workers and truck deliveries of materials and equipment would cause transportation impacts during the construction and operation of the SCPC power plant.

8.3.9.1 Construction

Transportation impacts associated with construction of the SCPC alternative would consist of commuting workers and truck deliveries of construction materials. During periods of peak construction activity, up to 2,275 workers could be commuting daily to the site significantly adding to the normal flow of traffic (NRC 1996). Vehicular traffic would peak during shift changes, resulting in temporary levels of service impacts and delays at intersections. Materials also could be delivered by rail or barge, depending on site location. Traffic-related transportation impacts during construction likely would range from MODERATE to LARGE.

8.3.9.2 Operation

Once construction of the SCPC alternative is complete, traffic-related transportation impacts on local roads would be greatly reduced. The estimated number of operations workers would be 228 (NRC 1996). Traffic on roadways would peak during shift changes, resulting in temporary levels of service impacts and delays at intersections. Frequent deliveries of coal and limestone by rail would cause levels of service impacts on certain roads because of delays at railroad crossings. Onsite coal storage would make it possible to receive several trains per day at a site with rail access. Limestone delivered by rail could also add additional traffic (though considerably less traffic than that generated by coal deliveries). If a site on navigable waters were used, barge delivery of coal and other materials would be feasible. Overall, the SCPC alternative transportation impacts would be SMALL to MODERATE during plant operations.

8.3.10 Aesthetics

The analysis of aesthetic impacts focuses on the degree of contrast between the SCPC alternative and the surrounding landscape and the visibility of the new SCPC plant at an existing power plant site.

During construction, all of the clearing and excavation would occur on the existing power plant site. These activities could be visible from offsite roads. The coal-fired power plant could be approximately 100 ft (30 m) tall, with two to four exhaust stacks several hundred feet tall with natural draft cooling towers approximately 400 to 500 ft (122 to 152 m) in height.

The power block of the SCPC alternative could look very similar to the existing power plant, and construction would appear similar to other ongoing onsite activities. Aesthetic changes during construction would be limited to the immediate vicinity of the existing power plant site, and overall impacts would be SMALL.

8.3.11 Noise

Ambient noise conditions in the vicinity of the existing power plant site would be affected by the construction and operation of a new SCPC power plant.

8.3.11.1 Construction

Overall noise levels at the existing power plant site would increase during the construction of the new SCPC power plant. Construction noises during construction, however, would be intermittent and relatively brief, and noise levels would decrease as the distance from the noise source increases. Impacts due to noise as a result of the construction of the SCPC alternative could range from SMALL to MODERATE.

8.3.11.2 Operation

Noise generated during power plant operations would be limited to routine industrial processes and communications. Therefore, noise impacts due to the operation of the SCPC power plant would be SMALL.

8.3.12 Historic and Archeological Resources

Lands needed to support construction of a coal-fired plant and associated corridors would need to be surveyed for historic and archaeological resources. Resources found in these surveys would need to be evaluated for eligibility on the NRHP, and mitigation of adverse effects would need to be addressed if eligible resources were encountered. When constructing a coal-fired plant on a previously disturbed former plant (brownfield) site, an inventory may still be necessary if the site has not been previously surveyed or to verify the level of disturbance and evaluate the potential for intact subsurface resources. The potential for impacts on historic and archaeological resources from this alternative would vary greatly depending on the resource richness and location of the proposed site. However, given that the preference is to use a previously disturbed former plant site, avoidance of significant historic and archaeological resources should be possible and effectively managed under current laws and regulations. Therefore, the impacts on historic and archaeological resources from the coal-fired alternative would be SMALL to MODERATE.

8.3.13 Environmental Justice

The environmental justice impact analysis evaluates the potential for disproportionately high and adverse human health, environmental, and socioeconomic effects on minority and low-income populations that could result from the construction and operation of a new power plant. As previously discussed in Section 8.1.12, such effects may include human health, biological, cultural, economic, or social impacts.

8.3.13.1 Construction

Potential impacts to minority and low-income populations from the construction of an SCPC alternative would mostly consist of environmental and socioeconomic effects (e.g., noise, dust, traffic, employment, and housing impacts). Noise and dust impacts from construction would be short-term and primarily limited to onsite activities. Minority and low-income populations residing along site access roads would be directly affected by increased commuter vehicle traffic during shift changes and truck traffic. However, because of the temporary nature of construction, these effects are unlikely to be high and adverse and would be contained to a limited time period during certain hours of the day. Increased demand for rental housing during construction could cause rental costs to rise disproportionately affecting low-income populations who rely on inexpensive housing. However, given the likelihood of locating the SCPC alternative at the site of an existing or former power plant and the proximity of most power plant sites to metropolitan areas, workers could commute to the construction site, thereby reducing the need for rental housing.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.3 of this chapter, the construction of the SCPC power plant would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.3.13.2 Operation

Emissions from the operation of an SCPC plant could affect minority and low-income populations as well as the general population living in the vicinity of the new power plant. However, all would be exposed to the same potential effects from SCPC power plant operations, and any impacts would depend on the magnitude of the change in ambient air quality conditions. Permitted air emissions are expected to remain within regulatory standards.

Based on this information and the analysis of human health and environmental impacts presented in Section 8.3 of this chapter, the operation of the SCPC power plant would not have disproportionately high and adverse human health and environmental effects on minority and low-income populations.

8.3.14 Waste Management

8.3.14.1 Construction

The coal-fired alternative would result in wastes during construction as a result of activities such as vegetation removal, excavation, and preparing the site surface before other crews begin actual construction of the plant. Wastes typical of the construction of large industrial facilities would also be generated. Because this alternative would be located an alternative site, additional construction of new transmission lines and a new rail spur would be necessary.

The impacts from waste generated during construction stage would be short-lived. The amount of construction waste would be small compared to the amount of waste generated during operational stage, and most could be recycled. Overall, the impacts from waste generated during construction stage would be SMALL.

8.3.14.2 Operation

Coal combustion generates several waste streams, including ash (a dry solid recovered from both pollution control devices (fly ash) and from the bottom of the boiler (bottom ash)) and sludge (a semi-solid by-product of emission control system operation, in this case, primarily calcium sulfate from the operation of the wet calcium carbonate SO_2 scrubber). Although EPA has not classified coal residue as hazardous waste, it does contain hazardous constituents that might leach from improperly designed or operated disposal cells and threaten surface or groundwater resources.

Particulates. Combustion of 2.88 million tons per year (2.61 million MT per year) of coal would result in substantial amounts of CCR, which includes both fly and bottom ash recovered from the fabric filter and from the bottom of the boiler. The NRC staff estimates that 271,960 tons of ash would be generated each year; of that, approximately 271,830 tons per year would be collected as bottom ash and fly ash in the fabric filter. Some additional fly ash might also be captured in the SO_2 scrubber downstream of the fabric filter. That amount has not been quantified; however, some CCR and scrubber sludge could be put to beneficial use, such as an admixture for lightweight concrete, road base, and road embankment stabilization. The remainder of the CCR and scrubber sludge would require disposal. Because the recycle potential for CCR relies on both the physical properties of the ash and the leachability of any toxic constituents present, a more conservative estimate of 50 percent being recycled is appropriate, with the remaining amount—135,400 tons per year—requiring disposal. Disposal of this amount of ash annually by landfilling over the expected 40-year lifetime of the coal-fired plants could noticeably affect land use, groundwater, and surface water quality. Landfill locations would require proper siting in accordance with state solid waste regulations and leachate from the disposal cells would need to be monitored and possibly captured for treatment because of leaching of toxic components (including heavy metals) in the ash. After closure of the waste site and revegetation, the land could be available for other uses.

Sulfur Oxides. Combustion of 2.88 million tons per year (2.61 million MT per year) of coal with 1.96 percent sulfur would result in the generation of 102,260 tons per year (92,770 MT per year) of SO_2, 95 percent of which would be captured in the wet scrubber and converted to an equimolar amount of calcium sulfate or 217,288 tons per year (197,120 MT per year) (dry basis). The NRC staff presumes that as much as 90 percent of the scrubber sludge could be recycled for such applications as gypsum wallboards. The remaining 21,730 tons per year (19,710 MT per year) could be co-disposed with the previously mentioned remaining CCR.

Spent Catalysts. The NRC staff has not estimated the amount of spent catalysts that would be produced, but it presumes that the entire amount would have no recycling opportunities and would require disposal. Depending on the catalysts used, special handling might also be required to address the potential hazardous character of these spent catalysts.

The impacts from waste generated during operation of this coal-fired alternative would be MODERATE; the affects would be clearly visible but would not destabilize any important resource, provided appropriate controls were applied. Failure to implement proper controls could result in a LARGE impact on surface water and land. The extent of disposal would be dependent on the percentage of the CCR and scrubber sludge that could be recycled.

Therefore, the NRC staff concludes that the overall impacts on wastes from construction and operation of this alternative would be MODERATE.

8.3.15 Climate Change-Related Impacts of a Coal-Fired Alternative

Combustion of fossil fuels, including coal, is the greatest anthropogenic source of GHG emissions in the U.S. After a thorough examination of the scientific evidence and careful consideration of public comments, the EPA announced on December 7, 2009, that GHGs threaten the public health and welfare of the American people and meet the CAA definition of air pollutants. Carbon dioxide (CO_2) is by far the largest GHG emitted during fossil fuel combustion. This section presents an assessment of the potential impacts the construction and operation of a coal-fired plant will have on climate change.

8.3.15.1 Construction

Impacts on climate change from the construction of a coal-fired alternative would result primarily from the consumption of fossil fuels in the engines of construction vehicles and equipment, workforce vehicles used in commuting to and from the work site, and delivery vehicles. All such impacts would be temporary. However, given the expected relatively short construction period, the overall impact on climate change from the releases of GHGs during construction of a coal-fired alternative would be SMALL.

8.3.15.2 Operation

EPA reported that, in 2010, the total amount of carbon dioxide equivalent (CO_2e) emissions related to electricity generation was 2,277.3 MMT (EPA 2012). The EIA reported that, in 2010, electricity production in Ohio was responsible for 121 MMT of CO_2 emissions (123 MMT of CO_2e) (EIA 2012). The NRC staff estimates that operation of the coal-fired alternative would amount to 6.98 million tons of CO_2e per year (6.33 MMT of CO_2e per year). This amount would represent 5 percent of the GHGs emitted in Ohio in 2010. This amount represents a 5 percent increase over the 2010 Ohio CO_2e emissions. Although coal combustion in the boilers would be the primary source, other miscellaneous ancillary sources such as truck and rail deliveries of materials to the site, commuting of the workforce, and deliveries of wastes to offsite disposal or recycling facilities would make contributions to the CO_2e emissions from continued operations.

NETL estimates that further development could yield technologies that could capture and remove as much as 90 percent of the CO_2 from the exhausts of supercritical pulverized coal-fired boilers (NETL 2010). With CCS in place, the coal-fired alternative would release 625,000 tons per year (567,000 metric tons per year), and impacts to climate change would be further reduced.

A coal-fired alternative would be expected to have a MODERATE impact on climate change. GHG emissions resulting from operation would be noticeable. Estimated GHG emissions would be nine times larger than the threshold in EPA's tailoring rule for GHG (75,000 tons (68,000 MT) per year of CO_2e).

8.4 <u>Alternatives Considered but Dismissed</u>

Alternatives to Davis-Besse license renewal that were considered and eliminated from detailed study are presented in this section. The order of presentation does not imply a priority. These alternatives were eliminated because of technical, resource availability, or current commercial limitations associated with these alternatives. As such, these alternatives would not be able to supply the replacement power needed if Davis-Besse were to shutdown in 2017.

8.4.1 New Nuclear

Given the current combined license (COL) application schedule, the time needed to review an application, and the anticipated length of construction, the NRC staff considers it unlikely that a new nuclear reactor could be sited, constructed, and become operational by the time the Davis-Besse license expires on April 22, 2017, and so it will not be considered by NRC staff as an alternative to license renewal.

8.4.2 Wind

Ohio has approximately 55,000 MW of wind power potential (NREL 2011), though only 67 MW of wind power capacity was in service as of mid-2011 (Wind Powering America 2011). Ohio has lagged the neighboring states of Pennsylvania, West Virginia, and Indiana in wind power implementation.

The largest wind project in Ohio history, the Blue Creek Wind Farm, was completed in March 2012 and has a capacity of 304 MW. Preliminary work for Blue Creek began in 2006. The State of Ohio currently has 802 MW of OPSB-approved projects that have not yet started operations and 524 MW of wind projects in review for a Certificate of Environmental Compatibility and Public Need (OPSB 2013). All of the approved projects are located onshore.

Offshore wind resources in Lake Erie are of high quality, though no wind installations currently operate there. The Lake Erie Energy Development Corporation (LEEDCo), a private non-profit group, has plans to install 20 to 30 MW of wind capacity 7 miles offshore of Cleveland. This would be the first freshwater, offshore wind facility in the U.S. LEEDCo aims to develop 1,000 MW of offshore windpower in Lake Erie by 2020 (LEEDCo 2013), though no turbines have yet been sited in Lake Erie.

Efforts to build offshore wind installations elsewhere in the Great Lakes have yet to succeed. For example, the New York Power Authority (NYPA) proposal to site and develop wind power resources in New York's portions of Lake Erie or Lake Ontario were shelved in September 2011, when NYPA found that offshore wind installations would cost two to four times more than land-based wind (Reuters 2011).

In the Atlantic Ocean, several wind-power projects have been proposed, but none have yet to begin construction. The most prominent of these projects, Cape Wind, was first proposed in 2001 and, after a lengthy and controversial permitting process, construction may begin in 2014. . Other projects offshore of Rhode Island and New Jersey are smaller than Cape Wind (Wald 2011), and another organization has proposed—though not yet constructed—a high-voltage direct-current powerline on the seafloor to connect offshore projects (Atlantic Wind Connection undated; Wald 2011). Finally, a group working near Long Island proposes an installation of 700 MW of wind capacity (Con Edison 2009). Backers are optimistic and the potential is great, but despite strong interest in offshore wind on the Great Lakes and the Atlantic Coast, no offshore wind power installations have yet materialized in the U.S. As no offshore wind capacity yet exists in either the Great Lakes or on the Atlantic Coast and as none appear likely to exist on a large commercial scale by 2017 (given the current state of development), the NRC staff finds that offshore wind will not be a reasonable alternative to Davis-Besse by 2017.

Comments received during scoping suggest that wind power could replace Davis-Besse. The NRC staff notes that, although wind power is intermittent and individual installations are unable to support baseload power supply, some individuals or groups have proposed that multiple, interconnected wind installations separated by long distances (and thus exposed to different weather and wind conditions) could function as a virtual power plant and provide wind power that could replace baseload generators like Davis-Besse. To date, however, no states or utilities operate arrays of wind installations as virtual power plants.

While Ohio is not large enough to site wind turbines as far apart as in the Archer and Jacobsen (2007) study discussed in Section 8.2, assuming that wind turbines could be constructed in neighboring states, approximately 4,300 MW of new wind capacity would be necessary to replace Davis-Besse. Provided that Blue Creek Wind Farm and all other approved wind projects in Ohio are completed as planned, this amount of wind power would exceed by approximately 2,300 MW the planned capacity in the State. To date, only Texas has more than 4,300 MW of installed wind capacity, and it is also the only state that has seen construction of 4,300 MW of wind capacity in 5 years' time.

Unlike Ohio, Texas has outstanding onshore wind resources, with potential for over 1,900,000 MW of wind power, or more than 34 times the amount of wind potential that NREL found could exist in Ohio (Texas' potential is also more than 31 times greater than Ohio's, Pennsylvania's, West Virginia's, and New Jersey's potentials combined) (NREL 2011). To date, Texas has approximately 10,135 MW of installed capacity (Wind Powering America 2011). Iowa, which has the largest installed capacity after Texas at 3,675 MW (Ibid.), has more than 10 times Ohio's wind potential (and more than 9 times the wind potential in Ohio, West Virginia, Pennsylvania, and New Jersey, combined) (NREL 2011). In short, to replace Davis-Besse with a wholly wind-powered alternative would require the second-fastest build-out of wind capacity in U.S. history in a State with relatively modest (19th of 50 states, and lower than the mean of all states) wind potential (NREL 2011).

Given the amount of wind capacity necessary to replace Davis-Besse, Ohio's wind resource potential (as well as the wind resources of surrounding states), Ohio's pace of wind development to date, and the 5 years available prior to license expiration, the NRC staff finds a completely wind-based alternative to be unreasonable.

<u>Wind With Power Storage</u>. Two storage options exist on a large enough scale to prove useful in supporting large wind installations. The largest energy storage installations in use in the U.S. are pumped storage hydroelectric facilities. These facilities use two reservoirs, one above the other in elevation. One or more electric pumps, driven by excess electricity, push water into the upper reservoir during periods of low demand or high electrical availability. During periods of high demand or low availability, operators release water from the upper reservoir to the lower reservoir through turbines that generate electricity. As the NRC staff notes in Section 8.4.5, Ohio has approximately 183 MW of undeveloped hydropower potential, an amount that is insufficient to back up wind power to function as an alternative to license renewal. Further, EIA is projecting a 2.2 percent growth in pumped storage capacity through 2040 (DOE/EIA 2013).

In compressed air energy storage (CAES), an electric motor uses excess electricity to pump air into an underground, pressurized cavity, and when electricity is needed, the compressed air is released through a gas turbine generator. The compressed air provides some power to the generator (essentially, reducing the need for compression by the turbine), and burning natural gas provides heat to increase the pressure and power the turbine. Thus, CAES is not solely an energy storage technology but also relies on additional fossil fuel (future, as-yet-undeveloped compressed air energy storage technologies promise no reliance on natural gas).

The other option, CAES, is a commercially viable technology for energy storage, though it is seldom used on a utility scale. CAES is discussed as part of the combination alternative in Section 8.2.

Currently, no CAES facilities exist in Ohio, though—as discussed in Section 8.2—First Energy has acquired the Norton Energy Storage project, a proposed CAES facility that could be constructed in a retired limestone mine.

Without detailed wind-speed data, specific site information, and detailed information on the full energy-storage capacity of the Norton Energy Storage project (measured in MWh, as opposed to its maximum instantaneous power output, measured in MW), it is difficult to estimate how much less wind capacity would be necessary if 536 MW of CAES are available. CAES is less effective at offsetting seasonal wind variation than it is at offsetting intra-day or day-to-day variation, as very large air reservoirs would be necessary to offset month-to-month or season-to-season variation. The McIntosh facility in Alabama provides up to 26 hours of compressed-air storage, while the Huntorf facility in Germany provides up to 2 hours of storage. Based on current experience, the NRC staff finds that CAES is unlikely to offset seasonal wind variability.

Currently, no state or utility in the U.S. is operating wind power in combination with CAES to offset baseload power supplies. A group of utilities had proposed a 270-MW project of that type in Iowa but has since terminated the project due to geologic unsuitability of the proposed site (ISEPA 2011). The McIntosh facility is the only existing U.S. CAES installation, and it is approximately one-fifth the size of the maximum capability FENOC indicates could exist at the Norton Energy Storage site by 2017. Further, the geology of the Norton Energy Project site (limestone) differs from both the Huntorf facility in Germany and the McIntosh facility in Alabama, which are in salt domes. Given the relatively rarity of these facilities, despite a 33-year span since the Huntorf facility went into operation, the challenges encountered to date at other sites where CAES has been considered, and the unique geology necessary for compressed air energy storage to work on a utility scale, the NRC staff assumes that the Norton Energy Storage project is the only viable nearby option for CAES at this time.

Archer and Jacobsen found that a widely dispersed array of interconnected wind installations could provide a portion of its nameplate capacity at a high availability. Under most conditions, a 19-site array (the largest array Archer and Jacobsen considered) produced more than 21 percent of its nameplate capacity, ultimately yielding 45 percent of the nameplate capacity when averaged over a year's time. Conceivably, the extra 24 percent of the array's nameplate output could be stored and dispatched during periods of low wind availability to allow a smaller wind array to serve the same load with the same availability, the same wind installation to serve a larger load with the same availability, or the same array to serve the same load with a higher availability (or some combination of the three possible outcomes). Assuming that CAES could allow a multiple site wind power array to capture all of the wind power up to its 45 percent capacity factor, approximately 2,018 MW of installed wind capacity would be necessary to replace Davis-Besse. This assumption oversimplifies the challenges associated with using the Norton project to store and release power. The maximum theoretical output of Norton by 2017 is 536 MW; therefore, it would be unable to provide enough power on days with little or no wind to offset the capacity provided by Davis-Besse. A utility would have to construct more than 2,018 MW, but less than 4,300 MW, in order to rely on a project like Norton to provide baseload wind when paired with a wind power array. Properly sizing a wind array to match the available energy storage would depend on detailed wind power information, operational characteristics for each installation, and performance characteristics of the storage site.

The amount of new wind power (2,018 MW) would exceed the amount of windpower installed in Ohio, West Virginia, Pennsylvania, Michigan, and New Jersey, combined, over the past 12 years. When combined with the fact that no utility is currently using CAES in combination with wind power to provide baseload power, the NRC staff does not consider this combination to be a reasonable alternative to Davis-Besse license renewal.

Environmental Impacts of a Wind Array and a Wind Array with the Norton Project. Although wind power or wind power with CAES are not considered reasonable alternatives, FENOC provided an analysis of potential impacts from both of these alternatives in its September 19, 2011, supplement to the Davis-Besse ER (FENOC 2011). The potential impacts of these dismissed alternatives to provide a comparison to the impacts of the proposed action.

Land Use. FENOC indicated that an array of interconnected wind installations would have a MODERATE to LARGE impact on land use, depending on the locations of the wind installations (FENOC 2011). FENOC assumed that an individual wind farm would require 50 ac (20 ha) per MW of capacity and that approximately 5 percent of the total land area would actually be occupied by turbines and support equipment. FENOC noted that Ohio's predominant land uses are rural agricultural croplands with scattered residences and woodlots and that turbines could be placed with adequate buffers around incompatible land uses. Assuming that 50 ac (20 ha) is required for each MW, a total of 10,800 ac (4,370 ha) will be occupied by the wind farm throughout its operation, while turbine installations will be spread across 216,000 ac (87,400 ha).[2] As this amount of land use is widely spread across Ohio, and perhaps into neighboring states or, in small amounts, to offshore Lake Erie, and is unlikely to prevent complimentary land uses from continuing in adjoining lands. Overall land use impacts from an interconnected wind array would be MODERATE.

Two elements change if CAES is paired with wind farm power generation. First, less land is required if the number of turbines is reduced due to energy storage. The amount of land required would vary from 5,040 ac (2,040 ha) to 10,800 ac (4,370 ha), depending on the characteristics of the CAES technology and specific wind characteristics at each site. Second, the North Energy Storage project site, with 92 ac (37 ha) at the surface, would be added to the total land use for the project, though that site is already a former mining site and committed to First Energy's uses. The amount of total land would range from 5,132 ac (2,080 ha) to 10,892 ac (4,410 ha). Again, overall land use impacts from a combination of wind power generation and CAES would be MODERATE.

Water Use and Quality—Surface Water. As FENOC noted in its supplement to the ER, wind turbines require no cooling water or water intakes, and the only potential impacts to surface water are a result of erosion or sedimentation during construction. As any projects within Ohio would have to minimize erosion and sedimentation through the use of onsite best management practices, and as construction-related issues would be short-lived with only temporary effects, the NRC staff finds that these impacts would only be temporarily noticeable and would be

[2] While FENOC calculated that 3,030 turbines would occupy 4,550 ac, the NRC staff here estimates that 2,150 turbines would occupy 10,750 ac. In reviewing FENOC's supplement, the NRC staff identified an error that caused FENOC to underestimate the potential land use of the wind installation rather than calculating land use on the size of the total installation (6,060 MW), FENOC appears to have calculated land use based only on the credited capacity factor (1,820 MW). Thus, although NRC staff assumed fewer turbines would be necessary to replace Davis-Besse than FENOC did, the NRC staff found the wind alternative requires more land area used than FENOC did.

unlikely to affect any important attributes of surface water resources. Further, as any offshore portion of an interconnected array of wind installations will be limited in size, the NRC staff does not expect these impacts to be significant. Overall, the NRC staff estimates that impacts to surface water use and quality will be SMALL.

Surface water use will increase if CAES is paired with an interconnected array of wind installations. FENOC indicates that the Norton Energy Storage project would rely on cooling towers to dissipate the heat that the gas turbines and compressors create, though the cooling towers would be much smaller than those typically used for coal and gas generation plants. FENOC indicates that cooling water makeup losses would be considerably less than those from Davis-Besse, as would discharge flows. FENOC indicates that this is primarily because less power would be derived from a steam cycle, though FENOC's ER supplement provides no indication that a CAES would rely on a steam cycle for any of its power generation. FENOC cites its 2007 ER from Beaver Valley Generating Station to support this proposition, though FENOC did not consider CAES in that ER. Based on a review of CAES technologies and FENOC's assertions regarding the Norton Energy Storage project, the NRC staff concludes that FENOC's overall assertion regarding water consumption is correct and is likely conservative, as it appears that no water is necessary to condense steam at the Norton Energy Storage project site. As a result, the NRC staff concludes that water consumption will not have a noticeable effect on surface water use or quality from an interconnected array of wind installations combined with compressed air energy storage. The overall impact on surface water use and quality is SMALL.

Water Use and Quality—Groundwater. FENOC indicated that groundwater would be used during construction only if other potable water supplies are limited and that "minor" amounts may be necessary during operation if other supplies are unavailable. As indicated in the preceding section, wind turbines do not rely on water for cooling, and the lack of onsite crews at wind installations means that installations do not generally require water for operations or to provide for the potable and sanitary needs of personnel. As a result, impacts to groundwater from an interconnected array of wind installations would be SMALL

CAES, as noted in the previous section, increases the amount of water the interconnected array of wind installations would require, but FENOC indicates that a CAES plant would not rely on groundwater for cooling and that regulations for groundwater extraction for potable water would limit impacts to SMALL. Groundwater would not be used for cooling, and consumption of groundwater for potable water supply would have a SMALL impact.

Air Quality. FENOC indicates that there are no air quality impacts associated with the operation of interconnected wind farms, and construction of the installations could result in short-term impacts from fugitive dust and equipment emissions. FENOC indicates that the emissions are SMALL. The NRC staff's review of potential air emissions from wind power installation shows that some maintenance equipment may produce emissions during operations, but, generally, the turbines themselves do not create air emissions. During construction, crews will employ dust-control practices, and emissions from installation equipment will be temporary and will not noticeably affect air quality. The air quality impacts from an interconnected array of wind installations is SMALL.

CAES creates operational air-quality impacts because the Norton Energy Storage project relies on gas-fired turbines to heat the air released from underground storage and provide some of the energy produced by the compressed air storage system. FENOC estimated emissions for the Norton Energy Storage project based on six combustion trains and one cooling tower, to match the amounts permitted by the Norton Energy Storage project's air emissions permit. The NRC staff notes that this overestimates the air quality impacts from the four trains that FENOC indicates could be operational at the Norton Energy Storage project by 2017. The NRC staff has scaled the air emissions from the Norton Energy Storage project to provide an estimate for four trains rather than six, while acknowledging that this estimate may slightly over or underestimate impacts of four trains, depending on their operational characteristics and whether additional trains benefit from efficiencies of scale or require additional support services.

The NRC staff estimates that the Norton Energy Storage project would have the following emissions:

- sulfur dioxide—28 tons (26 MT),
- nitrogen oxide—62 tons (57 MT),
- particulate matter less than or equal to 10 μm—31 tons (28 MT),
- VOCs—18 tons (16 MT), and
- carbon dioxide—450,000 tons (410,000 MT).

FENOC indicated that both sulfur dioxide and nitrogen oxide emissions would be subject to cap and trade programs; they would not add to regional emissions of either pollutant (in all seasons for sulfur dioxide and in ozone season for nitrogen oxides) as well as permit-based emissions controls for all listed pollutants. FENOC indicated that air quality impacts would be MODERATE. Earlier in this chapter, however, the NRC staff found these air emissions to be SMALL. The NRC staff notes that impacts are substantially lower than those of the NGCC alternative considered in Section 8.1. As a result, the NRC staff finds that the impacts of the Norton Energy Storage facility portion of this combination alternative on air quality would be SMALL.

Ecological Resources. FENOC indicates that interconnected wind installations could have a LARGE impact on ecological resources, especially during construction. Further, FENOC notes that wind installations could have noticeable impacts on migratory birds, eagles and raptors, and bats. FENOC indicates that wind installations in some parts of the U.S. have minor impacts, although FENOC also asserts that one cannot assume that similar impacts would occur in Ohio, particularly if any wind turbines are sited in or near Lake Erie. FENOC indicates that best management practices and awareness of habitats would minimize impacts to ecological resources. FENOC concludes that impacts to migratory species would depend on the location of wind installations and could be SMALL to MODERATE.

Most of the land on which wind farms would be located is already in agricultural use. As a result, terrestrial impacts would be SMALL, though impacts to birds and bats could increase in some locations. Generally, however, impacts would not destabilize any resources. The impacts to ecological resources from an interconnected array of wind installations would, therefore, range from SMALL to MODERATE.

Combining wind farms paired with CAES would likely affect fewer sites or have a smaller impact on the same number of sites. The types of impact from the wind portion, however, would remain the same. FENOC indicates that the impacts from the Norton Energy Storage project would be SMALL, given that it would only affect 92 ac (37 ha) of land surface and that water consumption and discharges would be regulated by NPDES limitations and provisions under Sections 316(a) and (b) of the Clean Water Act. Water consumption, water discharges, and air emissions are unlikely to noticeably affect important attributes of ecological resources except at the immediate Norton Energy Storage project site, which has already been degraded by previous mining operations. The overall impact of wind plus CAES is thus SMALL to MODERATE and dependent largely on the locations and characteristics of the wind installations.

Human Health. FENOC indicated that the only major human health risk from construction and operation of an interconnected array of wind installations is accidents. FENOC indicated that compliance with applicable occupational safety and health regulations (those implemented by OSHA) would ensure that impacts will be SMALL. The NRC staff agrees that impacts from construction and operation of an array of wind installations would be SMALL.

Construction of the Norton Energy Storage project would likely reduce the number of wind turbines necessary, but it would not eliminate the potential for accidents. In addition, it would add the same types of risks to human health as the NRC power plant alternative. Human health risks for the NGCC alternative would be SMALL. The Norton Energy Storage project poses some unique challenges, such as construction activities within a cavern, but the potential for health effects from its markedly lower emissions is much smaller. As a result, the overall impact level for the array of interconnected wind farms with CAES would be SMALL as well.

Socioeconomics. Constructing an interconnected array of wind installations would create temporary construction jobs, economic activity, and increased demand for short-term rental housing and public services in communities nearest to the construction sites. FENOC further indicates that the impacts would be spread throughout the region and that losses of jobs, tax revenues, and economic activity from Davis-Besse would have a significant impact on communities near Davis-Besse. FENOC also indicates that renewable resources are taxed at a lower rate than “conventional” energy generating facilities. The NRC staff notes that an interconnected array of wind farms would affect many rural communities during installation. However, given the relatively small number of construction workers scattered over a large area at various construction sites, the relative socioeconomic impact of this many construction workers would be SMALL. CAES construction workers are most likely to commute from nearby Akron and Cleveland during the short duration of construction activities. Commuting workers and transportation of wind-turbine components would noticeably increase traffic volumes on local roads and could create SMALL to MODERATE transportation impacts.

During operations, FENOC estimates that 50 to 100 CAES workers would be employed at the Norton Energy Storage project site. Fewer wind turbines would be installed under this wind combined with CAES alternative than the interconnected wind installation alternative. Since less land may be required for wind turbines due to energy storage, property tax payments to local communities would be smaller.

Wind turbines would have the greatest potential visual impact; wind turbines often dominate the view and become the major focus of attention. On flat terrain, wind turbines would be visible from miles away and would be the tallest man-made structures in rural settings. Placing turbines along ridgelines would maximize their visibility. Because wind farms are generally located in rural or remote areas, the introduction of wind turbines would be in sharp contrast to the visual appearance of the surrounding environment. Assuming the interconnected array of wind installations consisted of 2-MW turbines, 2,150 turbines would be required. These turbines would be spread widely over the region and would affect many viewsheds. Overall, the aesthetic impacts would range from MODERATE to LARGE.

Combining the Norton Energy Storage project with a somewhat smaller array of interconnected wind turbines would not reduce the overall aesthetic impact. The Norton project would be similar in appearance to the NGCC power plant alternative, but smaller. It does not have heat recovery steam generators and uses smaller cooling towers than the NGCC power plant. Overall, the aesthetic impacts would likely remain MODERATE to LARGE.

A widely scattered array of wind installations has the potential to affect historical and archaeological resources as well. Each turbine will require construction of a base structure that may extend up to 40 ft (12 m) below ground, depending on soils and topography (BLM 2005), and each would be 15 to 20 ft (5 to 6 m) wide depending on the turbine model. Construction crews may encounter some archaeological resources, even in areas that have been extensively farmed. FENOC indicates that impacts could be LARGE, but construction activity was likely to take place under OPSB or other comparable program rules; thus, actions would be taken to avoid, recover, or otherwise mitigate resource loss or disturbance during construction. Turbines would be widely spaced but could affect thousands of acres of land spread across the state. Given the potential for discovery, impacts to historical and archaeological resources from the wind and CAES alternative could range from SMALL to MODERATE. .

Combining wind farms with the Norton Energy Storage CAES project would reduce the number of wind turbines and ground disturbance, thus reducing the overall impact to historic and archeological resources from wind turbines installation. The only potential new effects would come from the Norton project site, which was previously used for limestone mining. Mining and industrial use of the 92-ac (37-ha) site has removed or otherwise affected the historic and archaeological resources at the former mine site. As a result, the Norton Energy Storage project is unlikely to contribute any additional impacts to existing historical and archaeological resources. Given the potential for discovery, impacts to historical and archaeological resources from the wind and CAES alternative could range from SMALL to MODERATE.

Overall, the interconnected array of wind installations would be noticeable and could affect important socioeconomic attributes. Therefore, overall socioeconomic impacts could range from MODERATE to LARGE. In addition, overall socioeconomic effects of the Norton Energy CAES project, in conjunction with a somewhat smaller interconnected array of wind farm installations, would be similar to the impacts from the standalone interconnected array of wind farm installations. Socioeconomic impacts under this alternative could also range from MODERATE to LARGE.

Waste Management. FENOC indicated that construction of an interconnected array of wind farm installations could generate large amounts of vegetation debris from land-clearing activities, and appropriate waste disposal activities would minimize these impacts. Most of the land used for wind farm installations is likely to be in agricultural use and fairly clear of vegetation, and wind turbines generate no waste during operations. As such, impacts from waste management would be SMALL.

FENOC indicated that operation of the Norton Energy Storage project would generate a small volume of waste during operations, like other gas-fired facilities, and that impacts would be SMALL. The primary types of waste generated by gas-fired power plants are SCR catalysts and other operational wastes. Overall, a combination of the Norton Energy Storage project with an interconnected array of wind installations would have SMALL waste management impacts.

Environmental Justice. Minority and low-income populations could be disproportionately affected by the visual impact and noise from the wind turbines. However, the turbines could be positioned away from these communities, thus reducing or avoiding disproportionately affecting minority and low-income populations.

Noise from CAES storage operations could have a localized impact on minority and low-income populations living near the Norton Energy Storage project site. Impacts from both components of this alternative could disproportionately affect minority or low-income populations.

8.4.3 Solar Power

Solar technologies, including PV and solar thermal (also known as concentrated solar power (CSP)), use the sun's energy to produce electricity at a utility scale. In PV systems, the energy contained in photons of sunlight incident on special PV materials results in the production of direct current (DC) electricity that is aggregated, converted to alternating current (AC), and connected to the high-voltage transmission grid. CSP technologies produce electricity by capturing the sun's heat energy. Two types of CSP technology that have enjoyed the greatest utility-scale applications are the parabolic trough and the power tower; both involve capturing the sun's heat and converting it to steam, which powers a conventional Rankine cycle steam turbine generator. Although some aspects of solar generation result in few environmental impacts, solar technology requires substantial land areas, and CSP technologies require roughly the same amount of water for cooling of the steam cycle as most other thermoelectric technologies.

The potential for solar technologies to serve as reliable baseload power alternative to Davis-Besse depends on the value, constancy, and accessibility of the solar resource. Both PV and CSP are enjoying growth worldwide, especially for various off-grid applications or to augment grid-provided power at the point of consumption; however, discrete baseload applications still have technological limitations. Although thermal storage can markedly increase the value of CSP-derived power for baseload applications by providing energy storage capabilities, low energy conversion efficiencies and the inherent weather-dependent intermittency of solar power limit its application as baseload power in all but those geographic locations with the highest and most constant solar energy values.

Ohio's RPS requires utilities to obtain 12.5 percent of their electricity through renewables by 2054. At least 0.5 percent of the renewable requirement must be met through solar energy resources (DSIRE 2013). EIA reports the total solar generating capacity (solar thermal and solar PV) in the U.S. in 2009 was 619 MW, 0.005 percent of the total nationwide generating capacity of 1,025,400 MW. Solar power produced 891,000 MWh of power in 2009, 0.02 percent of the nationwide production of 3,950,331 thousand MWh (EIA 2011a). In Ohio in 2010, all renewables (excluding hydroelectric) were responsible for 1,129,000 MWh, or 0.79 percent of the State's total generation of 143,598,000 MWh (EIA 2012a).

The DOE's NREL reports that the State of Ohio has average solar insolation useful for PV applications on the order of 4.0 kWh/m^2/day and direct normal irradiance (DNI) suitable for use in CSP applications averaging 3.5 kWh/m^2/day (NREL 2010b). Both of these solar insolation values are below the ideal for efficient and cost-effective application of PV and CSP technologies. For utility-scale development, insolation levels below 6.5 kWh/m^2/day are considered "not economically viable" given current technologies (BLM/DOE 2010).

PV installations have no ability to provide power at night, and they provide reduced levels of power on overcast days, during fog events, and when snow accumulates. While their generation during summer months is high when electricity consumption is high, their capacity to generate electricity in winter declines before the evening electricity demand peaks.

To date, PV installations have been the dominant technology installed in Ohio, and they are also the largest installations in the State are PV installations (the 10 MW Wyandot facility and the under-construction 49.9 MW Turning Point project, to be completed in 2015). As a result, the solar capacity considered as part of a combination alternative is from PV installations. Because PV does not produce electricity at night and produces diminished amounts of power during particular weather conditions, PV is not considered a viable, standalone alternative to license renewal. Further, because no CSP installations exist in Ohio, and because CSP has lower insulation values than PV, the NRC staff does not consider CSP to be a viable alternative to Davis-Besse license renewal.

As discussed in the wind power section, CAES could conceivably offset the variable power output of solar PV facilities and allow them to store some energy to be released when the sun is not shining or when output is low due to weather conditions. Because Ohio has very limited potential for new hydro development, the NRC staff will not consider pumped storage as a means of offset solar PV variability.

As noted in the combination alternative section, First Energy recently purchased the Norton Energy Storage project and could conceivably have 536 MW of capacity available by 2017 However, the Norton Energy Storage project is too small to provide for production of sufficient power to replace Davis-Besse while the sun is not shining, so the NRC staff does not consider solar plus the Norton Energy Storage project to be a reasonable alternative.

FENOC (2011) evaluated the potential environmental impacts of a combined solar and CAES alternative, and the NRC staff provides a brief discussion of its results here.

<u>Environmental Impacts of Solar PV with the Norton Project</u>

Land Use. FENOC indicated that a solar facility with sufficient capacity to replace Davis-Besse and provide electricity to a CAES facility (a total of 1,820 MW of solar capacity) would require approximately 37,900 ac (15,300 ha). The Norton Energy Storage project would require an additional 92 ac (37 ha) of a former mining site. This alternative would require more land than any other alternative. The land use impacts of this alternative would range from MODERATE to LARGE.

Water Use and Quality—Surface Water. FENOC indicated that a solar PV facility requires no water for cooling or operations. FENOC further notes that the only effects on surface water would occur during construction, when sedimentation or runoff could affect surface water, but best management practices would minimize this impact. The solar facility would have to comply with storm water discharge limits, and the from the Norton Energy Storage project would be SMALL. The NRC staff, therefore, finds that surface water impacts would be SMALL.

Water Use and Quality—Groundwater. FENOC assumed that neither solar PV installations nor the Norton Energy Storage project would use groundwater for any purpose. The NRC staff finds this to be a reasonable assumption. If the project does not use any groundwater, then the impacts to groundwater would be SMALL.

Air Quality. FENOC indicated that solar PV installations would have no effect on air quality. However, PV construction, installation, and maintenance (serving equipment or repairs) would cause some temporary air pollutant emissions.

The Norton Energy Storage project would have the following emissions, assuming that the maximum 536 MW would be installed by 2017:

- sulfur dioxide—28 tons (26 MT),

- nitrogen oxide—62 tons (57 MT),
- particulate matter less than or equal to 10 μm—31 tons (28 MT),
- VOCs—18 tons (16 MT), and
- carbon dioxide—450,000 tons (410,000 MT).

FENOC indicated that both sulfur dioxide and nitrogen oxide emissions would be subject to cap and trade programs; thus, they would not add to regional emissions of either pollutant (in all seasons for sulfur dioxide, and ozone season for nitrogen oxides) or permit-based emissions controls for all listed pollutants. FENOC indicated that air quality impacts would be MODERATE. However, the NRC staff found these air emissions to be SMALL. The impacts would be substantially lower than those of the NGCC alternative considered in Section 8.1. As a result, the impacts of the Norton Energy Storage facility portion of this combination alternative on air quality would be SMALL.

Ecological Impacts. FENOC indicated that development of solar PV installations could have major impacts on land resources as well as significant impacts on terrestrial ecological resources.

Most land would already be in agricultural use, given the predominant land use patterns in Ohio. As a result, terrestrial impacts are likely to affect those ecological resources that exist on agricultural lands. These impacts are likely to be noticeable; however, they are unlikely to be destabilizing, so impacts are MODERATE. Effects from the Norton Energy Storage project would be SMALL. Overall impacts to terrestrial ecological resources would be MODERATE.

As the solar PV portion of this alternative does not rely on any water during operation, and as permitting and practices during construction will limit impacts to surface water, the solar PV portion is unlikely to noticeably affect aquatic ecological resources. The Norton Energy Storage project is also unlikely to noticeably affect aquatic ecological resources. As a result, impacts to aquatic ecological resources will be SMALL.

Human Health. FENOC indicated that human health impacts from construction and operation of both solar PV and CAES would be regulated by OSHA and would, therefore, be SMALL. Impacts on human health from the CAES facility's air emissions would also not be noticeable. As a result, the NRC staff finds that human health impacts from this alternative would be SMALL.

Socioeconomics. Constructing solar PV installations would create temporary construction jobs, economic activity, and increased demand for short-term rental housing and public services in communities nearest to the construction sites. FENOC further indicates that the impacts would be spread throughout the region and that losses of jobs, tax revenues, and economic activity from Davis-Besse would have a significant impact on communities near Davis-Besse. FENOC also indicates that renewable resources are taxed at a lower rate than "conventional" energy generating facilities. Solar PV facilities would affect many rural communities during installation. However, given the relatively small number of construction workers scattered over a large area, the relative socioeconomic impact of this many construction workers would be SMALL. CAES construction workers are most likely to commute from nearby Akron and Cleveland given the short duration of construction activities. Commuting workers and transportation of solar PV components could noticeably increase traffic volumes on local roads and could create SMALL to MODERATE transportation impacts

During operations, FENOC estimates that 150 to 200 workers would be employed at both the solar PV installations and the Norton Energy Storage project. FENOC indicated that the Norton project would generate additional revenues for the communities near the project. Socioeconomic impacts would be SMALL to MODERATE.

FENOC indicates that solar PV facilities would be located in remote areas, would likely not generate large aesthetic concerns, and would likely meet minor resistance. The footprint of a utility scale, standalone solar PV installation would be quite large (approximately 37,900 ac (15,300 ha)) and would create a noticeable visual impact. Spread across a large site, the utility scale, standalone solar PV installation would dominate the view and would likely become the major focus of attention. The introduction of a utility scale, standalone solar PV installation would be in sharp contrast to the visual appearance of the surrounding environment. Installing solar PV technologies on building rooftops, although noticeable to a lesser degree in urban settings, would reduce the amount of land required for standalone solar sites. Any noise at a utility scale, standalone solar PV installation would be limited to industrial processes and communications. Based on this information, aesthetic impacts from the construction and operation of a solar PV alternative could range from MODERATE to LARGE depending on the type of solar technology installed and its location and surroundings.

FENOC indicated that the large amount of land needed for this alternative could have a large impact on cultural resources, but OPSB or other comparable program rules could reduce or minimize these impacts. Solar PV installations will require smaller and shallower excavations than wind turbines; so, they are less likely to disturb historical and archaeological resources beyond those already disturbed by farming or other activities.

Mining and industrial use of the 92-ac (37-ha) Norton Energy Storage project site has removed or otherwise affected the historic and archaeological resources at the former mine site. As a result, the Norton Energy Storage project is unlikely to contribute to impacts to existing historical and archaeological resources. Given the potential for discovery, impacts to historical and archaeological resources could range from SMALL to MODERATE.

Overall, solar PV installations paired with the Norton Energy Storage project would be noticeable and could affect socioeconomic attributes. Therefore, overall socioeconomic impacts could range from SMALL to MODERATE.

Waste Management. FENOC indicated that hazardous materials, such as cadmium and lead, are used in the manufacture of solar PV panels; thus, solar PV could create environmental impacts during manufacture and disposal. Solar PV technology manufacturers would employ best practices to minimize release and disposal of hazardous wastes and recycle any commercially valuable quantities of waste items. Some debris may be generated during installation. FENOC indicated that CAES would generate minimal amounts of wastes, similar to the NGCC alternative. Overall, waste management impacts would be SMALL.

Environmental Justice. Predominately minority and low-income communities could be disproportionately affected by the visual impact from the vast size of the solar PV installations if located near the installation. However, because of the large amount of land necessary for solar PV installations, solar PV installations could be positioned away from communities, thus reducing or avoiding disproportionately affecting minority and low-income populations.

Solar PV installations and CAES storage operations are unlikely to have any high and adverse effects on minority and low-income populations. given their lack of emissions, lack of water consumption or discharge, and minimal aesthetic impacts. However, noise from the existing

CAES storage operations component of this alternative would continue to have a localized impact on people living near the Norton Energy Storage project site. Impacts from both components of this alternative could disproportionately affect nearby minority or low-income populations but the overall effects would not be high and adverse.

8.4.4 Wood Waste

As noted in the GEIS (NRC 1996), the use of wood waste to generate utility-scale baseload power is limited to those locations where wood waste is plentiful. Wastes from pulp, paper, and paperboard industries and from forest management activities can be expected to provide sufficient, reliable supplies of wood waste as feedstocks to external combustion sources for energy generation. Beside the fuel source, the technological aspects of a wood-fired generation facility are virtually identical to those of a coal-fired alternative—combustion in an external combustion unit such as a boiler to produce steam to drive a conventional STG. Given constancy of the fuel source, wood waste facilities can be expected to operate at equivalent efficiencies and reliabilities. Costs of operation would depend significantly on processing and delivery costs. Wood waste combustors would be sources of criteria pollutants and GHGs, and pollution control requirements would be similar to those for coal plants. Unlike coal plants, there is no potential for the release of HAPs such as mercury. Co-firing of wood waste with coal is also technically feasible. Processing the wood waste into pellets can improve the overall efficiency of such co-fired units. Although co-fired units can have capacity factors similar to baseload coal-fired units, such levels of performance are dependent on the continuous availability of the wood waste fuel. In the State of Ohio, 2008 electricity generating capacity from wood waste was 65 MW and produced 418,000 MWh (EIA 2011c). Given the limited capacity and modest actual electricity production, the NRC staff has determined that production of electricity from wood waste at levels equivalent to Davis-Besse would not be a feasible alternative to Davis-Besse license renewal.

8.4.5 Conventional Hydroelectric Power

Three technology variants of hydroelectric power exist—dam and release (also known as impoundment), run-of-the-river (also known as diversion), and pumped storage. In each variant, flowing water spins turbines of different designs to drive a generator to produce electricity. Dam and release facilities affect large amounts of land behind the dam to create reservoirs but can provide substantial amounts of power at capacity factors greater than 90 percent. Power generating capacities of run-of-the-river dams fluctuate with the flow of water in the river, and the operation of such dams is typically constrained (and stopped entirely during certain periods) so as not to create undue stress on the aquatic ecosystems present. Pumped storage facilities use grid power to pump water from lower impoundments or flowing watercourses to higher elevations during off-peak load periods. Water is then released during peak load periods through turbines to generate electricity. Capacities of pumped storage facilities are dependent on the configuration and capacity of the elevated storage facility.

A comprehensive survey of hydropower resources in Ohio was completed in 1997 by DOE's Idaho National Environmental Engineering Laboratory (now known as the Idaho National Laboratory). In the study, generating potential was defined by a model that considered the existing hydroelectric technology at developed sites or applied the most appropriate technology to undeveloped sites and introduced site-specific environmental considerations and limitations. Ohio had little hydroelectric potential, with a total generating potential of 183 MW (INEEL 1998). More recently, EIA reported that, in 2008, conventional hydroelectric power (excluding pumped storage) was the principal electricity generation source among renewable sources in Ohio

(EIA 2011c). Nevertheless, only 527 gigawatt-hours (GWh) of hydroelectric power was generated in 2009, 0.19 percent of the nationwide total of 273,445 GWh (EIA 2011a). Although hydroelectric facilities can demonstrate relatively high capacity factors, the small potential capacities and actual recent power generation of hydroelectric facilities in Ohio, combined with the diminishing public support for large hydroelectric facilities because of their potential for adverse environmental impacts, supports NRC's conclusion that hydroelectric is not a feasible alternative to Davis-Besse.

8.4.6 Ocean Wave and Current Energy

Ocean waves, currents, and tides represent kinetic and potential energies. The total annual average wave energy off the U.S. coastlines at a water depth of 60 m (197 ft) is estimated at 2,100 terawatt-hours (TWh) (MMS 2006). Waves, currents, and tides are often predictable and reliable; ocean currents flow consistently, while tides can be predicted months and years in advance with well-known behavior in most coastal areas. Four principal wave energy conversion (WEC) technologies have been developed to date to capture the potential or kinetic energy of waves—point absorbers, attenuators, overtopping devices, and terminators. All have similar approaches to electricity generation but differ in size, anchoring method, spacing, interconnection, array patterns, and water depth limitations. Point absorbers and attenuators both allow waves to interact with a floating buoy, subsequently converting its motion into mechanical energy to drive a generator. Overtopping devices and terminators are also similar in their function. Overtopping devices trap some portion of the incident wave at a higher elevation than the average height of the surrounding sea surface, thus giving it higher potential energy, which is then transferred to power generators. Terminators allow waves to enter a tube, compressing air trapped at the top of the tube, which is then used to drive a generator.

Capacities of point absorbers range from 80 to 250 kW, with capacity factors as high as 40 percent; attenuator facilities have capacities of as high as 750 kW. Overtopping devices have design capacities as high as 4 MW, while terminators have design capacities ranging from 500 kW to 2 MW and capacity factors as high as 50 percent (MMS 2007).

The most advanced technology for capturing tidal and ocean current energy is the submerged turbine. Underwater turbines share many design features and functions with wind turbines, but because of the greater density of water compared to air, they have substantially greater power-generating potential than wind turbines with comparably sized blades. Only a small number of prototypes and demonstration units have been deployed to date, however. Underwater turbine "farms" are projected to have capacities of 2 to 3 MW, with capacity factors directly related to the constancy of the current with which they interact.

The Great Lakes do not experience large tides, and the limited energy output for wave technologies in the Great Lakes would outweigh the high cost. Consequently, the relatively modest power capacities, relatively high costs, and limited resource availability in Lake Erie support the NRC staff's conclusion that water energy current technologies are not feasible substitutes for Davis-Besse.

8.4.7 Geothermal Power

Geothermal technologies extract the heat contained in geologic formations to produce steam to drive a conventional steam-turbine generator. The following variants of the heat exchanging mechanism have been developed:

- Hot geothermal fluids contained under pressure in a geological formation are brought to the surface where the release of pressure allows them to flash into steam (the most common of geothermal technologies applied to electricity production).
- Hot geothermal fluids are brought to the surface in a closed loop system and directed to a heat exchanger where they convert water in a secondary loop into steam.
- Hot dry rock technologies involve fracturing a rock formation and extracting heat through injection of a heat transfer fluid.

Facilities producing electricity from geothermal energy can routinely demonstrate capacity factors of 95 percent or greater, making geothermal energy clearly eligible as a source of baseload electric power. However, as with other renewable energy technologies, the ultimate feasibility of geothermal energy serving as a baseload power replacement for Davis-Besse is dependent on the quality and accessibility of geothermal resources within or proximate to the region of interest—in this case, FirstEnergy's Ohio service territory. As of April 2010, the U.S. had a total installed geothermal electricity production capacity of 3,087 MW originating from geothermal facilities in nine states—Alaska, California, Hawaii, Idaho, Nevada, New Mexico, Utah, and Wyoming. Additional geothermal facilities are being considered for Colorado, Florida, Louisiana, Mississippi, and Oregon. Ohio does not have adequate geothermal resources to support utility-scale electricity production (GEA 2010). NRC concludes, therefore, that geothermal energy does not represent a feasible alternative to Davis-Besse.

8.4.8 Municipal Solid Waste

Municipal solid waste (MSW) combustors use three types of technologies—mass burn, modular, and refuse-derived fuel. Mass burning is currently the method used most frequently in the U.S. and involves no (or little) sorting, shredding, or separation. Consequently, toxic or hazardous components present in the waste stream are combusted, and toxic constituents are exhausted to the air or become part of the resulting solid wastes. Currently, approximately 86 waste-to-energy plants operate in 24 states, processing 97,000 tons (88,000 MT) of municipal solid waste per day. Latest estimates are that 26 million tons (24 million MT) of trash were processed in 2008 by waste-to-energy facilities. With a reliable supply of waste fuel, waste-to-energy plants have an aggregate capacity of 2,572 MW and can operate at capacity factors greater than 90 percent (ERC 2010). Currently, there are no waste-to-energy facilities operating in Ohio.

The EPA estimates that, on average, air impacts from MSW-to-energy plants are as follows:

- 3,685 lb (1,672 kg)/MWh of carbon dioxide,
- 1.2 lb (0.54 kg)/MWh of sulfur dioxide, and
- 6.7 lb (3.0 kg)/MWh of nitrogen oxide.

Depending on the composition of the municipal waste stream, air emissions can vary greatly, and the ash produced may exhibit hazardous characteristics that require special treatment and handling (EPA 2010d).

Estimates in the GEIS suggest that the overall level of construction impact from a waste-fired plant would be approximately the same as that for a coal-fired power plant. Additionally, waste-fired plants have the same or greater operational impacts as coal-fired technologies (including impacts on the aquatic environment, air, and waste disposal). The initial capital costs for municipal solid-waste plants are greater than those for comparable steam-turbine technology at coal-fired facilities or at wood-waste facilities because of the need for specialized waste separation and handling equipment (NRC 1996).

The decision to burn municipal waste to generate energy is usually driven by the need for an alternative to landfills, rather than energy considerations. The use of landfills as a waste disposal option is likely to increase in the near term as energy prices increase (and especially since such landfills, of sufficient size and maturity, can be sources of easily recoverable methane fuel); however, it is possible that municipal waste combustion facilities may become attractive again.

Regulatory structures that once supported municipal solid waste incineration no longer exist. For example, the Tax Reform Act of 1986 made capital-intensive projects, such as municipal waste combustion facilities, more expensive relative to less capital-intensive waste disposal alternatives such as landfills. Additionally, the 1994 Supreme Court decision C&A Carbone, Inc. *v.* Town of Clarkstown, New York, struck down local flow control ordinances that required waste to be delivered to specific municipal waste combustion facilities rather than landfills that may have had lower fees. In addition, environmental regulations have increased the capital cost necessary to construct and maintain municipal waste combustion facilities.

Given the small average installed size of municipal solid waste plants, the likelihood that additional stable streams of MSW are unlikely to be available to support numerous new facilities, the increasingly unfavorable regulatory environment, especially with respect to expanding pollution control regulations, and the fact that Ohio does not have any operating MSW plants, the NRC staff does not consider municipal solid waste combustion to be a reasonable alternative to Davis-Besse license renewal.

8.4.9 Biomass Fuels

When used here, “biomass fuels” includes crop residues, switchgrass grown specifically for electricity production, forest residues, methane from landfills, methane from animal manure management, primary wood mill residues, secondary wood mill residues, urban wood wastes, and methane from domestic wastewater treatment. The feasibility of using biomass fuels for baseload power depends on its geographic distribution, available quantities, constancy of supply, and energy content. A variety of technical approaches has been developed for biomass-fired electric generators, including direct burning, conversion to liquid biofuels, and biomass gasification. In a study completed in December 2005, Milbrandt of NREL documented the geographic distribution of biomass fuels within the U.S., reporting the results in metric tons available (dry basis) per year (NREL 2005). Limited amounts of potential biomass fuels are available in Ohio, with the highest potential located in the western half of the State. Power-generating capacity from biomass fuels is only 41 MW in Ohio and, in 2008, generated only 191,000 MWh (EIA 2011c).

In the GEIS, the NRC indicated that technologies relying on a variety of biomass fuels had not progressed to the point of being competitive on a large scale or of being reliable enough to replace a baseload plant such as Davis-Besse. After reevaluating current technologies, and after reviewing existing State-wide capacities and the extent to which biomass is currently being used to produce electricity in Ohio, the NRC staff finds biomass-fired alternatives are still unable to reliably replace the Davis-Besse capacity and are not considered feasible alternatives to Davis-Besse license renewal.

8.4.10 Oil-Fired Power

Although oil has historically been used extensively in the Northeast for comfort heating, EIA projects that oil-fired plants will account for very little of the new generation capacity constructed in the U.S. during the 2008 to 2030 time period. In 2008, Ohio generated approximately 1,311,743 MWh of electricity from oil-fired generation, just 1 percent of its total electricity profile. Further, EIA does not project that oil-fired power will account for any significant additions to capacity (EIA 2013).

The variable costs of oil-fired generation tend to be greater than those of nuclear or coal-fired operations, and oil-fired generation tends to have greater environmental impacts than natural gas-fired generation. In addition, future increases in oil prices are expected to make oil-fired generation increasingly more expensive (EIA 2013). The high cost of oil has prompted a steady decline in its use for electricity generation. Thus, the NRC staff does not consider oil-fired generation as a reasonable alternative to Davis-Besse license renewal.

8.4.11 Fuel Cells

Fuel cells oxidize fuels without combustion and its environmental side effects. Power is produced electrochemically by passing a hydrogen-rich fuel over an anode and air (or oxygen) over a cathode and separating the two by an electrolyte. The only byproducts (depending on fuel characteristics) are heat, water, and CO_2. Hydrogen fuel can come from a variety of hydrocarbon resources by subjecting them to steam reforming under pressure. Natural gas is typically used as the source of hydrogen.

Currently, fuel cells are not economically or technologically competitive with other alternatives for electricity generation. EIA projects that fuel cells may cost $5,478 per installed kW (total overnight costs, 2008 dollars) (EIA 2010c). This amount is substantially greater than coal ($2,223), advanced (natural gas) combustion turbines ($648), onshore wind ($1,966), or offshore wind ($3,937), but it is cost-competitive with solar PV ($6,171) or CSP solar ($5,132). Installed costs provided for PV and CSP solar are before application of Investment Tax Credits provided in Federal statutes. More importantly, fuel cell units are likely to be small in size (the EIA reference plant is 10 MWe). While it may be possible to use a distributed array of fuel cells to provide an alternative to Davis-Besse, it would be extremely costly to do so and would require many units and wholesale modifications to the existing transmission system. Accordingly, the NRC staff does not consider fuel cell technology to be a reasonable alternative to Davis-Besse license renewal.

8.4.12 Coal-Fired Integrated Gasification Combined Cycle

Integrated gasification combined cycle (IGCC) is an emerging technology for generating electricity with coal that combines modern coal gasification technology with both gas turbine and steam turbine power generation. Gasifiers similar to those used in oil refineries use heat pressure and steam to pyrolyze (thermally reform complex organic molecules without oxidation) coal to produce synthesis gases (generically referred to as syngas) typically composed of carbon monoxide, hydrogen, and other flammable constituents. After processing to remove contaminants and produce various liquid chemicals, the syngas is combusted in a combustion turbine to produce electric power. Separating the CO_2 from the syngas prior to combustion is also possible. Latent heat is recovered both from the syngas as it exits the gasifier and from the combustion gases exiting the combustion turbine and directed to a heat recovery steam generator feeding a conventional Rankine cycle STG to produce additional amounts of electricity. Emissions of criteria pollutants would likely be slightly higher than those from an

NGCC alternative but significantly lower than those from the supercritical coal-fired alternative. Depending on the gasification technology employed, IGCC would use less water than SCPC units but slightly more than NGCC (NETL 2007). Long-term maintenance costs of this relatively complex technology would likely be greater than those for a similarly sized SCPC or NGCC plant.

Only a few IGCC plants are operating at utility scale. Operating at higher thermal efficiencies than supercritical coal-fired boilers, IGCC plants can produce electrical power with fewer air pollutants and solid wastes than coal-fired boilers. To date, however, IGCC technologies have had limited application and have been plagued with operational problems such that its effective, long-term capacity factors are often not high enough for them to reliably serve as baseload units. Although IGCC technology is likely to become more commonplace in the future, current operational problems that compromise reliability result in the dismissal of this technology as a viable alternative to Davis-Besse.

8.4.13 Energy Conservation/Energy Efficiency

Though often used interchangeably, energy conservation and energy efficiency are different concepts. Energy efficiency typically means deriving a similar level of service by using less energy, while energy conservation simply indicates a reduction in energy consumption. Both fall into a larger category known as demand-side management (DSM). DSM measures—unlike the energy supply alternatives discussed in previous sections—address energy end uses. DSM can include measures that do the following:

- shift energy consumption to different times of the day to reduce peak loads;
- interrupt certain large customers during periods of high demand;
- interrupt certain appliances during high demand periods;
- replace older, less efficient appliances, lighting, or control systems; and
- encourage customers to switch from gas to electricity for water heating and other similar measures that utilities use to boost sales.

Unlike other alternatives to license renewal, the GEIS notes that conservation is not a discrete power-generating source; it represents an option that states and utilities may use to reduce their need for power generation capability (NRC 1996).

In a 2008 staff report, the FERC outlined the results of the 2008 FERC Demand Response and Advanced Metering Survey (FERC 2008). Nationwide, approximately 8 percent of retail electricity customers are enrolled in some type of demand response program. The potential demand response resource contribution from all U.S. demand response programs is estimated to be close to 41,000 MW, or about 5.8 percent of U.S. peak demand. A national assessment of demand response (DR) potential, required of FERC by Section 529 of the Energy Independence and Security Act of 2007, evaluated potential energy savings in 5- and 10-year horizons for four development scenarios—Business As Usual, Expanded Business As Usual, Achievable Participation, and Full Participation. Each of these scenarios represents successively greater demand response program opportunities and proportionally increasing levels of customer participation (FERC 2009). The greatest savings would be realized under the Full Participation scenario, with peak demand reductions of 188 GW by the year 2019, a 20 percent reduction of the anticipated peak load that would result without any DR programs in place. Under the Achievable Participation scenario, reflecting a more realizable voluntary participation level of

60 percent of eligible customers, peak demand would be reduced by 138 GW by 2019, a 14 percent reduction. The Business-as-Usual scenario considers the amount of demand response that would take place if existing and currently planned demand response programs continued unchanged over the next 10 years.

FERC's State-specific analysis indicates that by the year 2019, the Full Participation scenario would yield a 6,753 MW peak demand reduction in Ohio (17.5 percent of the State's projected peak demand). The Business as Usual scenario suggests that DR programs would yield a reduction of 483 MW (1.2 percent of the State's projected peak demand) (FERC 2009).

In July 2008, the Ohio legislature passed SB 221, which established an energy-efficiency resource standard that requires electric utilities to implement an energy-efficiency and peak demand reduction program that will yield a cumulative electricity savings of 22 percent by the end of 2025, with specific annual benchmarks. The bill also requires utilities to implement programs to reduce peak energy demand by 1 percent in 2009, and an additional 0.75 percent each year through 2018 (DSIRE 2013). In its ER, FENOC discussed that DSM load reductions are already considered in load forecasts; therefore, the reductions do not offset the projected power demands that Davis-Besse is expected to supply (FENOC 2010). Because the energy efficiency resource standard would require utilities to achieve savings of anywhere between 0.3 and 2 percent each year, and Davis-Besse contributes 5 percent of Ohio's total electrical generation annually, it is unlikely that the energy savings would completely replace the power generated by Davis-Besse by 2017, which is when the Davis-Besse operating license would have expired if FENOC had not applied for license renewal. Thus, the NRC staff concludes that passive DR programs are not a feasible baseload power alternative to Davis-Besse.

8.4.14 Purchased Power

Under the Purchased Power alternative, no new generating capacity would necessarily be built and operated by FirstEnergy; instead, the company would purchase electricity from other generators, in amounts equivalent to what Davis-Besse currently supplies. Those generators could be located anywhere within or outside the FirstEnergy service territory, although far-distant sources may not be immediately available to serve nearby load centers without substantial transmission system build-outs or without significant line loss when power delivered to Davis-Besse load centers originates at distant generation sources.

In theory, purchased power is a feasible alternative; however, because there are no assurances that sufficient capacity would exist during the entire license renewal timeframe to replace Davis-Besse, FENOC has determined that purchased power would not be a reasonable alternative (FENOC 2010). Davis-Besse is located in the region administered by the Midwest Independent System Operator (MISO), and ReliabilityFirst Corporation (RFC) enforces reliability standards in the areas in which Davis-Besse operates. The North American Electric Reliability Corporation's (NERC's) 2008 Regional Reliability Assessment estimates that the total internal demand of MISO will increase by 14,500 MW from 2008 through 2017, while the increase in planned generation additions through 2017 is only 4,400 MW. The reserve margins are expected to be 14.1 percent through 2014; however, additional generating capacity would be needed in the region in order to maintain sufficient capacity reserves beyond 2017 (NERC 2008). If Davis-Besse were not to operate beyond its current license period, existing resources may not be sufficient to support a purchased power alternative beyond 2017. NRC, therefore, concludes that a purchased power option is not a viable discrete alternative to extending the Davis-Besse reactor license.

8.5 No-Action Alternative

This section examines the environmental effects that occur if NRC takes no action. No action, in this case, means that NRC denies the renewed the operating license for Davis-Besse and the license, NPF-3, expires at the end of the current license term, on April 22, 2017. If NRC denies the renewed operating license, the plant will shut down at or before the end of the current license. After shutdown, plant operators will initiate decommissioning in accordance with 10 CFR 50.82.

No action is the only alternative that we consider in depth that does not satisfy the purpose and need for this SEIS, as it neither provides power-generation capacity nor meets the needs currently met by Davis-Besse or that the alternatives evaluated in Sections 8.1 through 8.3 would satisfy. Assuming that a need currently exists for the power generated by Davis-Besse, the no-action alternative would require the appropriate energy-planning decisionmakers (not NRC) to rely on an alternative to replace the capacity of Davis-Besse or rely on energy conservation or power purchases to offset parts of the Davis-Besse capacity.

This section addresses only those impacts that arise directly as a result of plant shutdown. The environmental impacts from decommissioning and related activities have already been addressed in several other documents, including the *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities*, NUREG-0586, Supplement 1 (NRC 2002); the license renewal GEIS, Chapter 7 (NRC 1996); and Chapter 7 of this SEIS. These analyses either directly address or bound the environmental impacts of decommissioning whenever FENOC ceases to operate Davis-Besse.

Even with a renewed operating license, Davis-Besse will eventually shut down, and the environmental effects we address in this section will occur at that time. Because these effects have not otherwise been addressed in this SEIS, the impacts are addressed in this section. As with decommissioning effects, shutdown effects are expected to be similar whether they occur at the end of the current license or at the end of a renewed license. Table 8.5-1 provides a summary of the environmental impacts of the no-action alternative.

Table 8.5-1. Environmental Impacts of No-Action Alternative

	No-Action Alternative	Continued Operation of the Davis-Besse Reactor
Air quality	SMALL	SMALL
Groundwater	SMALL	SMALL
Surface water	SMALL	SMALL
Aquatic resources	SMALL	SMALL
Terrestrial resources	SMALL	SMALL
Human health	SMALL	SMALL
Land use	SMALL	SMALL
Socioeconomics	SMALL to MODERATE	SMALL
Transportation	SMALL	SMALL
Aesthetics	SMALL	SMALL

	No-Action Alternative	Continued Operation of the Davis-Besse Reactor
Historical & archeological resources	SMALL	SMALL to MODERATE
Waste Management	SMALL	SMALL

8.5.1 Air Quality

When the plant stops operating, there will be a reduction in emissions from activities related to plant operation, such as use of diesel generators and employee vehicles. In Chapter 4, the NRC staff determined that these emissions would have a SMALL impact on air quality during the renewal term; therefore, if emissions decrease, the impacts to air quality from the no-action alternative will be SMALL.

8.5.2 Groundwater Use and Quality

Chapter 4 of this SEIS discusses the impact on groundwater that is currently occurring as a result of operation of Davis-Besse. No groundwater is used to support operation of the plant. Tritium contamination has been detected in groundwater monitoring wells, though no concentrations have been detected at or above the EPA drinking water limit of 20,000 picocuries per liter (pCi/L) (FENOC 2010). Once the reactor ceases operating, the potential for additional releases of tritium to the groundwater is expected to diminish. However, releases of tritium may not totally cease until decommissioning is completed. NRC concludes that impacts on groundwater from the no-action alternative would be SMALL.

8.5.3 Surface Water Use and Quality

Chapter 4 of this SEIS discusses the impacts on surface water from plant operation. Operational impacts include water withdrawals from Lake Erie in association with operation of the closed-cycle cooling system. Impacts also include stormwater runoff from industrial areas of the plant, controlled through provisions of a stormwater general permit. Once reactor operation stops, impacts associated with water withdrawals would cease; however, stormwater discharges from industrialized portions of the site would continue largely unchanged until decommissioning activities commence. The current stormwater general permit would continue in effect after reactor operation stops and would be replaced by an amended permit once decommissioning actions commence. The NRC staff concludes that impacts on surface water from the no-action alternative would be SMALL.

8.5.4 Aquatic Resources

If the plant were to cease operating, impacts on aquatic ecology would decrease because the plant would withdraw and discharge less water than it does during operations. Shutdown would reduce the already SMALL impacts on aquatic ecology.

8.5.5 Terrestrial Resources

If the plant were to cease operating, the terrestrial ecology impacts would be SMALL, assuming that no additional land disturbances on or offsite would occur during decommissioning activities.

8.5.6 Human Health

In Chapter 4 of this SEIS, the NRC staff concluded that the impacts of continued plant operation on human health would be SMALL. After cessation of plant operations, the amounts of radioactive material released to the environment in gaseous and liquid forms, all of which are currently within respective regulatory limits, would be reduced or eliminated. Therefore, the NRC staff concludes that the impact of plant shutdown on human health would also be SMALL. In addition, the potential for a variety of accidents would also be reduced to only those associated specifically with shutdown activities and fuel handling. In Chapter 5 of this SEIS, the NRC staff concluded that impacts of accidents during operation would be SMALL. It follows, therefore, that impacts on human health from a reduced suite of potential accidents after reactor operation ceases would also be SMALL. Therefore, the NRC staff concludes that impacts on human health from the no-action alternative would be SMALL.

8.5.7 Land Use

Plant shutdown would not affect onsite land use. Plant structures and other facilities would remain in place until decommissioning. Most transmission lines connected to Davis-Besse would remain in service after the plant stops operating. Maintenance of most existing transmission lines would continue as before. The transmission lines could be used to deliver new replacement electrical power from the Davis-Besse site. Impacts on land use from plant shutdown would be SMALL.

8.5.8 Socioeconomics

Plant shutdown would have a noticeable impact on socioeconomic conditions in the communities near Davis-Besse. Should the plant shut down, there would be immediate socioeconomic impacts from the loss of jobs (some, though not all, of the approximately 880 employees would begin to leave), and tax payments may be reduced. Impacts at the county level would be concentrated in Ottawa County as well as Lucas, Sandusky, and Wood counties, where the majority of Davis-Besse employees live. Revenue losses from Davis-Besse operations would directly affect Ottawa County and other local taxing districts and communities closest to, and most reliant on, the nuclear power plant's tax revenue. The impact of job loss, however, may not be as noticeable given the amount of time required to decontaminate and decommission the nuclear power plant and the proximity of Davis-Besse to the Toledo metropolitan area. The socioeconomic impacts of power plant shutdown (which may not entirely cease until after decommissioning) could, depending on the jurisdiction, range from SMALL to MODERATE. See Appendix J to NUREG-0596, Supplement 1 (NRC 2002) for a description of the potential socioeconomic impacts of plant decommissioning.

8.5.8.1 Transportation

Traffic volumes on the roads near Davis-Besse would be reduced after plant shutdown due to the loss of jobs. Deliveries of materials and equipment to Davis-Besse would also be reduced until decommissioning. Transportation impacts from the termination of power plant operations would be SMALL.

8.5.8.2 Aesthetics

Plant structures and other facilities would likely remain in place until decommissioning. Noise caused by reactor plants operation would cease. Therefore, aesthetic impacts of plant closure would be SMALL.

8.5.8.3 Historic and Archaeological Resources

Impacts from the no-action alternative on historic and archaeological resources would be SMALL. A separate environmental review would be conducted for decommissioning. That assessment would address the protection of historic and archaeological resources.

8.5.8.4 Environmental Justice

Impacts to minority and low-income populations when Davis-Besse ceases operations would depend on the number of jobs and the amount of tax revenues lost by the communities in the immediate vicinity of Davis-Besse after the termination of reactor operations. Closure of Davis-Besse would reduce the overall number of jobs and tax revenue for social services attributed to nuclear power plant operations. Minority and low-income populations in the township vicinity of Davis-Besse could experience some socioeconomic effects from power plant shutdown, but these effects would not likely be disproportionately high and adverse.

8.5.9 Waste Management

The wastes generated by continued plant operation are discussed in Chapters 2 and 6 of this SEIS. The impacts of low-level and mixed waste from plant operation are characterized as SMALL. Once Davis-Besse stops operating, generation of high-level waste would cease, and generation of low-level and mixed wastes would be diminished, limited only to those wastes associated with reactor shutdown and fuel handling activities. Therefore, the NRC staff concludes that the impacts of waste generation after shutdown would be SMALL.

Significant amounts of waste would be generated as a result of decommissioning, regardless of whether that takes place immediately after license expiration or at some point beyond that. However, pursuit of the no-action alternative would not impact the amounts or types of wastes that would be generated during decommissioning.

8.6 Alternatives Summary

In this SEIS, the NRC staff has considered alternative actions to license renewal of Davis-Besse, including in-depth evaluations of new generation alternatives (Sections 8.1 through 8.3), alternatives that the NRC staff dismissed from detailed evaluation as infeasible or inappropriate (Section 8.4), and the no-action alternative in which the operating license is not renewed (Section 8.5). Impacts of all alternatives considered in detail are summarized in Table 8.6-1.

Based on the above evaluations, the NRC staff concludes that the environmental impacts of renewal of the operating license for Davis-Besse would be smaller than those of feasible and commercially viable alternatives studied in this SEIS that satisfy the purpose and need of license renewal (provision of 908 MWe of baseload power to the grid). Impacts on air quality are less from continued operation of Davis-Besse than from any of the alternatives involving fossil fuels (including dismissed combinations that rely on CAES to support wind or solar power installations). The NRC staff considered a combination of alternatives that includes wind, solar, CAES, and a small amount of NGCC capacity, and it found that such a combination would have noticeable environmental impacts in more areas would have resulted from pursuit of NGCC generation alone or license renewal. Finally, the NRC concluded that under the no-action alternative, the act of shutting down Davis-Besse on or before its license expiration would have only SMALL impacts in all categories except socioeconomics, where it could have a MODERATE impact in areas immediately adjacent to Davis-Besse. However, depending on how the power lost to the region from reactor shutdown was replaced (decisions outside of NRC's authority and made instead by FirstEnergy, other power producers, and State or non-NRC Federal authorities or both), the net environmental impact of the no-action alternative could be greater than continued reactor operation, especially when fossil energy power plants were selected as full or partial replacements.

Table 8.6-1. Summary of environmental Impacts of Proposed Action and Alternatives

Alternative	Impact Area								
	Air Quality	Groundwater	Surface Water	Aquatic Resources	Terrestrial Resources	Human Health	Socioeconomics	Waste Management	Historic & Archeological Resources
License renewal	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE
NGCC at Davis-Besse	SMALL to Moderate	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL to MODERATE
Combination	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	MODERATE	SMALL	SMALL to LARGE
Supercritical pulverized coal at an alternate site	MODERATE	SMALL	SMALL	SMALL to LARGE	SMALL	SMALL	SMALL to MODERATE	MODERATE	SMALL to MODERATE
No-action alternative	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE	SMALL	SMALL

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10 CFR 51. *U.S. Code of Federal Regulations*, Title 10 "Energy," Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions."

40 CFR 60. *U.S. Code of Federal Regulations*, Title 40 "Protection of Environment," Part 60, "Standards of Performance for New Stationary Sources." 40 CFR Part 75. *U.S. Code of Federal Regulations*, Title 40, "Protection of Environment," Part 75, "Continuous Emission Monitoring."

40 CFR 86. *U.S. Code of Federal Regulations*, Title 40, "Protection of Environment," Part 86, "Selective Enforcement Auditing of New Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Vehicles."

40 CFR 87. *U.S. Code of Federal Regulations*, Title 40, "Protection of Environment," Part 87, "Control of Air Pollution from Aircraft and Aircraft Engines."

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9.0 CONCLUSION

This supplemental environmental impact statement (SEIS) contains the preliminary environmental review of FirstEnergy Nuclear Operating Company's (FENOC) application for a renewed operating license for the Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse), as required by Title 10 of the *Code of Federal Regulations* (CFR) Part 51 (10 CFR Part 51), which implements the National Environmental Policy Act (NEPA). Chapter 9 presents the conclusions and recommendations from the site-specific environmental review of Davis-Besse and summarizes site-specific environmental issues of license renewal that were identified during the review. The environmental impacts of license renewal are summarized in Section 9.1; a comparison of the environmental impacts of license renewal and energy alternatives is presented in Section 9.2; unavoidable impacts of license renewal and energy alternatives and resource commitments are discussed in Section 9.3; and conclusions and U.S. Nuclear Regulatory Commission (NRC) staff recommendations are presented in Section 9.4.

9.1 Environmental Impacts of License Renewal

Based on the NRC staff's review of site-specific environmental impacts of license renewal presented in this SEIS, the staff concludes that issuing a renewed license would have SMALL impacts. The site-specific review included 12 Category 2 issues and 2 uncategorized issues. Section 1.4 in Chapter 1 explains the criteria for Category 1 and Category 2 issues and defines the impact designations of SMALL, MODERATE, and LARGE.

The NRC staff also considered cumulative impacts of past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non Federal) or person undertakes them. The cumulative impacts of renewing Davis-Besse's operating license, described in Section 4.13, ranges from SMALL to LARGE depending on the resource. There would be SMALL cumulative impacts for Air and Meteorology, Human Health—Radiological, Socioeconomics, Historic and Archaeological Resources, and Environmental Justice. There would also be MODERATE cumulative impacts for Water Resources—Groundwater, Water Resources—Surface water, Terrestrial Resources, and Human Health—Microbiological Organisms, and there would be LARGE cumulative impacts to Aquatic Resources.

9.2 Comparison of the Environmental Impacts of License Renewal and Alternatives

In the conclusion to Chapter 8, the NRC staff determined that impacts from license renewal are generally less than the impacts of alternatives to license renewal. In comparing likely environmental impacts from natural-gas-fired combined-cycle (NGCC), combination alternative (wind, solar, NGCC, and compressed air energy storage), coal-fired power, and environmental impacts from license renewal, the NRC staff found that license renewal would result in the lowest environmental impact. Based on the NRC staff's analysis, the impacts of license renewal are reasonable in light of the impacts from alternatives to the license renewal.

9.3 Resource Commitments

9.3.1 Unavoidable Adverse Environmental Impacts

Unavoidable adverse environmental impacts are impacts that would occur after implementation of all feasible mitigation measures. Implementing any of the energy alternatives considered in this SEIS, including the proposed action, would result in some unavoidable adverse environmental impacts.

Minor unavoidable adverse impacts on air quality would occur due to emission and release of various chemical and radiological constituents from power plant operations. Nonradiological emissions resulting from power plant operations are expected to comply with U.S. Environmental Protection Agency (EPA) emissions standards, though the alternative of operating a fossil-fueled power plant in some areas may worsen existing attainment issues. Chemical and radiological emissions would not exceed the national emission standards for hazardous air pollutants (HAPs).

During nuclear power plant operations, workers and members of the public would face unavoidable exposure to radiation and hazardous and toxic chemicals. Workers would be exposed to radiation and chemicals associated with routine plant operations and the handling of nuclear fuel and waste material. Workers would have higher levels of exposure than members of the public, but doses would be administratively controlled and would not exceed any standards or administrative control limits. Construction and operation of non-nuclear power generating facilities would also result in unavoidable exposure to hazardous and toxic chemicals to workers and the public.

Also unavoidable would be the generation of spent nuclear fuel and waste material, including low-level radioactive waste, hazardous waste, and nonhazardous waste. Hazardous and nonhazardous wastes would also be generated at non-nuclear power generating facilities. Wastes generated during plant operations would be collected, stored, and shipped for suitable treatment, recycling, or disposal, in accordance with applicable Federal and state regulations. Due to the costs of handling these materials, power plant operators would be expected to conduct all activities and optimize all operations in a way that generates the smallest amount of waste practical.

9.3.2 Relationship between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

The operation of power-generating facilities would result in short-term uses of the environment, as described in Chapters 4, 5, 6, 7, and 8. “Short-term” is the period of time during which continued power generating activities would take place.

Power plant operations would necessitate short-term use of the environment and commitments of resources and would also commit certain resources (e.g., land and energy) indefinitely or permanently. Certain short-term resource commitments would be substantially greater under most energy alternatives, including license renewal, than under the no-action alternative due to the continued generation of electrical power as well as continued use of generating sites and associated infrastructure. During operations, all energy alternatives would entail similar relationships between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Air emissions from power plant operations would introduce small amounts of radiological and nonradiological constituents to the region around the plant site. Over time, these emissions would result in increased concentrations and exposure, but they are not expected to impact air quality or radiation exposure to the extent that public health and long-term productivity of the environment would be impaired.

Continued employment, expenditures, and tax revenues generated during power plant operations would directly benefit local, regional, and state economies over the short term. Local governments investing project-generated tax revenues into infrastructure and other required services could enhance economic productivity over the long term.

The management and disposal of spent nuclear fuel, low-level radioactive waste, hazardous waste, and nonhazardous waste would require an increase in energy and would consume space at treatment, storage, or disposal facilities. Regardless of the location, the use of land to meet waste disposal needs would reduce the long-term productivity of the land.

Power plant facilities would be committed to electricity production over the short term. After decommissioning these facilities and restoring the area, the land could be available for other future productive uses.

9.3.3 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitment of resources for electrical power generation would include the commitment of land, water, energy, raw materials, and other natural and manmade resources required for power plant operations. This section describes the irreversible and irretrievable commitments of resources that have been identified in this SEIS. A commitment of resources is irreversible when primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of resources neither renewable nor recoverable for future use. In general, the commitment of capital, energy, labor, and material resources would also be irreversible.

The implementation of any of the energy alternatives considered in this SEIS would entail the irreversible and irretrievable commitment of energy, water, chemicals, and—in some cases—fossil fuels. These resources would be committed during the license renewal term and over the entire life cycle of the power plant and would essentially be unrecoverable.

Energy expended would be in the form of fuel for equipment, vehicles, and power plant operations and electricity for equipment and facility operations. Electricity and fuels would be purchased from offsite commercial sources. Water would be obtained from existing water supply systems. These resources are readily available, and the amounts required are not expected to deplete available supplies or exceed available system capacities.

The irreversible and irretrievable commitment of material resources includes materials that cannot be recovered or recycled, materials that are rendered radioactive and cannot be decontaminated, and materials consumed or reduced to unrecoverable forms of waste. However, none of the resources used by these power-generating facilities is in short supply, and, for the most part, are readily available.

Various materials and chemicals, including acids and caustics, would be required to support operations activities. These materials would be derived from commercial vendors, and their consumption is not expected to affect local, regional, or national supplies.

The treatment, storage, and disposal of spent nuclear fuel, low-level radioactive waste, hazardous waste, and nonhazardous waste would require the irretrievable commitment of energy and fuel and would result in the irreversible commitment of space in disposal facilities.

9.4 Recommendation

The preliminary recommendation of the NRC staff is that the adverse environmental impacts of license renewal for Davis-Besse are not so great that preserving the option of license renewal for energy-planning decisionmakers would be unreasonable. The NRC staff based this recommendation of the following:

- the analysis and findings in the generic environmental impact statement (GEIS),
- information provided in the environmental report (ER) submitted by FENOC,
- consultation with Federal, State, and local agencies,
- a review of pertinent documents and reports, and
- consideration of public comments received during scoping.

10.0 LIST OF PREPARERS

This supplemental environmental impact statement (SEIS) was prepared by members of the Office of Nuclear Reactor Regulation (NRR) with assistance from other U.S. Nuclear Regulatory Commission (NRC) organizations and contract support from Argonne National Laboratory (ANL) and Pacific Northwest National Laboratory (PNNL).

Table 10.1-1 provides a list of NRC staff that participated in the development of the SEIS. ANL provided contract support for terrestrial, socioeconomic, aquatic ecology, cultural resources, air quality, and hydrology, presented primarily in Chapters 2, 4, and 8. PNNL provided contract support for the severe accident mitigation alternatives (SAMAs) analysis, which is presented in Chapter 5 and Appendix F.

Table 10.1-1. List of Preparers

Name	Affiliation	Function or Expertise
	NRC	
Allison Travers	NRR	Alternatives
Andrew Imboden	NRR	Branch Chief, Environmental
Andrew Stuyvenberg	NRR	Alternatives
April BeBault	NRR	Air & Meteorology Historic & Archeological Resources
Briana Balsam	NRR	Aquatic Ecology Terrestrial Ecology
David Wrona	NRR	Branch Chief
Brian Wittick	NRR	Branch Chief
Dennis Beissel	NRR	Hydrology
Emily Larson	NRR	Historic & Archeological Resources Socioeconomics
Jeff Rikhoff	NRR	Environmental Justice Land Use Socioeconomics
Kevin Folk	NRR	Hydrology
Jerry Dozier	NRR	SAMAs
John Parillo	NRR	SAMAs
Michelle Moser	NRR	Cumulative Impacts
Paula Cooper	NRR	Project Manager Hydrology
Elaine Keegan	NRR	Project Manager
Travis Tate	NRR	Branch Chief, SAMAs
William Rautzen	NRR	Human Health Radiation Protection Solid Waste

Name	Affiliation	Function or Expertise
Stephen Klementowicz	NRR	Human Health Radiation Protection Solid Waste
Lab Contractor[a]		
John Quinn	ANL	Hydrology
Konstance Wescott	ANL	Project Manager, Contract Staff Historic & Archeological Resources
Ron Kolpa	ANL	Alternatives
Youngsoo Chang	ANL	Air & Meteorology
SAMA Contractor[b]		
Steve Short	PNNL	SAMAs
G. Coles	PNNL	SAMA

[a] ANL is operated for the U.S. Department of Energy by the University of Chicago Argonne, LLC.

[b] PNNL is operated for the U.S. Department of Energy by Battelle.

11.0 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THIS SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT WERE SENT

Commenter	Affiliation (If Stated)
Environmental Impact Statement (EIS) Filing Section	U.S. Environmental Protection Agency (EPA) 1200 Pennsylvania Ave NW Washington, D.C. 20004
EIS Filing Section	U.S. EPA, Region 5 National Environmental Policy Act (NEPA) Implementation Section (Mail Code E-19J) 77 W. Jackson Blvd Chicago, IL 60604
Mr. Reid Nelson Director, Office of Federal Agency Programs	Advisory Council on Historic Preservation (ACHP) 1100 Pennsylvania Ave NW, Suite 803 Old Post Office Building Washington, D.C. 20004
John P. Froman Chief, Peoria Tribe of Indians of Oklahoma	Peoria Tribe of Indians of Oklahoma P.O. Box 1527 Miami, OK 74355
Mr. Clyde Scoles Director	Toledo-Lucas County Public Library 325 Michigan St Toledo, OH 43604
Ms.Deborah Rossman Director	Ida Rupp Public Library 310 Madison St Port Clinton, OH 43452
Mr. Edgar L. French	Delaware Nation P.O. Box 825 Anadarko, OK 73005
Mr. Harold G. Frank	Forest County Potawatomi Community Community of Wisconsin P.O. Box 340 Crandon, WI 54520
Mr. Kenneth Meshiguad	Hannahville Indian Community Council N14911 Hannahville B1 Rd Wilson, MI 49896
Mr. Floyd E. Leonard Miami Tribe of Oklahoma	P.O. Box 1326 Miami, OK 74355
Mr. Ron Sparkman Shawnee Tribe	P.O. Box 189 Miami, OK 74355
Mr. Leaford Bearskin Wyandotte Nation	P.O. Box 250 Wyandotte, OK 74370
Mr. Charles Todd Ottawa Tribe of Oklahoma	P.O. Box 110 811 Third Ave NE Miami, OK 74355

List of Agencies, Organizations, and Persons to Whom Copies of This Supplemental Environmental Impact Statement Were Sent

Commenter	Affiliation (If Stated)
Ms. Patricia Kurkul Regional Administrator	National Oceanic & Atmospheric Administration (NOAA) Fisheries Service Northeast Regional Office 55 Great Republic Dr Gloucester, MA 01930-2276
Mr. Mark Epstein Department Head, Resource Protection & Review	Ohio Historic Preservation Office 182 Velma Ave Columbus, OH 43211-2497
Mr. Brian Mitch Environmental Review Manager	Ohio Department of Natural Resources Division of Engineering Environmental Services Section 2045 Morse Rd, Building F-3 Columbus, OH 43229-6693
Mark Stahl [Current President - James M. Sass]	President of the Ottawa County Commissioners 315 Madison Street, Rm 103 Port Clinton, Ohio 43452
Jere Witt [Current Administrator - Dennis C. Jensen]	County Administrator Ottawa County 315 Madison Street Port Clinton, Ohio 43452
Fred Petersen	Director of the Emergency Management Agency Ottawa County 315 Madison Street, Rm 056 Port Clinton, Ohio 43452
Chris Galvin Director, United Way Ottawa County	chris.galvin@unitedwayottawacounty.org
Jackie VanTress	Office & Professional Employees International Union (OPEIU) Local 19 jackiev@bex.net
Kimberly Kaufman Executive Director, Black Swamp Bird Observatory	KimKaufman@bsbo.org Black Swamp Bird Observatory 13551 W. State Route 2 Oak Harbor, OH 43449
Steve Inchak	Representative Congressman Kucinich
Beth Leggett Director, American Red Cross Ottawa County	American Red Cross 1854 E. Perry St, Suite 600 Port Clinton, OH 43452 redcross@thirdplanet.net
Brad Goetz	International Brotherhood of Electrical Workers Local 1413 P.O. Box 122 Oak Harbor, OH 43449 bngoets@wcnet.org
Ann Heckerd Food Coordinator, St. Vincent DePaul Food Pantry	St. Vincent DePaul Food Pantry 1117 E. 3rd St Port Clinton, OH 43452 ajh1117@msn.com
Brian Boles Plant Manager, Davis-Besse	Bdboles@firstenergycorp.com

Commenter	Affiliation (If Stated)
Larry Tscherne International Brotherhood of Electrical Workers	larry@ibew245.com
Mike Drusbacky	Deputy Director, Ottawa County 315 Madison Street Port Clinton, Ohio 43452
Joseph DeMare Ohio Green Party	Ohio Green Party 1111 West Elm Tree Rd Rossford, OH 43460 electricity2@cs.com
Jane Ridenour President, OPEIU Local 19	OPEIU Local 19 2300 Ashland Ave, Rm 224A Toledo, OH 43620 opeiu19@sbcglobal.net
Patricia Marida Chair, Nuclear Issues Committee Sierra Club	Sierra Club 1710 Dorsetshire Rd Columbus, OH 43229 marida@wideopenwest.com 131 North High St, Suite 605 Columbus, OH 43215-3026
Matthew Heyrman	No affiliation given
Anita Rios	Ohio Green Party
Kevin Kamps	Beyond Nuclear
Al Compaan	Professor, University of Toledo
Katie Hoepfl	Student, University of Toledo
Tony Szilagye	No affiliation given
Ed McArdle	Sierra Club of Michigan
Phyllis Oster	No affiliation given
Dave Ellison	No affiliation given
Michael Keegan	mkeeganj@comcast.net Coalition for a Nuclear Free Great Lakes, Don’t Waste Michigan Monroe, Michigan 48161
Ralph Semrock	Associate Professor, Owens
Mike Leonardi	No affiliation given
Eric Britton	No affiliation given
Suzanne Patser	No affiliation given
James Whitaker	No affiliation given
Scott Robinson	No affiliation given
Simone Morgan	Sierra Club
Emily Journey	No affiliation given
Bob Patraicus	No affiliation given

List of Agencies, Organizations, and Persons to Whom Copies of This Supplemental Environmental Impact Statement Were Sent

Commenter	Affiliation (If Stated)
Kevin Malcolm	No affiliation given
Doug Todd	No affiliation given
Connie Hammond	Sierra Club
Bernadine Kent	No affiliation given
Pete Johnson	No affiliation given
Connie Gadwell-Newton	Ohio Green Party Sierra Club
Lee Blackburn	Sierra Club
Mary Knapp Field Supervisor, U.S. Fish & Wildlife Service	Fish & Wildlife Serives, Ecological Services 4625 Morse Road, Suite 104 Columbus, OH 43230
Dennis Kucinich, Member of Congress, 10th District Ohio House of Representatives	14400 Detroit Ave Lakewood, OH 44107
Marilyn & Paul Nesser	No affiliation given
Jessica Lillian Weinberg	No affiliation given
Erika Agner Sierra Club	Sierra Club
Christian George	Sierra Club
Amanda Baldino	Sierra Club
Inez George Sierra Club	Sierra Club
Leeza Perry Sierra Club	Sierra Club
Jeremy Bantz	Sierra Club
David Greene	Sierra Club
Jean Puchstein	Sierra Club
Sandy Bihn	Sierra Club
Bob Greenbaum	Sierra Club
Carol Rainey	Sierra Club
Leonard Bildstein	Sierra Club
Cate Renner	Sierra Club
Karen Hansen	Sierra Club
Natalie Schafrath	Sierra Club
Kathleen Bodnar	Sierra Club
Margaret Holfinger	Sierra Club
Ben Shapiro	Sierra Club

Commenter	Affiliation (If Stated)
Susan Jones	Sierra Club
Leslie Stansbery	Sierra Club
Stephen & Connie Caruso	Sierra Club
Robert Kyle	Sierra Club
Andy Trokan	Sierra Club
Joan DeLauro	Sierra Club
Joan Lang	Sierra Club
Jim Wagner	Sierra Club
June Douglas	Sierra Club
Tekla Lewin	Sierra Club
Tim Wagner	Sierra Club
Virginia Douglas	Sierra Club
Mary Beth Lohse	Sierra Club
George M. Williams	Sierra Club
Donna Emig	Sierra Club
Liz Loring	Sierra Club
Lance Wilson	Sierra Club
Mike Fremont	Sierra Club
Nick Mellis	Sierra Club
Paul Wojoski	Sierra Club
Linda Milligan	Sierra Club
Elisa Young	Sierra Club
Matt Trokan	Sierra Club

12.0 INDEX

APPENDIX A
COMMENTS RECEIVED ON THE ENVIRONMENTAL REVIEW

A COMMENTS RECEIVED ON THE ENVIRONMENTAL REVIEW

A.1 A.1 Comments Received During Scoping

The scoping process began on October 28, 2010, with the publication of the U.S. Nuclear Regulatory Commission's (NRC) notice of intent to conduct scoping in the *Federal Register* (75 FR 66399). As part of the scoping process, NRC held two public meetings at Camp Perry Lodging and Conference Center, Port Clinton, OH, on November 4, 2010. Approximately 40 members of the public attended the meetings. After the NRC staff presented prepared statements pertaining to the license renewal and the scoping process, the meetings were opened to the for public for their comments. Attendees provided oral statements that were recorded and transcribed by a certified court reporter. Transcripts of the entire meeting are attached at the end of this appendix. In addition to the comments received during the public meetings, comments were received through the mail and e-mail.

Each commenter was given a unique identifier so that every comment could be traced back to its author. Table A-1 identifies the individuals who provided comments applicable to the environmental review and the commenter ID associated with each person's set of comments. The individuals are listed in the order in which they spoke at the public meeting, then at the people's hearing, then at the Sierra Club meeting, and in random order for the comments received by letter or e-mail. The submitter of the two videos provided the NRC with a transcribed version of one of their meetings. In order to respond to comments, the other meeting was transcribed by the Environmental Project Manager. The video transcribed by the Project Manger remains the submitted comments. To maintain consistency with the scoping summary report, the unique identifier used in that report for each set of comments is retained in this appendix.

Specific comments were categorized and consolidated by topic. Comments with similar specific objectives were combined to capture the common essential issues raised by participants. Comments fall into one of the following general groups:

- Specific comments that address environmental issues within the purview of the NRC environmental regulations related to license renewal. These comments address the Category 1 (generic) or Category 2 (site-specific) issues identified in NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), or issues not addressed in the GEIS. The comments also address alternatives to license renewal and related Federal actions. There are also comments that do not identify new information for the NRC to analyze as part of its environmental review.

- There are comments that address issues that do not to fall within or are specifically excluded from the purview of NRC environmental regulations related to license renewal. These comments typically address issues such as the need for power, emergency preparedness, security, current operational safety issues, and safety issues related to operation during the renewal period.

Table A-1. Commenters on the Scope of the Environmental Review

Each commenter is identified along with their affiliation and how their comment was submitted.

Commenter	Affiliation (If Stated)	ID	Comment Source	ADAMS Accession Number
Mark Stahl	President of the Ottawa County Commissioners	1	Afternoon scoping meeting	ML110140231
			Evening scoping meeting	ML110140232
Jere Witt	County Administrator Ottawa County	2	Afternoon scoping meeting	ML110140231
			Evening scoping meeting	ML110140232
Fred Petersen	Director of the Emergency Management Agency Ottawa County	3	Afternoon scoping meeting	ML110140231
Chris Galvin	Director, United Way Ottawa County	4	Afternoon scoping meeting	ML110140231
			Meeting notes	ML110680510
Jackie VanTress	Office and Professional Employees International Union (OPEIU) Local 19	5	Afternoon scoping meeting	ML110140231
Kimberly Kaufman	Executive Director, Black Swamp Bird Observatory	6	Afternoon scoping meeting	ML110140231
Steve Inchak	Representative Congressman Kucinich	7	Afternoon scoping meeting	ML110140231
Beth Leggett	Director, American Red Cross Ottawa County	8	Afternoon scoping meeting	ML110140231
Brad Goetz	International Brotherhood of Electrical Workers Local 1413	9	Afternoon scoping meeting	ML110140231
Ann Heckerd	Food Coordinator, St. Vincent DePaul Food Pantry	10	Afternoon scoping meeting	ML110140231
Brian Boles	Plant Manager, Davis-Besse	11	Afternoon scoping meeting	ML110140231
			Evening scoping meeting	ML110140232
Larry Tscherne	International Brotherhood of Electrical Workers	12	Afternoon scoping meeting	ML110140231
Mike Drusbacky	Deputy Director, Ottawa County	13	Evening scoping meeting	ML110140232
Joseph DeMare	Ohio Green Party	14	Evening scoping meeting	ML110140232
			People's hearing	ML11348A017
			Meeting notes	ML110680517

Commenter	Affiliation (If Stated)	ID	Comment Source	ADAMS Accession Number
Jane Ridenour	President, OPEIU Local 19	15	Evening scoping meeting	ML110140232
			Meeting notes	ML110680512
Patricia Marida	Chair, Nuclear Issues Committee Sierra Club	16	Evening scoping meeting	ML110140232
			Sierra Club meeting	ML11348A013
			Letter	ML103370043
			Letter	ML110680515
Matthew Heyrman		17	Evening scoping meeting	ML110140232
Anita Rios	Ohio Green Party	18	People's hearing	ML11348A017
Kevin Kamps	Beyond Nuclear	19	People's hearing	ML11348A017
Al Compaan	Professor, University of Toledo	20	People's hearing	ML11348A017
Katie Hoepfl	Student, University of Toledo	21	People's hearing	ML11348A017
Tony Szilagye		22	People's hearing	ML11348A017
Ed McArdle	Sierra Club of Michigan	23	People's hearing	ML11348A017
Phyllis Oster		24	People's hearing	ML11348A017
Dave Ellison		25	People's hearing	ML11348A017
Michael Keegan	Coalition for a Nuclear Free Great Lakes Don't Waste Michigan	26	People's hearing	ML11348A017
Ralph Semrock	Associate Professor, Owens	27	People's hearing	ML11348A017
Mike Leonardi		28	People's hearing	ML11348A017
Unidentifiable Woman		29	People's hearing	ML11348A017
Eric Britton		30	People's hearing	ML11348A017
			E-mail	ML110680350
Suzanne Patser		31	Sierra Club meeting	ML11348A013
James Whitaker		32	Sierra Club meeting	ML11348A013
Scott Robinson		33	Sierra Club meeting	ML11348A013
Simone Morgan	Sierra Club	34	Sierra Club meeting	
			E-mail	ML110680350
Emily Journey		35	Sierra Club meeting	ML11348A013
Bob Patraicus		36	Sierra Club meeting	ML11348A013
Kevin Malcolm		37	Sierra Club meeting	ML11348A013
Doug Todd		38	Sierra Club meeting	ML11348A013

Commenter	Affiliation (If Stated)	ID	Comment Source	ADAMS Accession Number
Connie Hammond	Sierra Club	39	Sierra Club meeting	ML11348A013
			E-mail	ML110680350
Bernadine Kent		40	Sierra Club meeting	ML11348A013
Unknown		41	Sierra Club meeting	ML11348A013
Pete Johnson		42	Sierra Club meeting	ML11348A013
Connie Gadwell-Newton	Ohio Green Party	43	Sierra Club meeting	ML11348A013
			E-mail	ML110680350
Lee Blackburn	Sierra Club	44	E-mail	ML103430609
			E-mail	ML110680350
Mary Knapp	Field Supervisor, U.S. Fish and Wildlife Service	45	Letter	ML110060289
John P. Froman	Chief, Peoria Tribe of Indians of Oklahoma	46	Letter	ML103570365
Dennis Kucinich	Member of Congress, 10th District Ohio House of Representatives	47	Letter	ML110680518
Marilyn & Paul Nesser		48	E-mail	ML110680519
Jessica Lillian Weinberg		49	E-mail	ML110680520
Erika Agner	Sierra Club	50	E-mail	ML110680350
Christian George	Sierra Club	51	E-mail	ML110680350
Amanda Baldino	Sierra Club	52	E-mail	ML110680451
Inez George	Sierra Club	53	E-mail	ML110680530
Leeza Perry	Sierra Club	54	E-mail	ML110680350
Jeremy Bantz	Sierra Club	55	E-mail	ML110680350
David Greene	Sierra Club	56	E-mail	ML110680537
Jean Puchstein	Sierra Club	57	E-mail	ML110680350
Sandy Bihn	Sierra Club	58	E-mail	ML110680350
Bob Greenbaum	Sierra Club	59	E-mail	ML110680350
Carol Rainey	Sierra Club	60	E-mail	ML110680350
Leonard Bildstein	Sierra Club	61	E-mail	ML110680455
Cate Renner	Sierra Club	62	E-mail	ML11116A124
Karen Hansen	Sierra Club	63	E-mail	ML110680529
Natalie Schafrath	Sierra Club	64	E-mail	ML110680532
Kathleen Bodnar	Sierra Club	65	E-mail	ML110680350

Commenter	Affiliation (If Stated)	ID	Comment Source	ADAMS Accession Number
Margaret Holfinger	Sierra Club	66	E-mail	ML110680350
Ben Shapiro	Sierra Club	67	E-mail	ML110680350
Susan Jones	Sierra Club	68	E-mail	ML110680453
Leslie Stansbery	Sierra Club	69	E-mail	ML110680528
Stephen & Connie Caruso	Sierra Club	70	E-mail	ML110680525
Robert Kyle	Sierra Club	71	E-mail	ML110680350
Andy Trokan	Sierra Club	72	E-mail	ML110680350
Joan DeLauro	Sierra Club	73	E-mail	ML110680350
Joan Lang	Sierra Club	74	E-mail	ML110680452
Jim Wagner	Sierra Club	75	E-mail	ML110680350
June Douglas	Sierra Club	76	E-mail	ML110680350
Tekla Lewin	Sierra Club	77	E-mail	ML110680539
Tim Wagner	Sierra Club	78	E-mail	ML110680350
Virginia Douglas	Sierra Club	79	E-mail	ML110680350
Mary Beth Lohse	Sierra Club	80	E-mail	ML110680350
George M. Williams	Sierra Club	81	E-mail E-mail	ML110680449 ML110680454
Donna Emig	Sierra Club	82	E-mail	ML110680350
Liz Loring	Sierra Club	83	E-mail	ML110680350
Lance Wilson	Sierra Club	84	E-mail	ML110680350
Mike Fremont	Sierra Club	85	E-mail	ML110680523
Nick Mellis	Sierra Club	86	E-mail	ML110680350
Paul Wojoski	Sierra Club	87	E-mail	ML110680350
Linda Milligan	Sierra Club	88	E-mail	ML110680350
Elisa Young	Sierra Club	89	E-mail	ML110680350
Matt Trokan	Sierra Club	90	E-mail	ML110680350

In order to evaluate the comments, the NRC staff gave each comment a unique identification code that categorizes the comment by technical issue and allows each comment or set of comments to be traced back to the commenter and original source (transcript, video recording, letter, or e-mail) from which the comments were submitted.

Comments were placed into one of 17 technical issue categories, which are based on the topics that will be contained within the staff's supplemental environmental impact statement (SEIS) for Davis-Besse, as outlined by the GEIS. These technical issue categories and their abbreviation codes are presented in Table A-2.

Table A-2. Technical Issue Categories

Comments were divided into one of the 17 categories below, each of which has a unique abbreviation code.

Code	Technical Issue
AL	Alternative energy sources
AM	Air & meteorology
AQ	Aquatic resources
CI[(a)]	Cumulative impacts
CR	Cultural resources
HH	Human health
HY	Hydrology
LR	License renewal & its process
LU[(a)]	Land use
NO[(a)]	Noise
OL	Opposition to license renewal
OS	Outside of scope[(b)]
PA	Postulated accidents & SAMA
RW	Radioactive & non-radioactive waste
SE	Socioeconomics
SL	Support of license renewal
TR	Terrestrial resources

(a) No comments specific to the categories of cumulative impacts, land use, or noise were submitted during the Davis-Besse scoping period.

(b) Outside of scope are those comments that pertain to issues that are not evaluated during the environmental review of license renewal and include, but are not limited to, issues such as need for power; emergency preparedness; safety; security; terrorism; and spent nuclear fuel storage and disposal.

Comments received during scoping applicable to this environmental review are presented in this section along with the NRC response. They are presented in the order shown in Table A-3. The comments that are outside the scope of the environmental review for Davis-Besse are not included here but can be found in the scoping summary report, which can be accessed through the Agencywide Documents Access and Management System (ADAMS), Accession No. ML11168A197.

Table A-3. Comment Response Location in Order of Resource Area

Comment Category	Page
Alternative Energy Sources (AL)	7
Air & Meteorology (AM)	19
Aquatic Resources (AQ)	20
Cultural Resources (CR)	23
Human Health (HH)	23
Hydrology (HY)	29
License Renewal and its Process (LR)	32
Opposition to License Renewal (OL)	37
Postulated Accidents & SAMA (PA)	42
Radioactive & Non-Radioactive Waste (RW)	43
Socioeconomics (SE)	47
Support of License Renewal (SL)	50
Terrestrial Resources (TR)	51

A.1.1 Alternative Energy Sources (AL)

Comment: 5-2-AL; Research has shown that nuclear power is clean, is efficient and produces more energy at a lower cost than any other means of generation. So, it is important that we keep this plant in operation.

Comment: 11-1-AL; It's a priority for us as a company because Davis-Besse is a significant asset to our company. It provides a large source of safe, reliable, environmental friendly electricity to the surrounding area.

Comment: 12-3-AL; By extending the license here at Davis-Besse, it would continue to provide good clean power that's critical.

Comment: 15-3-AL, 15-7-AL; Research has shown that nuclear power is clean, it is efficient and it produces more energy at a lower cost than any other means of generation. So, it is important that we keep this plant in operation.

Response: *These comments are generally supportive of nuclear power, citing the cleanliness, efficiency and the cost of electricity. The discussion of alternatives, including license renewal, are presented in Chapter 8. No new and significant information was found as a result of these scoping comments and further evaluation was not considered in the development of the SEIS.*

Comment: 16-6-AL; In Ohio, the use of electricity has been increasing for a number of years. Now, with progressive legislation and Ohio Senate Bill 221, energy efficiency and conservation combined with the renewable sources of solar, wind and geothermal, these are providing so much additional and conserve energy to all plants and new coal plants in our state have been cancelled, and there's a strong movement to shut down the old polluting coal-fired plants.

Comment: 16-27-AL; In Ohio, the use of electricity has been decreasing for a number of years. Now with progressive legislation like Ohio's SB 221, energy efficiency and conservation, combined with the renewable sources of solar, wind, and geothermal, are providing so much additional and conserved energy that all plans for new coal plants in our state have been cancelled and there is a strong movement to shut down the old polluting coal-fired plants. The argument of US rising energy needs is irrational at best and at worst the resulting global warming would threaten our life-support system, and yes, our "way of life."

Comment: 20-1-AL; One of the things that I think is important to keep in mind is that First Energy and Davis-Besse provides about 8.3% of First Energy's baseload power generation, so that's important to recognize in terms of the alternatives. Now, in Ohio, Senate bill 221, which was passed in the spring of 2008, mandates for the investor-owned utilities that they should, achieve a higher efficiency by reducing demand by 2025 by 22%, a much larger number than the 8.3%, generation that's provided by Davis-Besse. And in addition, achieve 12 1/2% generation from renewals by 2025 and another 12 1/2% generation from so-called advanced energy, which may include new, new advanced nuclear, but continuation of Davis-Besse would not qualify for that additional gen..., for that 12 1/2%. Distributed generation will also qualify for a, a credit under the Senate bill 221. And alternative sources are very attractive for...wind, as Kevin mentioned, and also solar.

Comment: 20-7-AL; It may be done by advanced nuclear, and that's requiring NRC Generation III. Davis-Besse, I believe, is Generation II technology, but Generation III incorporates a passive safety systems. So even if the power goes out, such as when the tornado came through and disconnected the power plant from its emergency diesel generators, there would be passive safety equipment in the Gen-II, Gen-III design. And the Gen-III design would be for 60 years of operation instead of 40 years.

Comment: 22-9-AL; Here are a few suggestions. In the year 2021, Senate bill 221 will eliminate or generate as much power as Davis-Besse produces. If First Energy takes seriously the opportunities available for generating power through energy efficiency and making agreements for a better payoff for exceeding the energy efficiency targets the Senate bill 221 mandates, they can be more profitable without Davis-Besse. If they take an aggressive look at the potential of combined heat and power, wind, compressed air storage, solar, they can generate either through efficiency or through greater uses of existing resources, the needed capacity that the loss of Davis-Besse will create. There are solution for generating capacity. For every one cent invested in elec...in energy efficiency, three cents profit is gained. the solutions and incentives...alternative to the continuation of nuclear power to the elimination of nuclear power are already out there.

Response: *The comments are in general support of alternative energy production sources and reference The Ohio Senate Bill 221 as legislative support for renewable energy sources. The comments also represent a general opposition to nuclear energy.*

The Ohio Senate Bill (Am. Sub. S. B. No. 221) passed through the Ohio House of Representatives on Tuesday, April 22, 2008, and it passed through the Ohio Senate on Wednesday April 23, 2008, the effective date of the bill was July 31, 2008.

The bill focuses on energy pricing and sources. The pricing of electricity is outside the scope of the environmental review and is not discussed further in the SEIS. According to the bill analysis published by the Ohio Legislative Service Commission, the primary points of the bill, as it relates to energy sources, are as follows:

- *requires an electric distribution utility and an electric services company to provide a portion of their electricity supplies from alternative energy resources*
- *defines alternative energy resources as consisting of specified advanced energy resources and renewable energy resources with a placed-in-service date of January 1, 1998, or later, and as consisting of existing or new mercantile customer-sited resources*
- *specifies that the requisite portion of the electric supply derived from alternative energy sources must equal 25 percent of the total number of kilowatt hours of electricity sold by the utility or company to any and all retail electric consumers whose electric load centers are served by the utility and are located within the utility's certified territory or, in the case of an electric services company, are served by the company and are located within Ohio*
- *provides that half of the alternative energy can be generated from advanced energy resources, but at least half must be generated from renewable energy resources, including 0.5 percent from solar energy resources, subject to yearly, minimum, renewable and solar benchmarks that increase as a percentage of electric supply through 2024*
- *authorizes the Public Utilities Commission of Ohio (PUCO) to enforce the renewable energy and solar energy resource benchmarks through the assessment of compliance payments*
- *prescribes energy savings and peak demand reduction requirements for electric distribution utilities through 2025, sets yearly benchmarks, and authorizes PUCO enforcement of compliance through the assessment of forfeitures*
- *authorizes the PUCO to approve a revenue decoupling mechanism for an electric distribution utility if it reasonably aligns the interests of the utility and of its customers in favor of energy efficiency or energy conservation programs*
- *requires the PUCO, to the extent permitted by Federal law, to adopt rules establishing greenhouse gas (GHG) emissions reporting and carbon dioxide control planning requirements for each electric generating facility located in Ohio that is owned or operated by a public utility that is subject to PUCO jurisdiction and that emits GHGs, including facilities in operation on the act's effective date*

The NRC staff is aware of Senate Bill 221 and incorporated information about the legislation into its own alternatives analysis. State regulatory agencies and FirstEnergy Nuclear Operating Company (FENOC) will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the State's jurisdiction or the purview of the owners. Alternatives are discussed in Chapter 8, "Alternatives," of this SEIS; they include conservation (demand-side management) and renewable energy sources such as wind and solar energy.

Comment: 16-8-AL; There is good reason why there are no nuclear power plants coming on line to replace the old ones. Wall Street will not support them. The normal up-front cost and a 12- to 20-year length of time for completion makes it financially uncompetitive with wind and solar. On the latter, decentralize, meaning that jobs are being created all over the state. As compared to Davis Besse's extended shut-downs, if the wind stops blowing or the sun is behind a cloud, somewhere, it is likely not too serious or a long-term power shortage problem.

Comment: 16-20-AL; We are closing down Coal plants now because Ohio is actually using less electricity than they used to. We've got efficiency we've got solar we have wind we have geothermal we have all kinds of sustainable ways.

Comment: 19-11-AL; And, there was another, license extension, that I wanted to mention, that's being challenged. I brought some things to look at over here, some old posters from Seabrook New Hampshire, in the mid-1970s. you know, fifteen hundred people got arrested on a single day in 1977 trying to block the construction of Seabrook. Well, Seabrook has gone for a 20-year license extension and they've gone for it 20 years early, incredibly. They're only 20 years old. They have 20 more years on their license, and they've asked for a 20-year license extension. So Paul Gunter, my coworker, has challenged this 20-year early application, and his main challenge is the wind power potential off the gulf of Maine, which is tremendous. So showing that wind power is a great alternative. And, I'll just close now, by saying that the wind power potential of the Great Lakes is there. That will be one of our contentions against Davis-Besse for 20 more years. And add to that solar potential, with the biggest solar panel manufacturing factory in the country right here in Toledo. Add to that the efficiency potential, and there's no need for 20 more years of radioactive Russian roulette on the Lake Erie shoreline. Thank you Very much.

Comment: 20-6-AL; But we, should also know that there are some very good alternatives for, generating electricity, and one of those normally not thought about as generation, but it's energy conservation. And that is now widely accepted as the cheapest way to get more effectively, to get more energy, it's to use our energy more, more wisely. And then there's a very strong wind resources and solar resources. So, the important thing that, we need to recognize is that, is that these components, energy conservation, wind and solar, are already mandated by Senate bill 221 in the state of Ohio. And, windmills are, used by the, the publicly-owned, utilities, they are allowed by Ohio law to pass through, to pass those costs on to the customers, so, on to the consumers of the electricity. That, that might not have been my favorite way of doing it, but that's the way, the legislators have decided in the Public Utility Commission of Ohio.

Comment: 20-9-AL; So, let's take a little bit closer look at the resources that are available for wind. Lake Erie and the Lake Erie shore, as well as all of the Great Lakes, are great resources for, for wind energy. So, I, I'm showing here this, wind energy map. This is for the average wind power across the United States. And it may be hard to see from there, but, we hear a lot about the, the wind corridor in the Great Midwest, from Texas through to North Dakota. That's this, region of the Great Plains. But now, the wind, resources in...increase, the average wind power increases as you go from white, actually the key is down here, from white to the light blue to the darker blue and still darker, and you can see that, Ohio, for the most part, has a lot of wind resources that are similar to Texas. We hear about Texas because it has the most wind power of any of the any of the states. And Ohio has similar resources. But if you look at, in Lake Erie and on the near shore and, up to the border with Canada, you can see it's a very dark blue, and that's similar to some of these mountain passes here. So wind, resource availability in Lake Erie is really, really prime. much higher than almost any of the places in, in Texas, for example. So that's an indication that there really are tremendous resources out there and wind power is very competitive in terms of, rates for electricity generated by wind power. The big, let me just back up...One of the big issues with Texas, which is now struggling with getting the power, of course they have some major cities, but they can generate more than what can be used in their cities, is how you are going to get the power out to the big metropolitan areas like Chicago and Cleveland and Toledo and so on, and Detroit. That is not a problem when you generate the power in Lake Erie, we have a lot of major metropolitan areas that are very nearby.

Comment: 20-10-AL; For solar, Ohio has, actually very good solar isolation as well. and I want to point out that in this, in this Environmental Report, that's part of the First Energy petition for the renewal, there are some errors in that, in that report. For example, they, they say that the amount of sunlight in Ohio is less than half of what it is in some of the best areas in the country. that's a bit of a, an error and I'll point out why in just a moment. And then, they also used some data for the costs, which came from back in 1988, and the costs for solar photo-voltaic electricity has come down dramatically since 1988. One of the mistakes that is commonly, made when you think about solar, is you think about being able to see a sun, the sun in a clear day. And you think, you think, that, well, it's only on those clear days that photo-voltaics will generate usable power. And this is the kind of map that you would use if you were really worried only about direct sunlight, being able to have a clear sky, and being able to see a clear sun out there. And then when you take and you compare Toledo or, or Lake Erie with some areas in the Southwest, and I did the numbers here. actually, for the...for the South. when you compare Toledo with Orlando, even when you consider only direct sunshine, Toledo gets 75% of what Orlando does, down here in Florida. But it's not as good as San Diego, it's almost 60% of San Diego, >>>. and if you go out to the Mojave Desert, Toledo gets about 45%. So that's a number that's consistent with what, First Energy claimed in that report. However, the real data that you need to look at are the, us, the full sky radiation. The point of...Most solar panels are flat panels and they will accept light which is indirect, that is, as it comes scattered in hazy days or light cloudy days and light is scattered from those clouds and still make it to those panels. And so this is the appropriate math that needs to be looked for, the amount of electricity that can be produced by solar panels over the years. So, in that case, if you compared Toledo with Orlando, or Toledo with San Diego, Toledo gets 86% of what, Orlando gets, 79% of what Sand Diego gets. So the argument that the solar resources in Ohio, in Northern Ohio, are not very good, and actually you can see that the best resources here are Western Ohio and in certain...that's an argument that doesn't, work when you address solar. And that last point that I'd like to make about solar is that there are huge changes that have been happening in the last several years in terms of the costs of solar panels. And the cost driver on this is actually FirstEnergy, First Solar, sorry, First Solar, which is, started here in Toledo, by Toledo industrialists such as Harold, Harold McMaster, and our only US generating, US manufacturing facility is in Perrysburg.

Comment: 20-12-AL; Energy conservation, retro-fitting of homes and businesses and so with the more energy-efficient lights, and motors, and thermal efficiency saves, saves, save energy for everyone. It reduces the need for, generating capacity. Ohio has a lot of manufactures that supply components for wind turbines. The maintenance of wind turbines generates many jobs. I've already mentioned, First Solar is the largest manufacturer in the world. So manufacturing creates jobs. And there are several other PV manufacturers that are beginning, in Ohio, most of them actually in northwest Ohio, in the Toledo area. PV design and insulation creates a num...a large set of jobs.

Comment: 21-2-AL; So what I have done is done some statistical modeling using systems that are already in place here in northwest Ohio. I used one of the wind turbines in Bowling Green, owned by Bowling Green municipalities, and a solar array mounted on the home of Professor Compaan. This model is a little bit confusing. What it is here is on the X axis we have the volatility or the intermittency of the system that FirstEnergy mentioned. So what that means is that at some points throughout the day it can be high, it can be low. It's unexpected, the power production that would be produced. On here [indicating the Y axis] it's the actual output of the system. So along our curve here we have an entire wind, only wind system, and at the other end we have only solar. And, along the middle is a combination of the two. what I'm going to show you today is that it's not a matter of using one or the other. The combination of these different forms of renewable energy that's really going to help us offset the loss of nuclear power by closing Davis-Besse. So over here on the end of the curve is where we have the least volatility in the system. For this specific northwest Ohio that turned out to be about half wind and half solar that's going to produce the best outcome for us. Just an example here of what I mean by this. So in a 100% wind system has a volatility something like this. This is the power production over the course of the week by the Bowling Green wind turbine. you can see it's pretty unexpected what it's going to produce throughout the day. And on the opposite end, a 100% solar system, follows a pattern, you only get power production during the day, but even throughout the day you not sure if you're going to get a sunny day, cloudy day things like that re unexpected...So, by optimizing the system, using similar rating, say one megawatt wind turbine farm and one megawatt solar array, you get something that's quite a bit more predictable. Now put this here against a demand curve. This is from EBCOT it's in Texas, but the demand curve for any big city is gonna look about the same. A lot of high peaks during the afternoon, evening hours and lower at night time when we're sleeping. It's quite a bit more predictable, it follows the demand curve. What I want to point out here, though is that my graph is still quite a bit volatile here, but it's only taking into consideration two specific sites. We only have one wind turbine and one solar array. But, if FirstEnergy were to take their resources and erect, um sorry, use the wind and solar throughout their entire area that they service. Solar, it's not going to be cloudy in all the areas that they service. That's exactly what the (Go to my summary slide, here) European Wind Energy Association in their annual report in 2009. They said exactly that. That as wind and solar is developed across the entire area, the volatility in one specific area does not infect the overall baseload that it's generating. That's another thing I'd like to point out in FirstEnergy's application for Renewal, they kept mentioning that solar and wind are not a good replacement because they can't satisfy a baseload. But, as Dr. Compaan mentioned in his speech, Davis-Besse only produces 8.3% of FirstEnergy's baseload. So, we're not trying to make these curves fit identical. It just has to back up the coal and everything else that's already being produced. So we're using a combination of wind, solar and all the other technologies that are out there. They'll be able to easily offset the production lost by Davis-Besse.

Comment: 23-4-AL; The second article I refer is the November, 2009 cover story in *Scientific American*. I bought this issue and bring it with me to almost everything I go to. This article is entitled "A Plan for Sustainable Future. How to Get All Energy from Wind, Solar and Water by 2030 using Present Technology." The article by Mark Z. Jacobsen of Stanford University and Mark A. Delucchi of University of California, Davis it is describe by the editors of *Scientific American* as a "pragmatic hard headed study." Supply 100% clean energy by 2030 at the same or lower cost of traditional fossil and nuclear resources. Frankly, I'm amazed by this article. This is something, I think, we've been waiting for, and something we should push.

Comment: 25-4-AL; We should come up with energy conservation and efficiency measures that replace that 8.3%. Forget creating any alternative fuels or advanced nuclear. Just energy in energy conservation efficiency alone, we make up for this. The system that requires that we maintain the amount of consumption that we currently have as part of the licensure relicensure application is absurd because so much of the future depends on our reduction of and our conservation and our efficient use of energy. It's absurd to perpetuate the existing system.

Comment: 31-3-AL; There are so many other clean ways to provide energy. Wind Solar geothermal there is no reason to bring a nuclear plant online. There would have to be some other agenda involved we hope that is not military agenda. But we know that we don't the electricity from that plant in this state.

Comment: 35-2-AL; I believe we should be going in different directions when it comes to supplying energy to our communities. Direction that is not destructive that can provide new green jobs. Thank you.

Comment: 36-2-AL; It is located there on the great lakes, the largest clean water source in the world and it seems extremely dangerous and unnecessary

Comment: 39-3-AL; We need to invest our money into green technologies that would create job and also help our economy which is leaving the toxic legacy for our children as well as these nuclear power plants.

Comment: 41-1-AL; I wish to join the wave of the future. Which is alternative energy sources. Fossil fuels and nuclear energy are part of the past.

Comment: **30-4-AL, 34-6-AL, 39-9-AL, 43-7-AL, 44-5-AL, 50-4-AL, 51-4-AL, 53-4-AL, 54-4-AL, 57-4-AL, 58-4-AL, 59-4-AL, 60-4-AL, 62-4-AL, 65-4-AL, 66-4-AL, 67-4-AL, 69-4-AL, 70-4-AL, 71-A-AL, 72-4-AL, 73-4-AL, 74-4-AL, 75-4-AL, 76-4-AL, 77-4-AL, 78-4-AL, 79-4-AL, 80-4-AL, 81-4-AL, 81-9-AL, 82-4-AL, 83-4-AL, 84-4-AL, 85-4-AL, 86-4-AL, 87-4-AL, 88-4-AL, 89-4-AL, 90-4-AL**; I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones.

Comment: 55-4-AL; I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of potentially everyone that lives in the entire Midwest. The risk is unacceptable.

Comment: 52-4-AL; I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. This concerns me much.

Comment: 68-4-AL; I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. So Please stop the relicense of this very dangerous power plant it is not worth risking the lives of millions of people for energy when there are safer and cheaper options out there.

Comment: 61-4-AL; I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. This plant has the worst safety record in the U.S.A. and should be closed! You have no right to continue operating this unsafe plant. We have two coal plants in the area that produce more than enough electricity for this area and are safe!

Comment: 63-4-AL; There have been too many near-disasters at this plant. This, because of its proximity to the Great lakes, is unconscionable! To continue to put resources into this risky plant and to continue to endure the toxic side effects is insane! We should be putting all our energy investments into clean, safe, green alternatives, and that does NOT include nuclear power!

Comment: 64-4-AL; It's high time we step up our efforts to help protect the future generations by doing what we can to ensure a safe environment for species diversity. We cannot live in this world without being connected to the web of life that exists in every ecosystem. The nuclear waste generated from this plant would not only effect ourselves, and our children, but every species that struggles to survive as well. As someone who is SUPPOSE to represent the demands on their constituents I hope it is clear to you that Ohioans DON'T AGREE with this form of energy!

Comment: 56-4-AL; The Davis-Besse power plant must stop generating electricity and the Nuclear Regulatory Commission must end the operating license for the plant. In 2002, the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. Nuclear power has too many problems from waste to extreme expense to oversight. This is not an environmentally sound solution. I support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming.

Comment: 85-4-AL; I do not want Davis Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis Besse compromises my safety and the safety of my loved ones. In the early 80s Cincinnati's Zimmer Nuclear Plant was adjudged, according to the Wall Street Journal, to be the worst-built nuke plant in the U.S., for a number of reasons, one being that much of the crucial reactor steel was bought from a local scrap dealer. It could have ruined the Ohio River downstream from Cincinnati all the way to New Orleans. Davis-Besse could wreck Lake Erie and quite a land area around Toledo. Save us from that! We can do it cheaper, safer and cleaner with windmills in the lake.

Response: *These comments relate to the use of renewal sources of energy as an alternative to nuclear power. The NRC staff evaluated reasonable alternatives in Chapter 8, "Alternatives." In this chapter, the staff examines the potential environmental impacts of alternatives to license renewal for Davis-Besse, as well as alternatives that may reduce or avoid adverse environmental impacts from license renewal and when and where these alternatives are applicable.*

In evaluating alternatives to license renewal, the NRC staff first selected energy technologies or options currently in commercial operation, as well as some technologies not currently in commercial operation but likely to be commercially available by the time the current Davis-Besse operating license expires in 2017. Second, the NRC staff screened the alternatives to remove those that cannot meet future system needs. Then, the NRC staff screened the remaining options to remove those whose costs or benefits do not justify inclusion in the range of reasonable alternatives. The remaining alternatives, constituted comprise the alternatives to the proposed action that the NRC staff evaluated in-depth in this Chapter 8 of the

SEIS. The NRC staff considered 17 energy technology options and alternatives to the proposed action and then narrowed to the three alternatives considered.

The alternatives evaluated in-depth include the following:

- *natural-gas-fired combined-cycle (NGCC);*
- *combination alternative (wind, solar, NGCC, and compressed air energy storage); and*
- *coal-fired power.*

Other alternatives considered, but not evaluated further, are listed below:

- *wind power,*
- *wind power with compressed air energy storage,*
- *solar power,*
- *solar power with compressed air energy storage,*
- *wood waste,*
- *conventional hydroelectric power,*
- *ocean wave and current energy,*
- *geothermal power,*
- *municipal solid waste (MSW),*
- *biofuels,*
- *oil-fired power,*
- *fuel cells,*
- *energy conservation and energy efficiency, and*
- *purchased power.*

The NRC staff's alternatives analysis also involved consideration of combinations of alternatives including renewable technologies and conventional baseload technologies, as well as options not involving new generation capacity such as purchased power and conservation measures.

Comment: 20-11-AL; They've been, leading the cost reductions. So if you look here, this is a study that was done by Deutsch Bank and updated in 2009. It doesn't go back, to 1998, which is when, when First Energy pulled their numbers, but, you can, you can extrapolate back further if you want. There, it was something on the order of 40 cents/kilowatt-hour for the levelized cost of electricity, as it's called. but in 2010, the cost is about 20 centers/kilowatt-hour for cadmium telluride. This is, this is the type of material in the panels that are made by First Solar. Some of the other kinds of solar panels are shown here, a little bit higher in cost. But what Deutsch Bank projected is that there's going to be a crossover, a convergence between the cost of solar-generated electricity, as you go out here to, what is the number, it's like 2017 or so, so, 2017, at about the time when, when FirstEnergy wants to extend the license on the plant, solar is going to be, completely competitive, if not lower cost than, the electricity, than the conventional electricity. Notice that Deutsch Bank is using an average over the United States. Now the cost of electricity in the FirstEnergy territory is actually higher, those of you who live in FirstEnergy territory, your home costs, your home electricity costs are something like 12 or 12 1/2 cents/kilowatt-hour, so the curve for us should really start a little bit higher, and that convergence will happen even sooner. So First Energy has the option of extending, a nuclear generating plant with all of its associated dangers and also its costs. The cost of nuclear generated power is high, higher than most of the baseload, generating capacity of FirstEnergy. And its costs is continuing to increase. The alternative is to jump on some of the new technology, jump on those bandwagons, and those costs are decreasing. So that's the kind of options that FirstEnergy has, and you'd think that if they really look at it seriously and look at the options that they ought to conclude, that some of these alternative forms of electricity are the ones that ought to be, the ones, that are developed for the long-term future of their, of their company. So, just to make one final point, and that is alternative, alternative energy resources generate lots of jobs. They actually generate, many more jobs than what nuclear power does.

Comment: 16-28-AL; There is good reason why there are no new nuclear power plants coming online to replace the old ones. Wall Street will not support them. The enormous up-front costs and 12-20 year length of time for completion makes them financially uncompetitive with wind and solar. And the latter are decentralized, meaning that jobs are being created all over the state. As compared to Davis Besse's extended shutdowns, if the wind stops blowing or the sun is behind a cloud somewhere, there is likely not to be a serious or long-term power shortage problem.

Response: *These comments oppose nuclear power based on the costs associated with construction and operation when compared to other alternative sources of power. The regulatory authority over licensee economics falls within the jurisdiction of the states and, to some extent, the Federal Energy Regulatory Commission (FERC). The proposed rule for license renewal included a cost-benefit analysis and consideration of licensee economics as part of the National Environmental Policy Act (NEPA) review. However, during the comment period, state, Federal, and licensee representatives expressed concern about the use of economic costs and cost-benefit balancing in the proposed rule and the GEIS. They noted that the President's Council on Environmental Quality (CEQ) regulations interpret NEPA to require only an assessment of the cumulative effects of a proposed Federal action on the natural and man-made environment, and the determination of the need for generating capacity has always been the states' responsibility.*

For this reason, the purpose and need for the proposed action (i.e., license renewal) is defined in the GEIS as follows:

> *The purpose and need for the proposed action (renewal of an operating license) is to provide an option that allows for power generation capability beyond the term of a current nuclear power plant operating license to meet future system generating needs, as such needs may be determined by state, licensee, and, where authorized, Federal (other than NRC) decisionmakers.*

Title 10 of the Code of Federal Regulations*, Section 51.95(c)(2) (10 CFR 51.95(c)(2)) states the following:*

> *The supplemental environmental impact statement for license renewal is not required to include discussion of need for power or the economic costs and economic benefits of the proposed action except insofar as such benefits and costs are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation.*

The NRC staff identified feasible technologies in the GEIS, and the staff will use information in the GEIS, updating it as necessary to reflect recent technological advancements, as the basis for its alternative analysis. Since 1996, many energy technologies have evolved significantly in capability and cost, while regulatory structures have changed to either promote or impede development of particular alternatives, of this SEIS.

As a result, the analyses include updated information from the following sources:

- *Energy Information Administration (EIA),*
- *other offices within the Department of Energy (DOE),*
- *U.S. Environmental Protection Agency (EPA),*
- *industry sources and publications, and*
- *information submitted by the applicant in the FENOC Environmental Report (ER).*

The result of this analysis provided for three in-depth alternatives—Natural-gas-fired combined-cycle (NGCC), combination alternative (wind, solar, NGCC, and compressed air energy storage), coal-fired power. The details of this analysis can be viewed in Chapter 8, "Alternatives."

Comment: 21-1-AL; Hello everybody, my name is Katie Hopeful, student of Professor Compaan's at the University of Toledo. I'm a major in physics. My research is in this renewable energy area. So, what I'm going to be talking about today is alternatives to nuclear power. In FirstEnergy's license renewal application, they dismissed the possibility of almost any form of renewable energy to replace the power production that would be lost by the closing of Davis-Besse.

Response: *This comment questions FENOC's evaluation of alternatives to relicensing Davis-Besse contained in the ER. The requirements associated with the analysis of alternatives for FENOC's ER are based on NRC regulations.*

Section 51.43(c) of 10 CFR states the following: "Analysis. The Environmental Report must include an analysis that considers and balances the environmental effects of the proposed action, the environmental impacts of alternatives to the proposed action, and alternatives available for reducing or avoiding adverse environmental effects…"

The acceptance review determines whether the application contains sufficient information to allow the NRC staff to proceed with the environmental review. On October 18, 2010, the NRC staff determined that the application was complete and acceptable for docketing, in accordance with 10 CFR 51.43. The acceptance of the application shows that the applicant met the regulatory requirements, but it does not reflect the opinion of the NRC in the selection of alternatives. The NRC conducts an independent review of alternatives, selected based on the technical experience of the agency, in accordance with NEPA. This review is documented in Chapter 8 of this SEIS. In contrast to the Davis-Besse ER, Chapter 8 reflects analysis in depth of a combination alternative that includes renewable energies.

Comment: 21-3-AL; the only other thing that I was wanting to mention is the jobs that are going to be created. As he had already mentioned, the maintenance of the wind turbines; the installation of the protects; and also the forecasting that can be done. This was also mentioned in the European Wind Energy Association's annual report. The new technologies. They are able to forecast four hours ahead exactly what the wind speeds are going to be. So that they can predict if they need to have boost up the coal or other forms of production. It makes it really a lot more stable. So, this argument of volatility doesn't quite hold.

Response: *This comment relates to the benefit of creating jobs by supporting alternative energy sources. The NRC regulations at 10 CFR 51.71(d) require that a SEIS consider the environmental, economic, and technical impacts, and other benefits and costs of the proposed action and alternatives.*

The evaluation of each alternative considers the environmental impacts across seven impact categories: (1) air quality, (2) groundwater use and quality, (3) surface water use and quality, (4) ecology, (5) human health, (6) socioeconomics, and (7) waste management.

Socioeconomic impacts are defined in terms of changes to the demographic and economic characteristics and social conditions of a region. For example, the number of jobs created by the construction and operation of an alternative could affect regional employment, income, and expenditures. The NRC acknowledges that job creation would result from alternatives. Two types of job creation would likely result— construction-related jobs (transient, short in duration, and less likely to have a long-term socioeconomic impact) and operation-related jobs in support of operations (greater potential for permanent, long-term socioeconomic impacts). Workforce requirements for the construction and operation of each in-depth alternative were evaluated in order to measure their possible effects on current socioeconomic conditions. The results of each analysis are documented in Chapter 8, "Alternatives."

Comment: 23-2-AL; I would first like to quote excerpts from an article in *The Nation* magazine dated February 15, 2010, "The Case for Grade Power." This is generally referred to as using waste heat or cogeneration from large facilities of which Ohio has plenty. The article uses Ohio as an example for this opportunity. The article states that according to an analysis by Recycled Energy Development, the Libbey Glass Plant in Toledo, the Arselor (unintelligible) Middle School in Cleveland and the (unintelligible) Chemical Plant in Cincinnati together produces enough waste heat to produce between 145 and 185 megawatts of additional electricity. The study also indicates that Ohio has enough cogeneration potential to retire up to 8 nuclear power plants. According to Oak Ridge National Laboratory this strategy will cost less than half of a coal plant.

Comment: 23-3-AL; A recent report by Policy Matters of Ohio estimates that recycling 7.7 GigaWatts would require a $10.5 billion investment with a three year payback. This would have the further effect of making Ohio industries more competitive, more profit, saving both jobs and the environment.

Response: *These comments request the NRC staff to consider cogeneration and energy recycling as alternatives to license renewal. Cogeneration, also known as combined heat and power (CHP) is the simultaneous production of both heat and power. Davis-Besse produces electricity but dispels the waste heat through the cooling water system, as described in Chapter 2. In cogeneration plants, the waste heat (typically in the form of steam) is captured for other uses such as industrial process requiring steam or district heating or both. District heating systems that transfer waste heat, in the form of steam, for residential and commercial heating, are currently in operation in cities such as New York, NY, Detroit, MI, and Boston, MA. Currently no district heating systems in the U.S. are supplied with nuclear reactors as the steam source; however, countries such as Russia, the Czech Republic, Slovakia, Hungary, Bulgaria, and Switzerland have nuclear powered district heating from cogeneration plants.*

The NRC recognizes that cogeneration plants have the potential to offset power demand. In July 2008, the Ohio legislature passed Senate Bill 221, which established an energy-efficiency resource standard that requires electric utilities to implement an Energy-Efficiency and Peak Demand Reduction Program that will yield a cumulative electricity savings of 22 percent by the end of 2025, with specific annual benchmarks. Cogeneration can be retrofitted to existing power plants, and represents an option that states and utilities may use to reduce their need for power generation capability. The need for power may be determined by state, licensee, and, where authorized, Federal (other than NRC) decisionmakers. If the renewed license is issued, *state regulatory agencies and FENOC will ultimately decide whether the plant will continue to operate based on factors such as the need for power or other matters within the state's jurisdiction or the purview of the owners.*

The NRC did not consider cogeneration specifically as an alternative but did evaluate energy efficiency and conservation. Further information can be found in Chapter 8, "Alternatives."

A.1.2 Air & Meteorology (AM)

Comment: 16-5-AM; Added together, the disposal to support the industry's nuclear power also comes with a heavy carbon price, which means that nuclear power will not address the pollution, global warming.

Comment: 16-7-AM; The argument of rising energy is irrational at best, and at worst, the resulting global warming would threaten our life support system and, yes, our way of life.

Comment: 16-26-AM; Enormous amounts of energy go into this process. Added together along with disposal, these supporting industries cause nuclear power to also come with a heavy carbon price, which means that nuclear power will not address but will worsen global warming.

Comment: 23-6-AM; It is not carbon free as claimed, and not sustainable.

Comment: 39-2-AM; The process of production of nuclear energy from mining through disposal of waste is very carbon intensive and would contribute heavily to global warming.

Response: *These comments represent concerns about greenhouse gases (GHGs), not specifically for the operation of the nuclear power plant but generally from impacts from the entire nuclear fuel cycle. A large number of technical studies, including calculations and estimates of the amount of GHGs emitted by nuclear and other power generation options, are available in literature. These studies, however, are inconsistent in their application of full lifecycle analyses, including plant construction, decommissioning, and resource extraction (uranium ore, fossil fuel). Almost every existing study has been critiqued, and its assumptions challenged by later authors. Therefore, no single study has been selected to represent definitive results in this SEIS. Instead, the results from a variety of the studies are presented in SEIS Tables 6.2-1, 6.2-2, and 6.2-3 to provide a weight-of-evidence argument comparing the relative GHG emissions resulting from the proposed Davis-Besse relicensing compared to the potential alternative use of coal-fired plants, natural gas-fired plants, and renewable energy sources. The NRC staff provides a more detailed discussion on GHGs in Chapter 6, where comparisons of GHG emissions are presented from a variety of energy generation technologies. The NRC staff's analysis of alternatives in Chapter 8 also addresses relative levels of GHG emissions for alternatives.*

Comment: 14-21-AM; Transformer fires cause unique pollutions such as dioxin. Since the cause of the 2009 Davis-Besse transformer fire has not been determined, the possibility of another fire must be considered. The EIS must include the impact of missions created by transformer fires.

Response: *This comment expresses concerns regarding the air pollution created by a transformer fire and the potential release of toxins as a result of postulated future failures of the transformer. A polychlorinated biphenyls (PCB) transformer is a transformer that contains PCBs at concentrations greater than 500 parts per million (ppm). From 1929 through 1979, these transformers were installed in apartments, residential and commercial buildings, industrial* *facilities, campuses, and shopping centers. PCBs are used in electrical transformers because of their useful quality as being a fire retardant.*

The EPA regulates the use, storage and disposal of PCB transformers in accordance with the Toxic Substances Control Act (15 USC 2605) promulgated under 40 CFR Part 761. PCB-contaminated transformers containing between 50 and 499 ppm PCBs are also subject to EPA's regulations. Davis-Besse, at the time of construction, had PCB transformers; however, in 1992, FENOC completed a program to eliminate PCB transformers onsite. Information relating to the transformer fire and air emissions can be found in Chapter 2 of this SEIS. Further information on the regulation of PCB transformers can be found at http://www.epa.gov/epawaste/hazard/tsd/pcbs/index.htm.

A.1.3 Aquatic Resources (AQ)

Comment: 14-3-AQ; Another is the possible effect on the seven-billion-dollar fishery in Lake Erie. Specifically, I think you should look at how the wastewater and how the temperature effluent from this plant would affect and possibly affect indicia species such is the Asian carp. In other words, does the operation of Davis-Besse make it more or less likely that indicia species could come in here and ruin our fishing.

Comment: 22-2-AQ; We need to protect our water resources first from the effects of nuclear forms of pollution. Lake Erie provides drinking water and other consumptive uses to millions of people and many different industries in northern Ohio. We rely on Lake Erie for recreation, and we are entrusted to care for and protect the Lake for future generations as well. They have as much a right to the use and enjoyment of Lake Erie as our present generation, even if the comments do not agree. Davis-Besse is one of the greatest threats to the health of our Lake. Davis-Besse was strategically located on Lake Erie to meet the tremendous needs of Davis-Besse for water as a coolant. This is great for Davis-Besse but not so good for the Lake. Davis-Besse uses water from the Lake and spews it back as thermal pollution. Over the years, this has had consequences for Lake Erie. We have once again had increasing algae problems for Lake Erie. the growth of *lyngbya wollei*, a toxic algae, has accelerated over the past few years along with *microcystis*. These toxic algae have numerous conditions which contribute to their growth. One, of course, is the presence of ample amount of phosphorous and nitrogen. Another ingredient is an abundance of warm water. We have billions of gallons of thermal pollution from the power plants surrounding Lake Erie.

Comment: 22-3-AQ; studies on water use, fish kills, and the thermal impacts at the bay shore park land are over 30 years old. The intake for Davis-Besse is in less than 30 feet of water in the Great Lakes…should have been…in the Great Lakes, in Lake Erie's shallowest most biologically productive waters. Davis-Besse uses an estimated 50 million gallons of water a day which causes fish kills and thermal impacts. While cooling towers at Davis-Besse limit water use and fish kills with the best available technology, there should be an assessment of water use and fish kills. This request is made as the number of walleye are declining from an ODNRS estimate of 80 million about 5 years ago to less than 20 million in 2010.

Comment: 22-5-AQ; If Davis-Besse were to close on schedule, there would be fewer fish killed and no more warm water discharge. The estimated number of fish that would not be killed is unknown because there are no counts of fish impingement, that is, fish caught against screens, and entrainments, fish that go through screens. In assessing whether Davis-Besse should remain open or closed, an updated, independent analysis of the Davis-Besse water impacts, to fish impingement and entrainment and thermal impacts using Clean Water Act 316 A and B protocol needs to be conducted. If the incremental increase in fish kills and added temperature to the water in aiding algae growth and in decreasing walleye numbers, the environmental and economic impact of the fish kills and algae growth should be considered in the requested re-licensing of Davis-Besse. Furthermore, should the licensing go forward, the license needs to require periodic impingement and entrainment fish counts and thermal mixing zone plume impacts on algae growth and water quality.

Comment: 26-9-AQ; In addition, a scoping comment I have is the thermal pollution coming off the nuclear power plant. It's about a thousand nine hundred, about nine hundred megawatt facility. That's close to three thousand megawatts of thermal heat coming off of that. And, as we've seen, Lake Erie is beyond the tipping point when it comes to algal blooms. We are beyond that point. We have several facilities in the western basin of Lake Erie; several coal plants, and several nuke plants and the Lake cannot take the load. So I am requesting that the algal blooms that are occurring on Lake Erie, the *lyngbya wollei*, which is a toxic algae - - it's leading to the eutrophication of Lake Erie, the death of Lake Erie, I am requesting that this concept of algal blooms be investigated, and thermal pollution from the nuclear power plant be considered.

Comment: 16-17-AQ; We are also concerned about fish and Lake Erie and the heat coming out of the plant.

Comment: 19-10-AQ; So, just to conclude, I'd like to leave you all with some hope that now license extensions are being seriously challenged, almost the minute that they're brought up. Another one to mention is Indian Point, New York, River Keeper, Hudson River Keeper headed by Bobby Kennedy Junior, has seriously challenged the Indian Point license extension. The State of New York has joined that proceeding. The Attorney General of New York, the Environmental Department of New York, they are also requiring now Indian Point to install cooling towers, to lessen the thermal damage to the Hudson River, just like the thermal damage, the catastrophic destruction of marine organisms going on at these plants that lack cooling towers. That's not an issue at Davis-Besse because they have a cooling tower. But as we raised Fermi III, we add up all the thermal impacts, of all power plants in this neck of the woods, and all the toxic chemicals they're releasing, I'm talking nuclear and coal and others. You got to look at even the thermal impacts going on now, the destruction of the eco-system in Lake Erie, especially when Fermi III is being proposed.

Comment: 29-1-AQ; Resource Center and talk about the rise in microcystine levels due to the thermal pollution. And how that. I mean are they aware that did anyone comment on that

Comment: 29-2-AQ; Are they aware! That did anyone comment on that for them.

Comment: 29-4-AQ; No they don't. I just wanted to make sure that someone said that to them. And realize that the microcystine levels are rising.

Response: *These comments express concern over the health of Lake Erie. The concerns cite the presence of nuisance species and thermal pollution in the lake.*

The heated effluents of nuclear power plants can cause mortality among fish and other aquatic organisms from either thermal discharge effects or cold shock. Temperatures high enough to kill organisms are found in the cooling water systems, often in the area nearest the effluent discharge structure. Because thermal effects were among the earliest potential impacts identified for power plant operation, a great deal of research and regulatory effort has been aimed at understanding and controlling thermal discharges. Upper lethal temperatures (and *various other expressions of temperature tolerance) have been determined for many important species and life stages. As a result, conditions that can lead to thermal discharge effects are relatively predictable.*

A variety of nuisance organisms or nonnative species may become established or proliferate as a result of power plant operations, including fouling organisms such as the recently introduced zebra mussel, Dreissena polymorpha.

Mitigative measures have been employed at Davis-Besse to reduce the potential for thermal discharge effects. Davis-Besse is equipped with a cooling tower, offshore intake, closed intake canal, bottom intake, and a high-velocity discharge nozzle. The high-velocity discharge nozzle enhances the rapid mixing and heat dissipation of the heated effluent at the outfall.

Colonization of Lake Erie by zebra mussels resulted in several years of improved water clarity and dramatic food web changes, especially a shift in algal production from phytoplankton to bottom-dwelling algae and plants; however, recently, the zebra mussels have been linked to the blue-green alga (cyanobacteria) Microcystis aeruginosa. Microcystis had been a common species in Lake Erie for at least a century but recently has grown into nuisance bloom proportions. Research performed by the Great Lakes Environmental Research Laboratory (GLERL) showed video evidence of zebra mussels' selective eating habits. GLERL was able to capture the zebra mussels filtering the water, regardless of the presence of microcystis, and releasing the microcystis aeruginosa back into the lake. The zebra mussels however continued to eat the other algae. Zebra mussels, in response to the consumption of the algae, release phosphorous that, in turn, feeds the microcystis, further facilitating their growth.

The concentrations of phosphorous, despite years of decline, have recently been showing a gradual increase. Phosphorous has been linked to microcystis; however, it has also been theorized, coupled with thermal pollution, to encourage the growth of lyngbya wollei, a toxic algae. In Maumee Bay, large populations of lyngbya wollei have recently emerged. Research indicates the concern was initially detected in 2006, and the population has since been growing. The Ohio EPA, Division of Surface Water, has the authority over the Maumee Bay. According to the Ohio EPA:

> *[L]ittle scientific information exists to determine the complicated biological processes that encourage the spread of Lyngbya wollei. In order to investigate this issue further, Ohio EPA has formed a Phosphorus Task Force to more formally review the phosphorus loading data from Ohio tributaries to Lake Erie; to consider possible relationships between trends in dissolved reactive phosphorus loading and in-lake conditions; to determine possible causes for increased soluble phosphorus loading; and, to evaluate possible management options for reducing soluble phosphorus loading.*

Regarding studies under Sections 316(a) and 316(b) of the Clean Water Act, the Ohio EPA, and not the NRC, is responsible for regulating Davis-Besse's intake and discharge through the National Pollutant Discharge Elimination System (NPDES) permitting process and for implementing the requirements of Sections 316(a) and 316(b). Modifications to the NPDES permit are outside the regulatory authority of the NRC. The Ohio EPA will ultimately decide if modification to the permit is necessary in response to the presence of microcytosis aeruginosa and lyngbya wollei.

The Davis-Besse discharge, however, is not a major contributor of phosphorous to Lake Erie. The source of nuisance populations of microcystis aeruginosa or lyngbya wollei or both have not *been observed near the discharge location of Davis-Besse or the immediate surrounding area. The NRC staff acknowledges that Lake Erie is experiencing cumulative impacts to its water resources as a result of these species. These impacts have been included in Chapter 4 under cumulative impacts.*

Comment: 45-2-AQ; There are no Federal wilderness areas or designated critical habitat within the vicinity of the proposed site. Davis-Besse consists of 954 acres, of which approximately
733 acres are marshland that is leased to the U.S. Government as part of the Ottawa National Wildlife Refuge. In a letter dated December 16, 2009, we provided comments to FENOC on the proposed 20-year renewal of the operating license for Davis-Besse. At this time we have no additional comments.

Response: *This comment was provided by the USFWS. The NRC staff incorporated the USFWS's information provided in this comment into the draft SEIS, including the information in the referenced December 16, 2009, letter to FENOC, which was provided in Appendix C of FENOC's ER.*

A.1.4 Cultural Resources (CR)

Comment: 46-1-AR; The Peoria Tribe has no objection to the proposed construction. However, if any human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the construction should stop immediately, and the appropriate persons, including state and tribal NAGPRA representatives contacted.

Response: *The staff addresses the potential impacts to Cultural Resources associated with renewing the Davis-Besse operating license in Chapter 2. Programs associated with new ground disturbance related to refurbishment and/or the inadvertent discovery of Cultural Resources is described and/or sited in Chapter 3 and Chapter 4 of this SEIS. Finally, the environmental impacts of alternatives evaluated in depth is discussed in Chapter 8 of the SEIS, including cultural resource impacts.*

A.1.5 Human Health (HH)

Comment: 14-4-HH; There are several safety issues that impact on the environmental questions. First of all, I personally know a first responder. We've had conversations about Davis-Besse. He told me that they have been told that in the event of some sort of accident, the only thing they have to worry about is radioactive iodine, and since they will be given pills for radioactive iodine, they don't even have to worry about that.

Comment: 14-10-HH; Also, downwind from Davis-Besse in the local communities here, there is a cancer cluster. The state studied this cluster and it was woefully inadequate. It consisted of dosimeters, given to about a fifth of the families. They went out in the yards and ran the dosimeters themselves looking at the sky. They didn't find anything, but I'm not sure they -- believe this happened when Davis-Besse wasn't actually running, and it doesn't address the fact that there may have been emissions in the past, and there could be emissions in the future. So, I think that any federal environmental impact statement would have to look at known emissions from Davis-Besse which are routine, such as I have, and correlate those with the cancer cluster in these local counties and look for cancers that are specifically known to correlate with the nucleates that we know of at least, such as thyroid cancer. I know I only have about five minutes here. I want to say that I know - - as an environmentalist, I know that the

NRC is given an impossible task here. Any process that generates radioactive pollution that will be able to cause cancer, birth defects and hurt people for the next - - for millions of years in some cases, by definition, it can't be done safely.

Comment: 26-5-HH; And in fact there is a cancer cluster near Clyde, Ohio which is about 15 to 18 miles as the crow flies from Davis-Besse. So, the comment that I have on Scoping is that I am requesting that baseline epidemiological studies be done. And that we explore what is coming out of that nuclear power plant. They are allowed by licensing to release gaseous, liquid from the plant. Below "permissible" levels. But there are cancers over in Clyde, and families are decimated. And I would request that baseline epidemiological studies be done in the entire region.

Comment: 28-1-HH; I would go farther than to say the Nuclear Regulatory Commission is a "rogue" organization. I would call it a "terrorist" organization. And I would say that the cancer that people are suffering from in Clyde, Ohio, I know that Lucas County, when I left 10 years ago had the highest cancer rates of the State of Ohio. We're all facing cancer as our future. And this cancer, I would say is on the most part, is on the hands of...It's a legacy of industrial capitalism, but this cancer is on the Nuclear Regulatory Commission's hands because they have done nothing to police or regulate or control this industry. It's disgusting, it makes me sick to my stomach.

Comment: 28-2-HH; I was listening to public radio the other day and they were talking about how they felt like "the Rust Belt" was kind of offensive terminology to use for this area of the country. And the thought crossed my mind well why not "The Cancer Belt" instead? Because that's the number one killer in this area. So, if the "rust belt" is too niccy-nice. You know, they want to consider it the "water belt" but the "water belt" is contaminated.

Comment: 14-19-HH; Something else I just wanted to mention that Tony Mangano, Anthony Mangno has pointed out that thyroid cancers in Ottawa County, right around the plant, went from below the national average before the plant started operating to above the national average now. And, in fact, research says that cancer rates, thyroid cancer rates particularly, just about double when you put a nuclear power plant in. So, iodine, radioactive iodine is very rare. Thyroid cancer is very rare. Pretty much you can count on the fact that those people who are dying from thyroid cancer are dying because of radioactive releases from the plant. Radioactive releases that are casual, that are average, that are "normal," part of their normal operations. So, people are dying. They're in the hundreds now. If we keep doing this plant and radioactive thyroid. Iodine, radioactive isotopes of Iodine stay radioactive for 20 million years. So the more we generate the more we'll be. People will die from the cancers caused by this radioactive Iodine. They're in the hundreds now. Another 20 years they'll be in the thousands. So what we are trying to do here is prevent thousands of people from being killed by an unnecessary form of energy. We've heard testimony here today about just exactly why that's so unnecessary.

Comment: 43-3-HH; Yeah I want to make a statement on behalf of kids whose environment is being destroyed. There used to be a lot more nature to go to and tromp around in and now kids don't have that we have urban environments that are polluted kids getting cancer because of this kind of stuff and it's really not ok. So this is Connie Gadwell Newton urging you to not renew the licensing for Davis-Besse. Thank you.

Response: *The NRC's primary mission is to protect the public health and safety and the environment from the effects of radiation from nuclear reactors, materials, and waste facilities. The NRC's regulatory limits for radiological protection are set to protect workers and the public* *from the harmful health effects (i.e., cancer and other biological impacts) of radiation on humans. Radiation standards reflect extensive scientific study by national and international organizations. The NRC actively participates and monitors the work of these organizations to keep current on the latest trends in radiation protection.*

Recently, the NRC asked the National Academy of Sciences (NAS) to perform a state-of-the-art study on cancer risk for populations surrounding nuclear power facilities. The NAS study will update the 1990 U.S. National Institutes of Health—NCI report, "Cancer in Populations Living near Nuclear Facilities."

The study will be carried out in two consecutive phases. A Phase 1 scoping study will identify scientifically sound approaches for carrying out an epidemiological study of cancer risks. This scoping study began on September 1, 2010, and will last for 15 months. The result of this Phase 1 study will be used to inform the design of the cancer risk assessment, which will be carried out in a future Phase 2 study.

The Sandusky County Health Department (SCHD) and the Ohio Department of Health (ODH) conducted a study of childhood cancer incidence, from the years 1996 through 2006, in the city of Clyde and Green Creek Township, both located within 50 miles of Davis-Besse. The study's objective was to identify factors that may have contributed to the higher-than-expected childhood cancer rates found in that area. The families of 21 childhood cancer patients participated in the study, responding to questionnaires administered by SCHD staff. The questionnaires addressed a variety of topics, including possible exposure to ionizing radiation. The report concluded that there were no exposures or variables that were common to the 21 children with cancer who participated in this profile. The report can be viewed online at: http://www.sanduskycohd.org/Template/Childhood%20Cancer%20in%20Eastern%20Sandusky%20County%20a%20Profile%205%2026%2011.pdf

Although radiation may cause cancers at high doses, currently there are no data to unequivocally establish the occurrence of cancer following exposure to low doses, below about 10 rem (0.1 Sv). However, radiation protection experts conservatively assume that any amount of radiation may pose some risk of causing cancer or a severe hereditary effect and that the risk is higher for larger radiation exposures. Therefore, a linear, no-threshold dose response relationship is used to describe the relationship between radiation dose and detriments such as cancer induction; simply stated, any increase in dose, no matter how small, is assumed to result in an incremental increase in health risk. This theory is accepted by the NRC as a conservative model for estimating health risks from radiation exposure, recognizing that the model probably over-estimates those risks. Based on this theory, the NRC conservatively establishes limits for radioactive effluents and radiation exposures for workers and members of the public. While the public dose limit is 100 mrem (1 mSv) for all facilities licensed by the NRC (10 CFR Part 20), the NRC has imposed additional constraints on nuclear power reactors. Each nuclear power reactor, including Davis Besse, has license conditions that limit the total annual whole body dose to a member of the public outside the facility to 25 mrem (0.25 mSv). In addition, there are license conditions to limit the dose to a member of the public from radioactive material in gaseous effluents to an annual dose of 15 mrem (0.15 mSv) to any organ; for radioactive liquid effluents, a dose limit of 3 mrem (0.03 mSv) to the whole body, and 10 mrem (0.1 mSv) to any organ.

The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small. The doses of radiation that are received by members of the public as a result of exposure to nuclear power facilities are so low (i.e., less than a few *millirem) that resulting cancers attributed to the radiation have not been observed and would not be expected.*

A number of studies have been performed to examine the health effects around nuclear power facilities. The following is a list of some of the studies that have been conducted:

- *In 1990, at the request of Congress, the National Cancer Institute (NCI) conducted a study of cancer mortality rates around 52 nuclear power plants and 10 other nuclear facilities. The study covered the period from 1950 through 1984 and evaluated the change in mortality rates before and during facility operations. The study concluded there was no evidence that nuclear facilities may be casually linked to excess deaths from leukemia or from other cancers in populations living nearby.*
- *Investigators from the University of Pittsburgh found no link between radiation released during the 1979 accident at the Three Mile Island Nuclear Station and cancer deaths among nearby residents. This study followed more than 32,000 people who lived within 5 miles (mi) (8 kilometers (km)) of the facility at the time of the accident.*
- *In January 2001, the Connecticut Academy of Sciences and Engineering issued a report on a study around the Haddam Neck Nuclear Power Plant in Connecticut and concluded that exposures to radionuclides were so low as to be negligible and found no meaningful associations to the cancers studied.*
- *In 2001, the American Cancer Society concluded that, although reports about cancer clusters in some communities have raised public concern, studies show that clusters do not occur more often near nuclear plants than they do by chance elsewhere in the population. Likewise, there is no evidence linking the isotope strontium-90 with increases in breast cancer, prostate cancer, or childhood cancer rates.*
- *In 2001, the Florida Bureau of Environmental Epidemiology reviewed claims that there are striking increases in cancer rates in southeastern Florida counties caused by increased radiation exposures from nuclear power plants. However, using the same data to reconstruct the calculations on which the claims were based, Florida officials did not identify unusually high rates of cancers in these counties compared with the rest of the state of Florida and the nation.*
- *In 2000, the Illinois Public Health Department compared childhood cancer statistics for counties with nuclear power plants to similar counties without nuclear plants and found no statistically-significant difference.*

In summary, there are no studies to date that are accepted by the nation's leading scientific authorities that indicate a causative relationship between radiation dose from nuclear power facilities and cancer in the general public. The amount of radioactive material released from nuclear power facilities is well measured, well monitored, and known to be very small.

These comments provided no new and significant information. Therefore, no changes have been made to the SEIS.

Comment: 20-4-HH; So tritium is an isotope of hydrogen, it's hydrogen-3, which means one proton and two neutrons, and, it is not naturally occurring and has a half-life of 12.3 years. so it is produced in all nuclear reactors by a neutron bombardment either of lithium-6, or boron-10. And, some of you may remember boron is the acid, well, there's boron in the cooling water that is in the pressure vessel, and it was that leaking of boric acid, that was responsible for going through 6 inches of carbon steel in the reactor head. So, the presence of that boron is, under neutron, impact, can produce the, tritium. It's radioactive, it decays, in 12.3 years half-life, and it emits a high-energy electron which is, known as a beta particle, and, and there's another particle which is an anti-neutrino, which almost interacts, so, so, so little that, neutrinos can, pass completely through the earth. So we don't worry about the neutrinos or the anti-neutrinos, but the beta particle is 5.7 kilo, uh...KEV, kilo electron volts, and, this also has a fairly, fairly low penetration. It, it barely gets into your skin, it stops almost with the dead layers of the skin. However, if you ingest it, or you breath it, then it's very dangerous because it, it has a very short, penetration distance in your lungs or, or in your intestinal tract. So, bec...it's likely to be ingested either as water vapor, as, hydrogen, actually it would be an analog...isotope, one atom of hydrogen, one atom of normal hydrogen, one atom of tritium, or it, it forms, H2O, water, as, hydrogen, one atom of tritium, or it, it forms, H2O, water, as most likely a normal hydrogen isotope and a tritium isotope together with oxygen, so you will ingest it if you drink water from one of these contaminated wells. So, just a couple of things to remind us of the danger of, of these reactors. Even if there is not a catastrophic meltdown, there are ever-present dangers in these, in the operation of these nuclear reactors.

Comment: 26-7-HH; In addition, it was mentioned earlier that there were Tritium leaks in 2009. There was also a Tritium leak in 2008. The grounds are contaminated. I'm concerned about the buried piping at the Davis-Besse plant, about the leaking of Tritium, about the potential of flooding externally, the potential of flooding internally at the Davis-Besse plant. This is an aging plant. And with that Tritium leak and as you run a nuclear power plant into the ground, which is being proposed, another 20 years there are going to be increasing leaks, increasing contamination.

Response: *These comments are concerned with tritium in the groundwater. NRC regulations require licensees to control and limit radioactive releases, including tritium, to the environment (the air and water). As part of the NRC requirements for operating a nuclear power facility, licensees must comply with radiation dose limits for the public in 10 CFR Part 20 and keep releases of radioactive material into the environment during normal operations as low as is reasonably achievable (ALARA), in accordance with 10 CFR 50.36a..*

Information on FENOC's groundwater monitoring program is contained in Chapters 2 and 4 of this draft SEIS.

No new and significant information is provided in these comments. Therefore, no changes have been made to the SEIS because of these comments.

Comment: 22-4-HH; In addition, the amount of toxic algae has increased over the last, 10 to 15 years, so much that the Ohio EPA reports that physical contact with the toxic algae in Lake Erie probably causes illnesses, probably caused illnesses to 10 people in the summer of 2010.

Comment: 29-3-HH; It's not a question! I just want the panel to know that inadvertently when people start dying or getting sick because the levels occur. Is there any way that they could possibly be held responsible or get sued?

Response: *These comments express concerns relating to the nuisance organisms in Lake Erie as they apply to Human Health. Lyngbya wollei and Microcystis aeruginosa are two different species of cyanobacteria. Both currently exist in Lake Erie and have become a nuisance in the Maumee Bay area. When conditions are present to facilitate a rapid growth, a dense population forms, known as a bloom. Some Blooms are harmless; however, when these organisms contain toxins, other noxious chemicals, or pathogens, it is referred to as harmful algal blooms*

(HAB). HABs may cause health concerns dependant on the method an individual comes in contact with the toxin produced.

Thermal pollution has been referenced as a contributor to the growth of HABs. Davis-Besse's thermal effluent is warmer than the receiving waters. HABs, however, require calm, low-flow water conditions in order to facilitate their growth. The Davis-Besse outflow is equipped with a high-velocity discharge nozzle. The high-velocity discharge nozzle, as part of the NPDES permit, is intended to enhance the rapid mixing and heat dissipation of the heated effluent at the outfall. As referenced in 2.2.6, Aquatic Resources, of this SEIS, the regulation of surface waters is within the regulatory authority of the Ohio EPA. In addition, the thermal discharges, regulated by the NPDES permit, are also under the authority of the Ohio EPA.

NRC staff did not discover any studies linking Davis-Besse as a direct contributor to the formation of HABs. The health impacts associated with HABs and the impairment of Lake Erie are discussed in the "Cumulative Health Impacts," section of Chapter 4.

A.1.6 Hydrology (HY)

Comment: 20-3-HY; This is a study by Davis-Besse. In Appendix E, that's the Environmental Report, on this page (Page 2.3-2), I quote here, they're, they're required, by their operating license to have monitoring wells to monitor the quality of the groundwater in the, within the perimeter. And one of their wells in 2..., in the spring of 2009 showed a tritium level that was rising, 4000, pico curies/liter. And, this is a quote from their study. "As a result, the First Energy Nuclear Operating, Company," notice that's a separate operating company from First Energy, from the rest of First Energy, "is pursuing a root cause approach to identify the source of the tritium in the wells. No tritium concentrations of...have been detected above the, US EPA drinking water limit of 20,000 picocuries." But, this to me is very troubling. Even though the, the, concentration is not that high yet, but is an increasing amount, the question is where does it come from?

Response: *The comment expresses concern relating to the source of the tritium noted in FENOC's ER.*

The NRC staff describes the groundwater resources at Davis-Besse and the effects of plant operations on groundwater hydrology and quality in Chapters 2 and 4 of this SEIS. Chapter 2 summarizes the results of NRC's review of Davis-Besse's Groundwater Protection Program, including the placement of site groundwater monitoring wells. As part of this evaluation, the NRC staff specifically reviewed the conceptual groundwater model prepared for Davis-Besse in 2007 and 2008. All studies reviewed by the NRC staff are cited in Chapter 2 of this SEIS, including analysis of tritium information.

No new and significant information is provided in this comment. Therefore, no changes have been made to the SEIS because of this comment.

Comment: 26-6-HY; Earlier again, this week, I got several documents from Connie Klein who was one of the interveners at Davis-Besse on the first Operating. And she shared with me photos of the flooding of the Davis-Besse in 1972. This was during construction. The entire site was flooded for two to three weeks. Um I have concerns about the Davis-Besse flooding. As you all know Lake Erie is very shallow. The western basin is very very shallow, and it is subject to something called a seiches where the wind blows out the water, blows it east. Then the water comes back, like a bathtub, and floods the western shore. I'm concerned about the potential flooding of that Davis-Besse Plant.

Response: *This comment expresses concern regarding the potential of flooding at Davis-Besse. As part of the initial design of Davis-Besse, consideration for flooding was required to ensure the safety of structures and continued operation of the plant. The plants design basis included the determination of the probable maximum surge flood level and is documented in the final safety analysis report (FSAR).*

The static water levels in the western basin of Lake Erie are subject to long term, annual cyclical variation, and short period variations. These variations are due to wind tides and seiches. Seiches are a movement on the surface of an enclosed body of water, in this case Lake Erie, usually caused by intense storm activity.

The short period variations in the daily level from the monthly mean level are due to both a lengthwise wind tide which produces the greatest disturbance of water level and a transverse seiche in the west end of Lake Erie which can oscillate between the northern and southern shores. A traverse seiche of 0.8 ft has been recorded but for design purposes, 1.0 ft has been used in the design considerations.

Based on collected and available data since 1860, the maximum variations in the mean monthly water level are 4.2 feet above datum and 1.2 feet below datum. Not included in this range were two occurrences in 1973 and 1974, when an all-time high lake level was recorded at 4.9 ft above datum. Davis-Besse, in its design considerations, used a probable maximum variation of 4.8 feet above and 1.5 feet below datum. Although 4.8 ft is less than the recorded 4.9 ft, the 0.1 ft difference is accounted by the rounding up of the daily level variation from 0.8 ft to 1.0 ft.

A probable maximum meteorological event was used to determine the maximum rise in lake level due to wind tides. This meteorological event would have a maximum ENE wind at anyone location of 100 miles per hour for a 10-minute period, and the wind speed could exceed 70 miles per hour during the six-hour period both before and after the maximum wind speed. The force or push of the wind driving the water level up, resulted in a maximum wind tide rise of 9.3 ft.

The probable maximum surge flood level that could occur at Davis-Besse would be a combination of all these occurrences, for both the cumulative high and the cumulative low. For flooding concerns, the design would relate to the cumulative high. Thus, the 4.8 high monthly mean, 1.0 ft seiche, and the 9.3 ft wind tide would result in a 15.1 ft rise in low water datum to reach a static high elevation of 583.7 ft. Davis-Besse has a finished floor elevation set above the static high and is further protected by an earthfill breakwall built up to an elevation of 591.0 ft to further protect the site from potential wave action.

As a result of the 2011 earthquake and tsunami that struck Japan, resulting in extensive damage to the nuclear power reactors at the Fukushima Dai-ichi facility, the NRC has taken significant action to enhance the safety of reactors in the United States. Operating nuclear reactors were directed to use present-day information to reevaluate the flooding hazards that could impact their site and to submit their reevaluations to the NRC for evaluation in a Hazard Reevaluation Report. Information on the NRC's actions relating to Fukushima Dai-ichi accident can be found at: http://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard.html*.*

A.1.7 License Renewal and its Process (LR)

Comment: 14-1-LR; Good evening. Like most people in the Northwest Ohio area, I first found out about the scoping meeting earlier in the week when there was a story in the Blade. So, I had not had an opportunity to completely read the Environmental Impact Statement that's been prepared with the application for the license renewal. But, I think that is one of the issues that should be dealt with in the scoping process at either another later meeting or perhaps further announcements, and at the very least, I would like to request a hard copy also be placed in the Wood County Library in Bowling Green, Ohio.

Comment: 16-1-LR; My name is Patricia Marida. I'm the Chair of the Nuclear Issues Committee of the Ohio Sierra Club. And, we had a whopping four days to know about this meeting. I had four days ahead. I learned about it this morning and have come up from Columbus here.

Comment: 14-15-LR; And though…I felt at the time, those people should be at this hearing, but most people didn't even know it happened. It went by before people could get their thoughts together. And so we asked the NRC to hold another one here in Toledo, they refused, but we have decided to hold our own and that's what this is...that's what this is about.

Comment: 16-23-LR; First let me say that the Sierra Club is disappointed that the NRC only gave 10 days notice of these scoping meetings in the *Federal Register*, and that the public only had 3 days notice from an article in *The Toledo Blade*. The Davis-Besse Environmental Report and License Renewal Application were almost 2000 pages, not including the NRC Generic Environmental Impact Statement for Nuclear License Renewal. Therefore, we would like to request that the NRC hold at least one additional scoping meeting, and that this be held in Toledo, close to the population center with residents who are informed by *The Blade*. Also, setting the comment deadline during the holiday season makes it difficult for people to have time to digest the material and comment. Therefore, we would also like to request an extension of the comment period, preferably until the end of January.

Comment: 44-1-LR; I would be very interested in a scoping meeting taking place in Toledo, Ohio where more people would be able to attend. I also think more time should be allotted for the comment period as December 27, 2010 falls in the middle of the holiday period. Perhaps an additional 30 day period would be appropriate.

Comment: 49-1-LR; The people of Northwest Ohio, Southeast Michigan, and other communities that would be the most adversely affected by an accident at Davis-Besse deserve a longer comment period and more hearings before the NRC automatically approves First Energy's request to re-license. Please attend our hearing, as outlined below. PUBLIC HEARING on re-licensing of the Davis-Besse Atomic Reactor Saturday Dec. 18 from 12 noon to 3 pm St. Mark's Episcopal Church 2272 Collingwood Blvd Toledo, Ohio 20 MORE Years of Radioactive Russian Roulette on the Great Lakes shore?! We are calling for input from all interested parties regarding First Energy's mismanagement of Davis-Besse, and the Nuclear Regulatory Commission's lack of oversight of that facility, in particular residents of Ohio, the Toledo area, South East Michigan, or residents of any community that would be directly adversely effected by an accident at Davis-Besse. Anyone can testify, sign in will be required. This hearing will be videotaped and presented to the NRC. FirstEnergy has applied to the U.S. Nuclear Regulatory Commission (NRC) for a 20-year operating license extension at its Davis-Besse nuclear power plant near Oak Harbor, Ohio, just over 20 miles east of Toledo. Davis-Besse is one of the most problem-plagued atomic reactors in the entire country: it has suffered six "significant accident sequence precursors," three times more than any other American nuclear plant. The original license was granted in 1977 and will expire in 2017. If the extension is approved Davis-Besse can operate until 2037. In the past 10 years NRC has rubber-stamped 60 or 60 license renewals sought by industry. The NRC Office of Inspector General has reported serious problems with NRC's license extension program: NRC staff have "cut and pasted" the nuclear utility's own work, sometimes word for word, falsely presenting it as an independent safety

Comment: 14-13-LR; So, I'd like to welcome you all. My name is Joe DeMare and I spoke at the official NRC hearing on November 4. And I have to tell you, it was a, a rather disappointing experience, because almost everyone there was either employed by Davis-Besse or they were from an organization that received money from Davis-Besse.

Response: *The environmental scoping period is an opportunity for the public, tribal governments, and local, state and Federal government entities to assist the NRC in identifying areas of concern, impacts, and alternatives as staff develops the SEIS for license renewal. The NRC announced the start of the scoping period by use of a* Federal Register *Notice, published on October 28, 2010. The 60-day review period for the environmental scoping period ended on December 27, 2010.*

The purpose of the environmental scoping meeting was to provide a brief summary of the license renewal and scoping process and to allow the public an opportunity to provide comments. Although the NRC emphasizes the purpose for the solicitation of comments, it does not restrict the topic of those comments to those applicable to license renewal. As a result, the public, in some instances, takes this opportunity to voice their opinion in support or against the approval or denial of the renewed license.

The environmental scoping meeting was one method for providing scoping comments. Comments were also sent to the NRC in response to this draft SEIS by the following methods:

- *Comments were submitted electronically via the Federal rulemaking Web site:* http://www.regulations.gov *and search for documents filed under Docket ID NRC-2010-0298.*
- *Comments were mailed to: Chief, Rulemaking and Directives Branch (RADB), Division of Administrative Services, Office of Administration, Mail Stop: TWB-05-B01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Comments were faxed to RADB at (301) 492-3446.*

Additional details relating to the license renewal can be found in Chapter 1 of this draft SEIS or at http://www.nrc.gov/reading-rm/doc-collections/nuregs/brochures/br0291/br0291-r2.pdf.

Comment: 18-3-LR; Now we're looking at what the NRC is doing in, in its laughable oversight of all the nuclear power plants but Davis-Besse in particular. And it occurs to me that, that…the NRC is a rogue agency and just as the, as the, SEC failed us, failed us, the citizens that it should be, watching out for, that is our goals, that is our tool, that is the thing that, the entity that we have put in place through our government to make sure that everybody plays by the rules. And that is what the, Nuclear Regulatory Commission is as well. However, it is failing to do that, it has, it has absolutely failed to do that. And what it has done in reference to Davis-Besse and the numerous problems that we have seen is, at Davis-Besse, demonstrates that very clearly.

Comment: 25-2-LR; We need to broaden the idea of what environmental consequences, environmental impact means when it comes to nuclear power and something like Davis-Besse, and other people who have spoken here today have done a better job at talking about what specifically, The common definition of what environmental impacts might be. But I'd like to say something about the political environment that is affected by the operation of nuclear power plants and Davis-Besse relicensing, the potential licensure of a plant down in Piketon a new power plant that our Democratic Governor invited in to this situation that Kucinich will probably go right along with and that is the credibility and the competency of something called the Nuclear Regulatory Commission. Already while the residents of this area would be most directly affected by the power plant, Cleveland is not that far away and the NRC should have solicited input from people from a broader radius around the power plant including Michigan and Indiana. Because what we've found from the Chernobyl accident is that radioactive waste doesn't stop at municipal boundaries or national boundaries. And the environmental impact is much broader than how some fish that get caught in an intake pipe or the other kind of more immediate sort of environmental impacts that people might think of. The fact that the NRC didn't hold multiple hearings on this is a problem, but they shouldn't and I'm speaking directly to the NRC at this point. The NRC shouldn't take as the expression of the people of Ohio the testimony of just those people who attended the hearing on November 6th or 4th or whenever it was right after election day. That the people are economically benefitting from the conduct of FirstEnergy by the operation of that power plant whether it's through their jobs or through charitable contributions, that is not a legitimate expression. We have a political problem in this country of disengagement and alienation and generally, the government and its regulatory bodies are treated with contempt by the mass media. And a culture of contempt is built among the people for our government and for the mechanisms that we as people use collectively to monitor things like the banking industry or the nuclear industry. It's not to our benefit that that is happening, but it is. So that small group of people who testified in favor of this relicensing is not a complete or an inclusive representation of the people that are concerned with this. And I would suggest that most of the people that are concerned with this are disengaged and are not paying attention. And the credibility of the NRC is at stake.

Comment: 26-4-LR; So the lesson I take out of this was I learned that the NRC is incapable of learning lessons. As mentioned earlier, they are indeed a rogue agency. This past week, the 61st nuclear power plant that had applied for relicensing was relicensed. They are now batting 1000%. 1000, Batting 1000. 61 for 61 on relicensing applications. So, the NRC has not a shred of credibility with the public, and they are there, running interference, keeping the people away from confronting these utilities when they run these abysmal plants.

Comment: 28-3-LR; I don't have any faith in the Nuclear Regulatory Commission to do anything about the issue, but, thanks. That's all I have to say.

Comment: 26-10-LR; So, I do not have confidence in the NRC to force about proper equipment, maintenance. Perpetually, there are exemptions that are requested and just as a matter of rubberstamping - - the Nuclear Regulatory Commission, the Nuclear Rubberstamp Commission, allows them exemption time after time. Again. Production over safety. Profit over people.

Response: *These comments express a lack of confidence relating to NRC's oversight and regulation. To ensure that U.S. nuclear power plants are operated safely, the NRC licenses the plants, licenses the plant operators, and establishes license conditions for the safe operation of each plant.*

In addition, the safe operation of nuclear power plants is not limited to license renewal but is and will be dealt with on a daily basis as a part of the current operating license. The NRC, on an ongoing basis, at every nuclear power plant, addresses safety issues and concerns. The NRC conducts safety inspections throughout the operating life of the plant, whether during the original or renewed operating license. If the NRC discovers safety issues at a nuclear power plant, they *are addressed immediately, and any necessary changes are incorporated under the current operating license. As such, the regulatory safety oversight of Davis-Besse is ongoing.*

Comment: 18-4-LR; This is the beginning. Certainly, we don't have enough people in this room. We never do when we try to do something like this. We fit it in between all of the things that we do as, as mothers, as fathers, as, as parts of families, as parts of communities, we fit it in with our jobs, and we are determined to make a change. So as we approach that process here, in, in making comments, that the Nuclear Regulatory Commission will do their utmost to ignore, as, as we approach this process, we have to understand that this is the beginning of the process. This is the beginning of the process of us as citizens, and I believe that "We the People" is one of the most powerful statements that anybody can make. And "We the People" embodies our democracy, so "We the People" will be the ones who will have to challenge not only Davis-Besse but the NRC.

Comment: 23-1-LR; Hi folks. Um I prepared written comments for the NRC. I'm really pleading with you all because I'm not sure they'll listen or read them.

Response: *These comments express a lack of confidence over the NRC's ability to address and incorporate scoping comments. To further enhance the development of the SEIS, public participation is solicited as part of the license renewal scoping process. NRC held two public meetings on November 4, 2010, to solicit comments from the public.*

Two additional meetings, not sponsored by the NRC, were also conducted to obtain comments from the public. The People's Hearing, held by the Green Party of Ohio, represented by Anita Rios and Joseph DeMare, was held on December 17, 2010. The Sierra Club, represented by Patricia Marida, also held a separate meeting on December 11, 2010. Prior to the Davis-Besse scoping period, scoping comments in video format had never been submitted. The Peoples Hearing provided a transcript of the meeting, in addition to the video submission, to ensure the accurate capture of their comments. The NRC, to provide complete representation of the comments, developed an unofficial transcript of the Sierra Club meeting. Comments are both welcomed and encouraged as part of the Draft SEIS comment period for incorporation into the final SEIS.

The NRC makes a conscious effort to address public concerns provided in the scoping comments. The NRC acknowledges there is public dissatisfaction when comments, are categorized as out of scope. The Scoping Summary Report and Appendix A of this SEIS, however, has included expansive responses. Where the comments were deemed in scope, a summarized response is provided and the reader is directed to the appropriate section within the SEIS to gain additional details. Where the comments are categorized as out of scope, staff responded to the comments and redirected the reader to where the comments are addressed.

Comment: 26-2-LR; We've heard that there are several alternatives to Davis-Besse. Replacement power is available now. Could be generated much cheaper. It is about the consecration of wealth and a cartel of the utilities that like the monopoly status that they enjoy, and they are locking out the people. It is not power, not energy for the people. It is power and political power against the people.

Comment: 16-25-LR; The environmental effects that occur in other parts of the United States should come under consideration when the NRC develops the Environmental Impact Statement.

Response: *These comments request evaluation of the cumulative effects of license renewal on the United States. The cumulative effects of license renewal are evaluated in this SEIS. A detailed discussion can be found in Chapter 4.*

Comment: 16-32-LR; Even the 40-year time frame for operation of a power plant does not have an engineering basis, but was based on the time needed to pay off construction bonds. What happened to the engineering responsibility to oversee and advice an operation of this magnitude of danger?

Response: *The Atomic Energy Act provides the NRC with the regulatory authority for to issue licenses for commercial power reactors to operate for up to 40 years and allows these licenses to be renewed for another 20 years. A 40-year license term was selected based on economic and antitrust considerations -- not technical limitations. The NRC has established a license renewal with clear requirements to assure safe plant operation for an additional 20 years of plant life.*

The license renewal rule, 10 CFR Part 54, establishes the technical and administrative requirements for renewing a reactor operating license. Part 54 focuses the staff's review on managing the adverse effects of aging to ensure that important systems, structures and components will continue to perform their intended function during the 20-year period of extended operation. An applicant must provide the NRC with an evaluation that addresses the technical aspects of plant aging and describes the ways those effects will be managed. The NRC reviews the application and documents the conclusions in the safety evaluations.

The applicant must also prepare an evaluation of the potential impact on the environment if the plant operates for another 20 years. The NRC performs plant-specific reviews of the environmental impacts of license renewal in conformance with the National Environmental Policy Act and the requirements of 10 CFR Part 51. To facilitate the environmental review for license renewal, certain issues were evaluated generically for all plants rather than separately in each plant's renewal application. The generic evaluation, NUREG-1437, Generic Environmental Impact Statement for License Renewal of Nuclear Plants*, (GEIS) assesses the scope and impact of environmental effects that would be associated with license renewal at any nuclear power plant site. A plant-specific supplement to the GEIS, commonly referred to as the SEIS, is prepared for each licensee that applies for license renewal.*

Before a new license is issued, the NRC will ensure that there is a technically credible and legally sufficient basis for granting a renewed license for an extended 20 years as reflected in the NRC's safety evaluation report, final environmental impact statement supplement, and the proposed renewed license.

A.1.8 Opposition to License Renewal (OL)

Comment: 7-1-OL; FirstEnergy should not be allowed to continue to operate Davis-Besse after 2017.

Comment: 14-12-OL; In this specific case, Davis-Besse has one of the worst operating records in the industry. That's widely known. This will actually be a very interesting test case to see if the NRC is able to deny any license. I think if any license should be denied, it would be Davis-Besse.

Comment: 16-2-OL; The Sierra Club opposes nuclear energy in its entirety, citing serious environmental health and public expense issues throughout the nuclear fuel cycle.

Comment: 14-14-OL; And I know that there are many people, thousands of people, in the Northwest Ohio area, that don't want this license renewed and think it's an insane gamble with our health and safety to run this plant for another 20 years.

Comment: 14-16-OL; So, we have a lot of very educated, very well-informed speakers. And we have people that are just plain citizens that, but I think most of the people that we've scheduled to speak…feel that Davis-Besse should not be renewed. We have opened this up to the public and if anyone here wants to, to speak that hasn't been asked to already, you just need to sign up, there's a little sheet outside, I'll ask you to sign.

Comment: 18-1-OL; And Davis-Besse is about 20 miles from here. And, I have been opposed to nuclear power for a very long time. But as I was thinking about, what we are doing here today and, what I wanted to talk about today, it kept, coming back to me that I think that even if I was in favor of nuclear power, this is still a nuclear power plant that I would want shut down.

Comment: 18-7-OL; And in the face of that, in the face of that lack of responsibility and lack of planning for the future, the NRC has continued to do nothing. They just slapped them on the wrist for that, they slapped them on the wrist, they fined them. But if you look at, FirstEnergy's profits, they have gone up, they have, they have never gone down, they never had to really pay for, for what they did here at Davis-Besse. They have shown, a complete lack of responsibility to the people they serve. And the NRC has failed to hold them accountable.

Comment: 18-8-OL; Now the other thing about FirstEnergy is, First Energy holds a corporate charter from here in Ohio. And I think that one of the next steps that, that we should be pushing towards is to revoke that corporate charter for FirstEnergy. They are, they are a rogue corporation. They have failed to, to provide oversight of their own facilities, and they have failed to, show any real determination to actually learn from that situation that transpired back when the, Davis-Besse almost, melted down actually. So I hope that these proceedings are the first step towards preventing, a nuclear meltdown. In the face of the failure of First Energy to be vigilant and maintain its, its facilities appropriately, and in the face of, of the failure of the Nuclear Regulatory Commission to provide adequate oversight, and I would invite each of you to be a part of that next step because certainly we must grow this movement if we are to be effective. Thank you.

Comment: 19-8-OL; And there's ongoing problems with Davis-Besse, to the present day. I'd like to just share some figures for, what might happen if there were a major radioactivity release at Davis-Besse. This comes from a 1982 NRC report entitled "Calculation of Reactor Accident Consequences," or CRAC, which is a nice little acronym the NRC came up with. So, if there were a major radioactivity release from Davis-Besse, the NRC and the Sandia National Lab in New Mexico, which conducted the study, determined that there could be 1,400 peak early fatalities, they call them, 1,400 peak early fatalities, 73,000 peak early injuries, and 10,000 peak cancer deaths. And they attributed a dollar figure of 84 billion dollars for property damage. So, that study came out in 1982. NRC tried to cover it up. Congressman Ed Markey of Massachusetts, got it ousted by subpoena by holding a hearing and out came the figures. So if you increase, all those casualties due to the increase in population since 1982, if you, increase, due to inflation the, property value damages, that would go up to $185 billion dollars. And a little update to mention, just came out in, mid-September, "Inside the EPA," which is a trade press, publication in Washington, DC, scooped the story that they did a freedom of information act release to the NRC, the EPA, and the Federal Emergency Management Agency, and discovered, internal e-mails between the agencies, the lawyers of the agencies, fighting with each other over a little minor detail of after a major radioactivity release who would, be in charge of the clean-up and how would it be paid for. So it turns out that the lawyers at these 3 agencies, were discussing how Price-Anderson, the national liability, coverage for major nuclear power plant accidents, will not cover the cleanup costs. It would cover other things, property damage and, and some very strictly controlled categories, but not clean up costs. So, that's a little issue.

Comment: 19-9-OL; Davis-Besse, which is deteriorated with age, has already had so many close calls, 2 major accidents. So, you can see things are pretty out of control. Anita mentioned the, NRC as a rogue agency. And we keep trying to figure out what the NRC stands for. Is it Nobody Really Cares? Is it Nuclear Rubberstamp Commission? it might be Nuclear Rubberstamp Commission, because of, the 60 license extension applications they've considered so far, they have rubberstamped every single one of them. And, these are oldest reactors in the country with major problems.

Comment: 14-17-OL; OK, so while Al's setting up, I just want to mention that, technically what these comments are going to be is part of the Environmental scoping comments for the Environmental Impact Statement, which is part of the application for the 20-year renewal. So part of that process is that if we could show that there are cheaper, safer, more environmentally friendly alternatives to doing nuclear power, to renewing this license for another 20 years, technically the NRC is supposed to say "OK, you're right, nuclear power isn't that, we won't extend this, licensing application."

Comment: 22-1-OL; Water is the foundation of life. And it's our most precious resource in Ohio. Nuclear energy is not needed for life here in northwest, Ohio.

Comment: 22-7-OL; Davis-Besse should not be re-licensed. The other question that has to be considered - is the safety culture within Davis-Besse changed? And if one were to assess the safety culture in personnel...Technology doesn't fail on its own, technology fails...People operate technology.

Comment: 23-2-OL; So, we urge the Commissioners to deny the 20 year relicensing. If there ever was a candidate for the first denial of a relicense, this is it. As the history of the facility proves, it is too dangerous and expensive to continue this operation, especially since it is too dangerous and expensive to continue this operation, especially since it is not needed for present or future power generation. I would like to refer the Commissioners to two articles quoting studies that support this latter statement.

Comment: 23-5-OL; It's past time to admit that we can no longer afford this complicated and dangerous technology - - not the feed-in tariff, I'm referring to Davis-Besse.

Comment: 24-3-OL; As a very senior citizen, I would like to encourage the members of the audience who are opposing the relicensing of the plant to keep fighting. It can sometimes get discouraging, but the opposition that was mounted to the original building of nuclear plants in the 1960s and 70s did result in enough added expense for the electrical industry to put a halt to the building of new plants, although Davis-Besse was approved.

Comment: 25-1-OL;. Some people may remember me from the early 90s. I know at least Mike Leonardi was here in the room. There he is! That's when we fought off the whole proposition to build a low level radioactive waste dump here in Ohio. I'm sorry I wasn't here in the 70s to resist against the Davis-Besse, but if I lived in Ohio then, I would've.

Comment: 26-1-OL; We are blessed in that we live in 20% of the world's surface freshwater here in the Great Lakes the most precious resource on the planet. Without it, life is not possible. And yet we have a nuclear power plant that has an abysmal record, Davis-Besse. But I'm here to tell you that it's not about the generation of energy. It's about the concentration of wealth and power. Political economy.

Comment: 26-12-OL; Now we've got to stop the production of this material, and I say do not relicense this and the plant should be shut down immediately.

Comment: 27-2-OL; So, I just agree that they should not get relicensing whatsoever. They have done the worst job in managing this plant. They do not follow good engineering principles. They're making the same mistakes all over again. They should be shut down permanently, and they should not be relicensed.

Comment: 14-18-OL; We haven't done enough. We haven't killed this monster yet. But, I think I had hopes that it would die a natural death. That as each plant reached the end of its operating license it would simply be pulled off the market for economic reasons. Now they're trying to give us undead nuclear power plants. Nuclear zombie power plants.

Comment: 14-20-OL; So, I wanted to thank everyone here for keeping up the fight. And I think Kevin has one more comment about the next step would be after this comment period is over. We'll submit comments. But after this is finished then we're going to have interventions. Once they grant the license. We're expecting they'll grant it. We'll be able to perhaps put in one last line of defense to stop this monster. Let it die a natural death. So, here's Kevin one last time.

Comment: 31-1-OL; Hello my name is Suzanne Patser and I live in Columbus Ohio and I'm very concerned about the Davis-Besse plant coming back online. I can't think of anything that would be a worse idea for our state.

Comment: 31-5-OL; So I am absolutely 100% against any nuclear plant opening anywhere. It is not the type of energy that our country needs, our State needs, that Toledo needs that anybody needs that lives or works in that area.

Comment: 33-1-OL; Hello my name is Scott Robinson from Worthington Ohio and I'm opposed to the relicensing of the Davis-Besse nuclear power plant. Thank you.

Comment: 34-2-OL; It puts people in Toledo especially in danger and could possibly extend as far south as Columbus. So I really do not think that this should be renewed.

Comment: 35-1-OL; I'm Emily Journey and I'm from Westerville Ohio. I'd like you to know that I do not support the relicensing of the Davis-Besse Atomic reactor.

Comment: 36-4-OL: So because of the ongoing contamination and the inherent nature of the radioactive contamination in the process of it being mined and transported. I would like the commission to look very closely at this and do what we all know is correct and keep Davis-Besse closed.

Comment: 37-1-OL; Alright. I'm totally against the nuclear power. I just I'm an old guy and I've been around for many years and I know the history damages that it can cause and I'm really opposed to it. That's why I'm on camera here. That's why I'm on camera and I will do whatever I can to support the cause against it. The actions, take actions against it. That what all I got to say. Thank you very much.

Comment: 38-2-OL; By all means please do not approve the relicensure of Davis-Besse. Thank you

Comment: 39-5-OL; I'm very disconcerned for the future of our children and future generations in terms of the toxicity and global warming. Also we don't need this energy and it is just not a good way for our country to be going. Thank You

Comment: 40-1-OL; My name is Bernadine Kent and I'm from Columbus Ohio and I have been informed of the Davis-Besse power plant in Toledo. I'm concerned about this plant extending their license for the next 20 years. To me that doesn't make any sense especially since they have problems.

Comment: 42-1-OL; My name is Pete Johnson I'm associated with the Columbus free press and citizens alliance for secure elections and I'm definitely opposed to relicensing Davis-Besse.

Comment: 43-1-OL; Basically I mean I've heard a lot of the science about it and I can't really say a whole lot about that. But what I can say is that you it's going to be relicensed supposedly for 20 more years and that would be to 2037, I believe, so I'm opposed to the relicensing of Davis-Besse because I think it's a youth issue and basically this is an important youth issue its important to the young people who are not allowed to vote and be politically active and children and the future generations.

Comment: 16-14-OL; Hi my name is Patricia Marida. I'm the chair of the nuclear issues committee at the Ohio Sierra Club. I gave a presentation before the Nuclear Regulatory Commission on November 4, 2010, as to why the Sierra Club opposes the extension of a license at Davis-Besse.

Comment: 16-15-OL; Tonight I'm going to give my personal statement. I think that it's well recorded there are 10 pages of documentation of very serious violations and illegalities, and actually nuclear accidents at Davis-Besse. It is the most accident ridden power plant, nuclear power plant in the nation. It is very clear that we have a serious problem here also because the Nuclear Regulatory Commission has been very laxed in enforcing Davis-Besse. In fact allowing them to, allowing FirstEnergy and Davis-Besse Operating Company to continue operating the plant when it was supposed to be shut down for an inspection. And the reactor head came within 1/8" or metal left between containment and a nuclear holocaust. So It is very clear that the regulatory and the supervision is lacking were also would like the NRC to be sure to cover the safety issues there, there are many safety issues.

Comment: 47-1-OL; First Energy should not be allowed to continue to operate Davis-Besse after 2017. The people of Northeast Ohio are familiar with First Energy's pathetic record in protecting the safety of people who live in the region.

Comment: 48-1-OL; We are area residents near the Davis-Besse plant as we live in Wood County. We would like to have this nuclear power plant eliminated. We say the article about it in our local paper, the *Sentinel-Tribune*. It is an old plant and has had a history of accidents/problems.

Comment: 14-14-OL, 14-16-OL, 14-17-Ol, 14-18-OL, 14-20-OL, 16-14-OL, 16-15-OL, 30-1-OL, 34-3-Ol, 34-7-OL, 39-6-OL, 39-10-OL, 43-4-OL, 44-2-OL, 50-1-OL, 51-1-OL, 52-1-OL, 53-1-OL, 54-1-OL, 55-1-OL, 56-1-OL, 57-1-OL, 58-1-OL, 59-1-OL, 60-1-OL, 61-1-OL, 62-1-OL, 63-1-OL, 64-1-OL, 65-1-OL, 66-1-OL, 67-1-OL, 68-1-OL, 69-1-OL, 70-1-OL, 71-1-OL, 72-1-OL, 73-1-OL, 74-1-OL, 75-1-OL, 76-1-OL, 77-1-OL, 78-1-OL, 79-1-OL, 80-1-OL, 81-1-OL,

81-6-OL, 82-1-OL, 83-1-OL, 84-1-OL, 85-1-OL, 86-1-OL, 87-1-OL, 88-1-OL, 89-1-OL, 90-1-OL; Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037.

Comment: 30-5-OL, 43-8-OL, 44-6-OL, 50-5-OL, 51-5-OL, 52-5-OL, 54-5-OL, 55-5-OL, 56-5-OL, 57-5-OL, 58-5-OL, 59-5-OL, 60-5-OL, 61-5-OL, 62-5-OL, 63-5-OL, 64-5-OL, 65-5-OL, 66-5-OL, 67-5-OL, 68-5-OL, 70-5-OL, 71-5-OL, 72-5-OL, 73-5-OL, 76-5-OL, 77-5-OL, 78-5-OL, 79-5-OL, 80-5-OL, 81-10-OL, 82-5-OL, 83-5-OL, 84-5-OL, 85-5-OL, 86-5-OL, 87-5-OL, 88-5-OL, 89-5-OL, 90-5-OL; Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Comment: 53-5-OL; Until nuclear power can be made safe for the environment by solving the waste problem, I do not want it to continue in operation. Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Comment: 69-5-OL; Now is not the time to expand nuclear energy in Ohio. Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Comment: 70-5-OL; These plants have been a financial leach on the people long enough! Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Comment: 74-5-OL; Davis-Besse is not safe and we seem to want to wait until something really disastrous happens before anything is done—when it is too late! Nuclear energy is NOT clean energy and we have the perpetual problem of what to do with nuclear waste. Dear Nuclear Regulatory Commission, please say NO to Davis Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis Besse.

Comment: 77-5-OL; Davis-Bess is far too dangerous. Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Comment: 81-5-OL; We are moving to Westlake, Oh. soon and don't want to have to worry about unsafe Davis-Besse blowing up near us. I have read this petition and agree with it all. Dear Nuclear Regulatory Commission, please say NO to Davis Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis Besse

Comment: 81-10-OL; Thank you for your prompt action on this matter for the safety and health of the People of Ohio. I have read this petition and agree with it all!!!! Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Response: *These comments are general in nature and express opposition to FENOC, nuclear power, the license renewal of Davis-Besse, or all of these. The majority of these comments express opposition for reasons outside the scope of license renewal. Expanded responses to these comments are documented in the Davis-Besse Scoping Summary Report. Those comments that express opposition for in-scope reasons are documented in the applicable* *technical area within this appendix. The NRC did not evaluate these comments in the development of the SEIS, as they did not provided any new and significant information.*

A.1.9 Postulated Accidents & SAMA (PA)

Comment: 14-8-PA; I think an environmental review needs to look at what would happen if the concrete wall either collapsed from radiation or if the perimeter was destroyed through the attack of a plane or through the attack of some motorist or some terrorist group planting explosives. What would happen to the radioactive dust and the containment structure because of the weakening?

Comment: 16-12-PA; And, I would like to add also that the pools of radioactive waste are extremely vulnerable to terrorists attacks or to other explosions. So, that certainly should be a consideration of the NRC to look at; that is, how are we going to protect those pools of radioactive waste?

Response: *These comments express concern for the potential adverse environmental impacts associated with postulated accidents. The comments also raise concerns that the GEIS and SEIS do not adequately evaluate the possible impacts of beyond-design-basis accidents initiated by terrorist attacks or sabotage. Under 10 CFR 51.53(c)(3)(ii)(L), license renewal applicants must consider alternatives to mitigate severe accidents if the staff has not previously evaluated SAMAs for the applicant's plant in an environmental impact statement or related supplement or in an environmental assessment. The purpose is to ensure that potentially cost-beneficial, aging-related plant changes (i.e., hardware, procedures, and training) with the potential for improving severe accident safety performance are identified and evaluated*

An analysis was developed to support offsite consequence estimates for Level 3 probabilistic risk assessments of severe accidents at light water reactors. Such assessments have long served as the foundation for NRC regulatory decisions, which include analyses of health and safety, land contamination, and economic consequences (NRC, 2009). A description of the code that was used to perform the calculations of the offsite consequences of a severe accident for Davis-Besse can be found in NUREG/CR 6613, Code Manual for MACCS2: Volumes 1 and 2 *(NRC, 1998). It is beyond the scope of the Environmental Report (ER) and the SEIS to describe in detail the code's analytical process. However, a description of the application of the MACCS2 code for the Davis-Besse analysis has been provided in the relevant portions in Appendix F of this SEIS.*

The SEIS provides a site-specific evaluation of SAMAs in Chapter 5 and Appendix F. However, in the GEIS, the NRC staff did evaluate existing impact assessments performed by the NRC and by industry at 44 nuclear plants in the United States and concluded that the risk from beyond-design-basis accidents at existing nuclear power plants would be small.

With respect to spent fuel pool accidents, onsite storage of spent fuel is considered a Category 1 issue, which was evaluated in the GEIS; therefore, accidents would be encompassed by the analysis of the Category 1 issue of onsite spent fuel storage. As such, the need for mitigation alternatives within the context of renewal has been considered, and the Commission concludes that its regulatory requirements already in place provide adequate mitigation incentives for onsite storage of spent fuel. No discussion of mitigation alternatives is needed in an LRA because the Commission has generically concluded that additional site specific mitigation alternatives are unlikely to be beneficial (NRC, 1996). In addition, the NRC *staff did not find any new and significant information that would call the analysis of the Category 1 issue into question.*

A detailed discussion of Postulated Accidents and SAMAs can be found in Chapter 5 and Appendix F of this SEIS.

Comment: 14-9-PA; We are in an area of the country that could be affected by the fault if there is a large earth quake, and I think this may not have been examined sufficiently in the environmental impact study.

Response: *The comment expresses concern for the seismic design of Davis-Besse. The seismic design of the plant is outside the scope of the environmental review; however, structures that are in scope of license renewal are examined and the results are documented in the publication of NRC's Davis-Besse safety evaluation report (SER).*

Results of prior geologic, seismologic, and subsurface investigations indicate no evidence of fault traces, offset geomorphic features, shear zones, faults, sand boils, soil flows, or any other direct or indirect physical effects of prior earthquakes. The nearest fault is the Bowling Green Fault, which is located 35 miles west of the site. Geologic, including seismic, information is presented in Chapter 2 of this SEIS.

Insofar as the comments suggest that a seismic event during the period of license renewal could result in environmental impacts, such impacts were considered as part of the SEIS discussion of severe accidents initiated by external phenomena and by the GEIS in its "Review of Existing Impacts." As discussed in Chapter 5 of the draft SEIS, the NRC staff evaluated the risk of beyond-design-basis earthquakes at existing nuclear power plants, and determined that the risk from such events is SMALL; further, the NRC determined that the risks from other external events are adequately addressed by the generic consideration of internally-generated severe accidents in the GEIS, and that this issue should be considered on a site-specific basis in a plant's SAMA analysis. FENOCs SAMA analysis included a search for mitigation measures for accident scenarios initiated by fire and seismic external events. A detailed discussion can be found in Chapter 5 and Appendix F of this SEIS.

Additionally, the NRC has directed operators of nuclear power plants to reaffirm their existing abilitiy to resist earthquakes and flooding as a result of the accident at the Fukushima Dai-ichi nuclear power plants in 2011. Plant-specific actions taken in reponse to lessons learned from the Fukushima Dai-ichi accident can be found at: http://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard/japan-plants.html*.*

A.1.10 Radioactive & Non-Radioactive Waste (RW)

Comment: 20-2-RW; Kevin already mentioned this, but, the expectation when Davis-Besse and all the other nuclear reactors were built was that would mean that there would be a federal repository for all of the high-level nuclear waste and that is not available. And as Kevin mentioned, the Yucca Mountain, facility has been, the funding for it has been discontinued, it has no operating license. That means that for 33 years, all of the high-level radioactive waste generated at Davis-Besse are still being stored on-site, initially in a cooling pool, as I understand it, and then, a few years ago, they, they constructed above-ground containers for the fuel after it cools off, in this pool. So, my, position would be that no nuclear plant license extensions should be granted until there's a long-term storage facility available for these nuclear wastes. And, one of the troubling indicators, I think, is I read through the Environmental Study that is, is mandated for this license extension.

Comment: 23-7-RW; There's no place to put the waste and we believe that it is immoral to burden our children and generations far into the future with deadly waste.

Comment: 24-1-RW; At that time, planning for the long term containment of the radioactive waste was to be done in the future. We now know that we still do not have any methods approved for the long term storage and isolation of the tons of spent radioactive rods and other radioactive material that is made during the mining and processing of the fuel. This material will be dangerously radioactive to humans and other living things for hundreds of thousands of years. To put that into perspective, we will be starting on the year 2011 of the common era on January 1st.

Comment: 26-11-RW; In addition there is a ISFSI. It's dry cask storage of high level nuclear waste. High level nuclear waste is currently stored outside at the Davis-Besse. This has a..there..No one wants this nuclear waste. Yucca Mountain is not going to happen. It's not geologically sound. It's not scientifically sounds. It's not going to happen. Nobody wants this stuff. Yet, the NRC runs a con game. They have "confidence" a "waste confidence" decision. It is a con game. They're asking the public, the folks of Toledo, of Ohio, "Please accept our promise to take this waste at some point. We don't know what to do with it just yet. But, we'll figure it out later on. But, in the meantime just let us go and make more." It's been said that nuclear power is the gift that keeps on giving. It keeps on giving the radioactive waste, and the power is fleeting. But we are left with the deadly lethal legacy for tens of thousands of years.

Comment: 39-1-RW; My name is Connie Hammond I live in Columbus Ohio. I'm a member of the Sierra Club nuclear issues committee and the Ohio Green party. My primary concern is with the toxic legacy that we are leaving for our Children and Grandchildren. Beyond the obvious radioactivity and pollution that these plants produce.

Response: *These comments address concerns regarding the management of radioactive waste at the Davis-Besse site.*

No new and significant information is provided in these comments. Therefore, no changes have been made to the SEIS because of these comments. The management of radiological and non-radiological waste is discussed in Chapter 2 of this SEIS. In addition, Chapter 6 of this SEIS contains information on spent nuclear fuel.

Comment: 24-4-RW; Originally nuclear power was touted as power that would be produced so cheaply that it would not even have to be metered. Now we are being told that it will solve the problem of pollution generated by using fossil fuels. We will be replacing carbon problems of pollution, generated by using fossil fuels, with problems of radioactive pollution for which there is no cleanup but time.

Comment: 36-1-RW; Hi my name is Bob Patraicus, I have a PhD in political Science. I am a JD. My concerns with Davis-Besse begin with the obvious. There has been contamination. Radioactive contamination at that plant in the past it continues to occur. Moreover the entire process of mining transporting and allowing radioactivity as a fuel source is inherently contaminating.

Comment: 43-2-RW; A lot of the people who are working to relicense this nuclear facility are going to have died of old age by the time its finished and then when it's finished we are going to need to worry about cleaning it up keeping it in repair and I don't think that people are really looking ahead to the future and considering you know the work that is going to be involved to make sure that its safe. Nuclear waste and radioactivity has a half life of gabillion years to put it in kids terminology and you know a lot of the people who are going to be effected by nuclear waste are not even born yet. And so speaking on behalf of the youth, babies, people who cannot speak for themselves. I just wanted to say that relicensing Davis-Besse and using nuclear energy is wrong. It may be expedient for the people who are only planning on living you know 10 or 20 more years then fine but they don't care if the world is going to be destroyed. But there are people who that effects and I would just urge the people who are making this decision to think of the future generations and to be able to think about somebody other than yourselves really.

Comment: 16-4-RW; Contamination occurs throughout the milling, refining, transport and conversion of uranium to uranium hexafluoride and then enrichment in which the gaseous diffusion process took as much energy as a large city to enrich the uranium. Then additional uranium must be formulated to ground. An enormous waste - - uranium hexafluoride which is 99 percent of the original uranium but is not fissionable and, therefore, not useable for energy. However, it is just as radioactive and must be then converted back to the more stable uranium oxide. A newly-operated plant at Piketon will take 25 years running around the clock to deconvert the 40,000, 14-ton canisters containing hexafluoride that are already on the site, and that is not counting how much more that might be generated from other conventional facilities, enormous amounts of energy due to this process.

Comment: 16-24-RW; The Sierra Club opposes nuclear energy in its entirety, citing serious environmental, health, and public expense issues throughout the nuclear fuel cycle. The time frames needed to guard the radioactive nuclear waste generated from this process are geologic in nature. Isolating the radioactive nuclear waste will consume public time and money for generations to come. The only viable solution for radioactive waste is to stop generating it. Radioactive contamination and waste are a major reason to discontinue the use of nuclear power. The risk and reality is that radioactive contamination has occurred, is occurring and will continue to occur throughout the nuclear power cycle. Mining is leaving radioactive tailings exposed to the air and water on First Nations land in the US, Canada, and Australia. Contamination occurs throughout the milling, refining, transport, conversion of uranium to uranium hexafluoride (UF_6), and then enrichment - which in the gaseous diffusion process at Piketon, Ohio, took as much energy as a large city. Then the fissionable uranium must be formulated into rods. An enormous waste stream is the depleted uranium hexafluoride (DUF_6), which is 99% of the original uranium but is not fissionable and therefore not usable for energy. However, it is just as radioactive and must be deconverted back to the more stable uranium oxide. A newly operating plant at Piketon will take 25 years running round-the-clock to deconvert the 40,000 14-ton canisters of DUF_6 already on the site, not counting how much more will be generated from other enrichment facilities.

Comment: 32-1-RW; Hi my name is James Whitaker and I'm from in Columbus Ohio and as far as the creation of more radioactive waste here in the state of Ohio I don't think we need to do that I think that the any of the fuels that we have as far as fossil fuels is adequate if it's done properly. But I certainly don't want to create more nuclear waste.

Comment: 16-18-RW; So the fleeting use of electricity in the past has left us with a legacy of nuclear waste. But however we understand that the Nuclear Regulatory Commission does not have to even consider that when they are deciding whether or not to license Davis-Besse because in the past the Nuclear Regulatory Commission has made a decision that they are not going to, that this doesn't have anything to do with a new license despite the fact that much more of this dangerous radioactivity is going to be stored at the plant there is no solution for it there is no magic solution that will turn lead into gold it will remain radioactive for millions of years and will gradually spread itself around. It is so important for the Nuclear Regulatory Commission to look at issues of the onsite storage and to look at containing at least in the near future making this waste safe. The new waste is going to be generated there really does need to be a plan for isolating it onsite. We are not asking for a plan to isolate it for a hundred million years because we all know that's an impossibility. We are asking for some sort of a plan working with Doctor Arjun Makhijani of the Institute for Environmental and Economic Research in Washington DC, we are asking for you the NRC to work with him and look at some serious ways of isolating this waste in canister that are hidden in bunkers where they are safe from terrorist attack.

Comment: 30-3-RW, 34-5-RW, 39-8-RW, 43-6-RW, 44-4-RW, 50-3-RW, 51-3-RW, 52-3-RW, 53-3-RW, 54-3-RW, 55-3-RW, 56-3-RW, 57-3-RW, 58-3-RW, 59-3-RW, 60-3-RW, 61-3-RW, 62-3-RW, 63-3-RW, 64-3-RW, 65-3-RW, 66-3-RW, 67-3-RW, 68-3-RW, 69-3-RW, 70-3-RW, 71-3-RW, 72-3-RW, 73-3-RW, 74-3-RW, 75-3-RW, 76-3-RW, 77-3-RW, 78-3-RW, 79-3-RW, 80-3-RW, 81-3-RW, 81-8-RW, 82-3-RW, 83-3-RW, 84-3-RW, 85-3-RW, 86-3-RW, 87-3-RW, 88-3-RW, 89-3-RW, 90-3-RW; NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY! Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming.

Response: *These comments express concern over the uranium fuel cycle and of the management of nuclear waste. The environmental impacts of the uranium fuel cycle and solid waste management are contained in Chapter 6 of this SEIS.*

No new and significant information is provided in these comments. Therefore, no changes have been made to the SEIS because of these comments.

A.1.11 Socioeconomics (SE)

Comment: 1-1-SE; Good afternoon. My name is Mark Stahl, and I'm the President of Ottawa County Commissioners. Ottawa County is successful because we surround ourselves with successful community partners, and Davis-Besse is one of those community partners, who we look very favorably upon. You will hear from some other agencies, the nonprofits, the contributions that you make back to our community helps us tremendously, and we greatly appreciate that. We also as Commissioners appreciate our NRC partnership. We have had conversations with you, I know, through the years, and we appreciate those unbiased conversations that we've had in regard to Davis-Besse.

Comment: 2-3-SE; Many of the Davis-Besse employees live in the community and are important assets to Ottawa County. I think it's very important that the corporate structure that's been put in place to oversee the operations of Davis-Besse continue, and I think it's a good structure.

Comment: 4-1-SE; I'm Chris Galvin, Director of the United Way in Ottawa County. The Davis-Besse Nuclear Power Station and on a larger scale the First Energy Corporation are a tremendous community partner to the local United Way. Since 1993, First Energy has contributed more than 13.5 million dollars to United Way of Greater Toledo which serves Ottawa, Wood and Lucas Counties. 3.1 million came from corporate gifts, 10.4 million from its incredibly generous employees. First Energy has also earned United Way's Pillar Award each year since at least 1992. Our data doesn't go back any further than that. It seems they consistently give more than a hundred thousand dollars each year to the Greater Toledo campaign. Not only does this community consistently get solid financial support from First Energy and its employees, but executive leadership has also demonstrated exceptional personal commitment to our work. In 1993, Don Saunders chaired the local United Way campaign, raising 12.5 million Dollars. In 2005, Jim Murray, now retired, but formerly First Energy President of Ohio Operations, chaired the local United Way campaign. Under Mr. Murray's leadership, the campaign raised 13.3 million Dollars. We also presented Mr. Murray with our Prestigious Caring Award in 2006 for demonstrating value and concern for our community through vision, leadership, service and commitment to the people of our community. In 2009, Trent Smith, Regional President of Toledo Edison First Energy, became chairman of the United Way of Greater Toledo's Board of Trustees and has drawn to a close on his second year of service. Mr. Smith has gone above and beyond the level of service, dedication and commitment we typically see from board chairs. He has become involved in virtually every level of our work, digging in and helping find real solutions. In addition to these executive leaders, numerous upper-level management have supported United Way by using their voice and relationships to help secure financial and volunteer support as well as advocating on behalf of the United Way and the Northwest Ohio Region. In addition to Don Saunders, Jim Murray, and Trent Smith, some of the stand-out employees include Debbie Paul, Mike Adams, and Mel Lomack. Additionally, in the 1990s Jennifer Schreiber served five years as the chair of our community impact cabinet, the highest level of community impact volunteers who decide how money is allocated in this community. Also joining her on the cabinet was Jenny Ammadon. Both are not retired. First Energy also demonstrates incredible commitment to the communities through sponsorships and/or participation in programs and events. In 1993 and 1994, Davis-Besse sponsored our loaned executive program. Jim Ferris, now retired from Davis-Besse, was the landed executive in those two years. First Energy has also sponsored loaned executives over the years, from 1996 continuing for 11 years. Employees consistently contribute to and participate in Stamp Out Hunger and/or Scouting for Food efforts each year. They were a major sponsor of our Family Food Fund in 2008. First Energy was the sponsor of our Community Building event in 2005, and was the initiator and sponsor of the Veterans Appreciation Event in 2006, which continued until 2009.

Comment: 5-1-SE; On behalf of the Union, I would like to voice our support in this public. A renewal of this license will not only promote and maintain employment for our members who live and shop and send their children to school in that area, but it will also assure the delivery of reliable electric service to our customers.

Comment: 8-2-SE; We also because we have the mandate but we do not receive government funds, I can speak to what Chris Galvin of United Way said with regards to the money that comes into the United Way. We are a United Way Agency, but even besides that, we have profited, the Red Cross organization, from financial support on many levels from First Energy and Davis-Besse as well as from the volunteer aspect of the employees that respond through the involvement of their families. We have three or four blood drives that we conduct at Davis-Besse that are very successful. We have had a lot of leadership that has come out of the Davis-Besse plant. Chuck Witt was a six-year chairman for our local advisory board. Currently, Terry Mortis, who is the Regional Manager also of the Ottawa County District with First Energy that provides a lot of leadership, a lot of guidance to the Red Cross.

Comment: 9-2-SE; Davis-Besse over the years has provided a good living, a good income for many residents of Ottawa County and surrounding counties and especially now in a time when unemployment is high.

Comment: 10-1-SE; Davis-Besse has been very generous with their donations to the Food Pantry in the past years. I also would like to say that if it were to close, they may be coming to our Food Pantry, and I would hate to see that.

Comment: 11-2-SE; It is also important from a license renewal aspect, 20 additional years of this asset to provide for the employment opportunities for the local community, and many of our young engineers are graduating from college today who wonder if nuclear power is a viable future and a career path. It's important to know that plants such as Davis-Besse and others are undergoing renewal process have a future that they can depend on.

Comment: 12-4-SE; By extending the license here at Davis-Besse, it would continue to provide good clean power that's critical. In addition to that, also supporting the much-needed tax base, not only to this area but to the State, and I'm confident along with our members, that IBEW, Local 245, that Davis-Besse will continue to be safe, not only for the employees but also for the area.

Comment: 1-3-SE; And, the county isn't successful unless you're surrounded by successful community partners, and I can tell you that Brush-Romley (ph) is one of those partners. They contribute tremendously to the good of this community. We also cherish the NRC's partnership that we have. You are our eyes and our ears. You are what helps us maintain the public safety here, and we appreciate that as well.

Comment: 2-5-SE; So I've had some broad experience with the Davis-Besse people and with the Nuclear Regulatory Commission, and I think this process and the processes that the NRC uses are great processes, but I think it's important to know that when we look at what Davis-Besse has done over the years and how they have responded to Ottawa County as a community, we couldn't have asked for anything more.

Comment: 15-2-SE; The renewal of this license will promote maintaining employment of not only our members who live and shop and send their children to the schools in this area, but it will also ensure the delivery of reliable electric service to all of our customers.

Comment: 11-5-SE; We have long-term employment opportunities for the surrounding communities. Younger engineers graduating from college need to know that the nuclear power is very efficient and is a great career. Davis-Besse has a significant impact on the economy of the local area, providing folks, several hundred people employment, providing materials and service in support of the operation of the plant. We have always had a commitment to ensure public safety and a protection of the environment, and that commitment continues today. As you have already heard from several of those speakers, we enjoy a good relationship with the surrounding communities, and we look forward to sustaining this relationship for an additional 20 years.

Comment: 4-3-SE; The Davis Besse Nuclear Power Station, and on a larger scale, the First Energy Corporation, are the tremendous community partner to the local United Way. Since 1993, First Energy has contributed more than \$13.5 million to United Way of Greater Toledo which serves Ottawa, Wood, and Lucas counties. \$3.1 million came from corporate gifts. \$10.4 million from its incredibly generous employees: First Energy has also earned United Way's Pillar Award each year since at least 1992...which means they consistently give more than \$100,000 each year to the greater Toledo campaign. Not only does this community consistently get solid financial support from First Energy and its employees, but executive leadership has also demonstrated exceptional personal commitment to our work. In 1993, Don Saunders chaired the local United Way campaign, raising \$12.5 million. In 2005, Jim Murray, now retired, but formerly First Energy President of Ohio Operations, chaired the local United Way campaign. Under Mr. Murray's leadership, the campaign raised $13.3 million. We also presented Mr. Murray with our prestigious Spirit of Caring award in 2006 for demonstrating value and concern for our community through vision, leadership, service, and commitment to the people of our community. In 2009, Trent Smith, regional president of Toledo Edison/First Energy, became chairman of United Way of Greater Toledo's Board of Trustees and is drawing to a close on his second year of service. Mr. Smith has gone above and beyond the level of service, dedication, and commitment we typically see from Board chairs. He has become involved in virtually every level of our work, digging in and helping find real solutions. In addition to these executive leaders, numerous upper level management have supported United Way by using their voice and relationships to help secure financial and volunteer support as well as advocating on behalf of United Way and the NW Ohio region. In addition to Don Saunders, Jim Murray, and Trent Smith, some of these standout employees include Debbie Paul, Meg Adams, and Mel Womack. Additionally, in the 1990s, Jennifer Shriver served five years as the chair of our Community Impact Cabinet, the highest level of community impact volunteers who decide how money is allocated in the community. Also joining her on the cabinet was Jenny Amidon. Both are now retired. First Energy also demonstrates incredible commitment to the community through sponsorships of or participation in programs and events. In 1993 and 1994, Davis Besse sponsored our Loaned Executive program, a program that provides United Way with temporary campaign employees. First Energy began sponsoring this program in 1996 and continued for 11 years. Employees consistently contribute to and participate in Stamp Out Hunger and/or Scouting for Food efforts each year. They were a major sponsor of our Family Food Fund in 2008. First Energy was a sponsor of our Community Building Event in 2005 and was the initiator and sponsor of our Veterans' Appreciation Event in 2006 which continued until 2009.

Comment: 15-6-SE; A renewal of this license will promote and maintain employment of not only our members, who live and shop and send their children to schools in this area, but...it will assure the delivery of reliable electric service to all our customers.

Comment: 25-5-SE; And economically, as we all know, and others have testified to, nuclear power does not make economic sense. In as much as our economy is the management of our household, I think it relates directly to the ecology of our house or our State or our community here, and that ecological system that we are all part of and that this nuclear power plant and the NRC and the other governmental leaders and the other citizens that aren't here, that ecosystem is very much a part of the environment, and any hearing that focuses on environmental impacts has to include all of that as the one ecosystem or environmental that we're in.

Response: *These comments concern the socioeconomic impact of Davis-Besse. The majority of the comments are supportive of license renewal, the applicant, in general, and describe the socioeconomic benefits of Davis-Besse. Comment 25-5-SE expresses opposition to license renewal because of the environmental costs. The socioeconomic impacts of renewing the Davis-Besse operating license are discussed in Chapters 2 and 4. In addition, the socioeconomic impact of not renewing the operating license (no action alternative) is discussed in Chapter 8.*

A.1.12 Support of License Renewal (SL)

Comment: 1-2-SL; So, I will let these two gentlemen fill you in, but as President of the Ottawa County Commissioners, I'm here to offer our support to you, Davis-Besse, in your application process.

Comment: 2-4-SL; We look forward to a license renewal. Ottawa County wants Davis-Besse to stay, and welcome them in the future and urge the NRC to move forward with this license renewal.

Comment: 3-2-SL; So, really, all this adds up to the fact that our relationship in Ottawa County with Davis-Besse is a benefit to the residents of Ottawa County

Comment: 4-2-SL; Davis-Besse and First Energy are a valued community partner, both philanthropically and economically. They have been incredible contributors to our community over the past 20 years, and we only hope that this will continue for at least another 20 years.

Comment: 6-3-SL; So, it is opinion of the Black Swamp Bird Observatory that the Davis-Besse Nuclear Power Plant is a critical player in bird conservation in the entire region of the western hemisphere.

Comment: 8-3-SL; I ask hard questions and I sometimes like the answers, sometimes I'm not so sure about the answers, but I am confident in the safety of the Davis-Besse plant and the good that it does in the community for the people that are involved.

Comment: 9-3-SL; We support the license renewal, and we ask the NRC to support it as well.

Comment: 12-2-SL; In addition to that, we not only work out local issues but something more important or just as important. We work together on issues in Washington also through our labor management committee. A lot of people probably aren't aware of that, but we do that through our Land Pact Committee.

Comment: 1-4-SL; With that said, we're going to have a few people from the Agency describe what Davis-Besse does for Ottawa County, and on behalf of the Ottawa County Commissioners, I would like to extend our full support in regards to their application.

Comment: 15-1-SL; And, on behalf of the Union, I would like to voice our support at this public meeting for a multitude of reasons.

Comment: 11-4-SL; This effort is important to us for several reasons. This licensing extension will allow us to continue to provide safe, reliable environmentally friendly electricity to our customers for years to come. Davis-Besse is an important asset, and the Company's generation portfolio shows we have a good mix of power generation service.

Comment: 4-4-SL; Davis Besse and First Energy are a valued community partner, both philanthropically and economically. They have been incredible contributors to our community over the past 20 years and we only hope this will continue for at least another 20.

Comment: 15-5-SL; My name is Jane Ridenour and I am President of OPEIU Local 19. OPEIU stands for Office & Professional Employees International Union and we represent the clerical support staff at Davis Besse. On behalf of the Union I'd like to voice our support at this public meeting.

Response: *These comments are general in nature and express support for nuclear power or the license renewal of Davis-Besse or both. The comments provide no new and significant information and will not be evaluated further*.

A.1.13 Terrestrial Resources (TR)

Comment: 6-1-TR; Our organization has been conducting migratory bird regions in this area for more than 20 years, and we really take pride in this marriage, and we work hard like a good spouse to maintain it. The marsh represents a critical stop-over habitat for millions of migratory birds. And, in fact, many the world's leading bird experts consider this marsh to be one of the most critical areas of stop-over habitat in the entire western hemisphere.

Comment: 6-2-TR; The observatory in these 20 years have had the full support of First Energy and Davis-Besse to conduct this critical research and, in fact, during a very exciting tumultuous time in this country's history, we were very afraid that our consistent effort meaning that seven days a week, spring and fall, during song bird migration, our research staff was out at that marsh in front of the power tank conducting this research seven days a week for more than 20 years. When the tragedy occurred on 9/11, we were very concerned for, of course, the human tragedy, but also concerned that our research would be interrupted. And, in fact, Davis-Besse really fully understood the importance of this research, and the importance of conserving the integrity of the data set, and we didn't miss a single day. And, perhaps nothing else, no other event in our history or recent history speaks more to how much they have said they understand the critical role that they play in local environmental and conservation issues than that event. So, based on our long-standing relationship, it is our opinion the Davis-Besse and First Energy have not only worked to fully understand and fully support the environmental issues for this local community, but have also fully embraced the role that they play in all of these issues.

Response: *The NRC staff agrees with the Black Swamp Bird Observatory in its characterization of Davis-Besse marsh habitat as critical stop-over habitat. Additionally, the NRC staff incorporated the Black Swamp Bird Observatory's publically available research publications into Chapter 2 of the draft SEIS.*

Comment: 45-1-TR; There are no Federal wilderness areas or designated critical habitat within the vicinity of the proposed site. Davis-Besse consists of 954 acres, of which approximately 733 acres are marshland that is leased to the U.S. Government as part of the Ottawa National Wildlife Refuge. In a letter dated December 16, 2009, we provided comments to FENOC on the proposed 20-year renewal of the operating license for Davis-Besse. At this time we have no additional comments.

Response: *The NRC staff incorporated the U.S. Fish and Wildlife Services' information provided in this comment into the draft SEIS, including the information in the referenced December 16, 2009, letter to FENOC, which was provided in Appendix C of FENOC's ER.*

Comment Letters and Meeting Transcripts

The following pages contain the comments, identified by commenter designation (from Table A-1) and comment number, from letters, e-mails, public scoping meeting transcripts and the transcript from the People's Hearing.

Commenter: Mark Stahl

are Mark Stahl of the Ottawa City Commission, and then Jere Witt of Ottawa County, and Fred Petersen of the Ottawa County EMA.

If you would like to speak from this microphone, that would be fine. Go ahead and lead off.

MR. STAHL: Thanks, Mark.

Good afternoon. My name is Mark Stahl, and I'm the President of Ottawa County Commissioners. Ottawa County is successful because we surround ourselves with successful community partners, and Davis-Besse is one of those community partners, who we look very favorably upon.

You will hear from some the other agencies, the nonprofits, the contributions that you make back to our community helps us tremendously, and we greatly appreciate that. 1-1-SE

We also as Commissioners appreciate our NRC partnership. We have had conversations with you, I know, through the years, and we appreciate those unbiased conversations that we've had in regard to Davis-Besse.

So, I will let these two gentlemen fill you in, but as President of the the Ottawa County Commissioners, I'm here to offer our support to you, 1-2-SL

Commenter: Jere Witt

Davis-Besse, in your application process.

Thank you.

MR. WITT: Thanks, Mark. I appreciate you putting Mark before Fred and I because he's our boss. I'm Jere Witt. Many of you know me. I'm County Administrator for Ottawa County. I've been with the County for 32 years, and ironically when I looked at the dates on there, I started with the County on July 20, 1978, and I believe the plant began operating in on July 31, 1978. So, we're pretty close on our birth dates there.

I've been involved, as I said earlier, many years with Davis-Besse and especially within the last five to ten years. I was part of the restart overview panel that worked for two years on the head issues. I got my nuclear degree during that two years. I much appreciated, and I really got a better feeling for Davis-Besse and the nuclear industry.

I currently serve on the Company Nuclear Review Board to ensure that Davis-Besse continues to operate safely, and there's a bunch of nuclear experts on there and then there's me, but it's easy for me a use their expertise to see if Davis-Besse operates safely, and I'm happy to say that every time we've met, we have concluded that Davis-Besse does continue to operate 2-1-OS

2-1-OS continued

safely.

I attend and participate in the NRC quarterly exit meetings of Davis-Besse, and those have been another way for Ottawa County to keep informed on what's going on with Davis-Besse.

I receive many, many, many more than I really want to see daily e-mails from the plant, but the most important one is the morning e-mail that I get every morning that tells the current status of the plant and the issues that are going on, and it's an easy way for me to keep up daily. I'm kept informed by plant management. I think I get calls in the middle of the night any time there is an issue, and we appreciate that because it's showing their concern that Ottawa County is able to keep inform.

As Mark mentioned, we work closely with the NRC. We've been meeting with them quarterly just to bring us up to speed, hear what's going on at Davis-Besse, and get the NRC's side of that.

2-2-OS

I actually have a vested interest in the plant. I own property that abuts the plant, and it's very important to me that they keep that plant operating safely. I have a cottage there that my -- when the head incident happened, my grandchildren and their mother and dad were living there, and my wife kept asking me if I knew what I was talking about, that it was safe, and I was assuring her that I did.

We continue to watch closely to see that the plant does operate safely. I have personally witnessed the transformation of the site personnel in the new safety culture, and they continue to maintain that culture, and I think that is one of the most important things that any nuclear power plant has to do.

I believe that the people who work at Davis-Besse and have witnessed how they challenge each other for safe plant operation. I don't think that was necessarily always true years ago, but today they do, in fact, and at many of my visits out there, I have witnessed how they challenge each other.

2-2-OS continued

Many of the Davis-Besse employees live in the community and are important assets to Ottawa County. I think it's very important that the corporate structure that's been put in place to oversee the operations of Davis-Besse continue, and I think it's a good structure.

2-3-SE

Davis-Besse has been a great asset to the community and are very involved in Ottawa County. We in Ottawa County will continue to watch and make sure the plant operates safely, but through my past involvement, I have no concerns for the safety of Davis-Besse.

We look forward to a license renewal. Ottawa

Commenter: Fred Petersen

County wants Davis-Besse to stay, and welcome them in the future and urge the NRC to move forward with this license renewal. 2-4-SL

Thank you very much.

MR. BARKLEY: Thank you Jere.

Fred?

MR. PETERSEN: Thank you. My name is Fred Petersen. I'm the Director of the Ottawa County Emergency Management Agency. I've been involved in the EMA for 16 years and ten months.

I want to talk specifically about the Ottawa County EMA's good working relationship with Davis-Besse Power Station. Largely because of that relationship we provide a lot of benefits.

All of our plans and procedures are thorough and well maintained and are regularly exercised. Those exercises are conducted specifically on the radiological side biannually. So, every two years, FEMA comes in and evaluates our performance plan to keep us in compliance.

Over the years that I have been associated with the agency and even prior to that, we have had no significant issue on our exercises, and they perform very well.

Our emergency operation center and our risk management agency are generally better equipped, more 3-1-OS well maintained and larger and larger staffed than most counties of our size throughout the State of Ohio. And, that is because of our partner.

We feel like we're very well prepared for anything that happens here in the county, specifically radiological rescue emergency preparedness. But, some of the things that we do on the radiological side that really benefit us are lot of spill-over benefits on preparedness work review at Davis-Besse. Those would include, we have a great relationship with our fire, EMS, law enforcement, private response orientation in the county, and that's because we regularly exercise training and work with them.

So, all the events that have happened in the county, we have been very successful with our response, and a lot of that is because of everything we do with Davis-Besse, and how it helps with our relationship.

An example of that would be the tornado this past June. Everyone that was involved had some sort of role in the radiological response program. A lot of the response procedures that we use for Davis-Besse are very applicable to some of the things that we had to do like HAZMAT.

The tangible things that we have is because of Davis-Besse. One of the things that is very

3-1-OS continued

Commenter: Chris Galvin

noticeable in the county is we have county-wide siren system. A large part of that is at the Davis-Besse plant, and is available to us for any number of outdoor notifications that need to be relayed; specifically, weather, very, very important to the community.

We also do a brochure calendar for our particular State of Ohio, Lucas County, that goes to all of our residents and provides them a plethora of information about all types of emergency response and what they can do in response to tornadoes, floods, HAZMAT and radiological emergency.

3-1-OS continued

So, really, all this adds up to the fact that our relationship in Ottawa County with Davis-Besse is a benefit to the residents of Ottawa County.

3-2-SL

Thank you.

MR. BARKLEY: Thank you.

The next three people I would like to call are: Chris Galvin of the United Way; followed by Jackie VanTress of OPEIU, Local 19; and following, Kimberly Kaufman of the Black Swamp Bird Observatory.

Thank you.

MS. GALVIN: I'm Chris Galvin, Director of the United Way in Ottawa County. The Davis-Besse Nuclear Power Station and on a larger scale the First Energy Corporation are a tremendous community partner to

4-1-SE

the local United Way. Since 1993, First Energy has contributed more than 13.5 Million Dollars to United Way of Greater Toledo which serves Ottawa, Wood and Lucas Counties. 3.1 Million came from corporate gifts, 10.4 Million from its incredibly generous employees.

First Energy has also earned United Way's Pillar Award each year since at least 1992. Our data doesn't go back any further than that. It seems they consistently give more than a hundred thousand dollars each year to the Greater Toledo campaign.

Not only does this community consistently get solid financial support from First Energy and its employees, but executive leadership has also demonstrated exceptional personal commitment to our work.

In 1993, Don Saunders chaired the local United Way campaign, raising 12.5 Million Dollars.

In 2005, Jim Murray, now retired, but formerly First Energy President of Ohio Operations, chaired the local United Way campaign. Under Mr. Murray's leadership, the campaign raised 13.3 Million Dollars. We also presented Mr. Murray with our Prestigious Caring Award in 2006 for demonstrating value and concern for our community through vision, leadership, service and commitment to the people of our

4-1-SE continued

community.

In 2009, Trent Smith, Regional President of Toledo Edison First Energy, became chairman of the United Way of Greater Toledo's Board of Trustees and has drawn to a close on his second year of service. Mr. Smith has gone above and beyond the level of service, dedication and commitment we typically see from board chairs. He has become involved in virtually ever level of our work, digging in and helping find real solutions.

In addition to these executive leaders, numerous upper-level management have supported United Way by using their voice and relationships to help secure financial and volunteer support as well as advocating on behalf of the United Way and the Northwest Ohio Region.

In addition to Don Saunders, Jim Murray and Trent Smith, some of the stand-out employees include Debbie Paul, Mike Adams, and Mel Lomack. Additionally, in the 1990's Jennifer Schreiber served five years as the chair of our community impact cabinet, the highest level of community impact volunteers who decide how money is allocated in this community. Also joining her on the cabinet was Jenny Ammadon. Both are now retired.

First Energy also demonstrates incredible commitment to the communities through sponsorships and/

4-1-SE continued

Commenter: Jackie VanTress

or participation in programs and events.

In 1993 and 1994, Davis-Besse sponsored our loaned executive program. Jim Ferris, now retired from Davis-Besse, was the loaned executive in those two years. First Energy has also sponsored loaned executives over the years, from 1996 continuing for 11 years.

Employees consistently contribute to and participate in Stamp Out Hunger and/or Scouting for Food efforts each year. They were a major sponsor of our Family Food Fund in 2008.

First Energy was the sponsor of our Community Building event in 2005, and was the initiator and sponsor of the Veterans Appreciation Event in 2006, which continued until 2009.

4-1-SE continued

Davis-Besse and First Energy are a valued community partner, both philanthropically and economically. They have been incredible contributors to our community over the past 20 years, and we only hope that this will continue for at least another 20 years.

4-2-SL

Thank you.

MR. BARKLEY: Thank you, Chris.

Jackie?

MS. VANTRESS: Good afternoon. My name is Jackie VanTress, and I am representing OPEIU, Local 19.

Commenter: Kimberly Kaufman

"OPEIU" stands for Office and Professional Employees International Union, and we represent the clerical support staff at Davis-Besse.

On behalf of the Union, I would like to voice our support in this public meeting. A renewal of this license will not only promote and maintain employment for our members who live and shop and send their children to school in that area, but it will also assure the delivery of reliable electric service to our customers. 5-1-SE

Research has shown that nuclear power is clean, is efficient and produces more energy at a lower cost than any other means of generation. So, it is important that we keep this plant in operation. 5-2-AL

Local 19 is proud of the safety record and operations at Davis-Besse as well as the work we do here and the service we provide to the public. OPEIU, Local 19, would like to continue to be a part of the team for at least the next 20 years. 5-3-OS

Thank you.

MR. BARKLEY: Thank you, Jackie.

MS. KAUFMAN: Good afternoon everybody. My name is Kimberly Kaufman, and I'm the Executive Director of Black Swamp Bird Observatory, and while I understand the seriousness nature of this hearing, I'm actually really pleased to have this opportunity to address this group.

My organization represents a somewhat unique marriage, if you will, between a conservation organization and a nuclear power plant. The general public and, of course, all of you in the room are certainly familiar with the fact that the nuclear power plant resides in this part of Ottawa County, but very few are actually aware that the power plant co-exists with the thriving marsh that just sort of forms a hub around the power plant.

Our organization has been conducting migratory bird regions in this area for more than 20 years, and we really take pride in this marriage, and we work hard like a good spouse to maintain it.

The marsh represents a critical stop-over habitat for millions of migratory birds. And, in fact, many the world's leading bird experts consider this marsh to be one of the most critical areas of stop-over habitat in the entire western hemisphere.

6-1-TR

The observatory in these 20 years have had the full support of First Energy and Davis-Besse to conduct this critical research and, in fact, during a very exciting tumultus time in this country's history, we were very afraid that our consistent effort meaning

6-2-TR

that seven days a week, spring and fall, during song bird migration, our research staff was out at that marsh in front of the power tank conducting this research seven days a week for more than 20 years.

When the tragedy occurred on 9/11, we were very concerned for, of course, the human tragedy, but also concerned that our research would be interrupted. And, in fact, Davis-Besse really fully understood the importance of this research, and the importance of conserving the integrity of the data set, and we didn't miss a single day.

And, perhaps nothing else, no other event in our history or recent history speaks more to how much they have said they understand the critical role that they play in local environmental and conservation issues than that event.

So, based on our long-standing relationship, it is our opinion the Davis-Besse and First Energy have not only worked to fully understand and fully support the environmental issues for this local community, but have also fully embraced the role that they play in all of these issues.

6-2-TR continued

So, it is opinion of the Black Swamp Bird Observatory that the Davis-Besse Nuclear Power Plant is a critical player in bird conservation in the entire

6-3-SL

Commenter: Steve Inchak

region of the western hemisphere. 6-3-SL continued

Thank you.

MR. BARKLEY: Thank you, Kimberly.

The next three people I would like to call are Steven Inchak, who is representing Congressman Dennis Kucinich; Beth Leggett with the American Red Cross; and Brad Goetz of the IBEW, Local 1413.

Welcome, Steve.

MR. INCHAK: Good afternoon.

Thank you for the opportunity to speak. My name is Steve Inchak, and I work for Congressman Kucinich, and what I'm going to do is simply read a letter that the Congressman sent to the NRC chairman today, and it reads as follows. And, I would also like to ask that you consent to include the article referenced in the official record, which I will provide after I read the letter. It reads as follows:

"Dear Chairman Jackstow: First energy should not be allowed to continue to operate Davis-Besse after 2017. The people of Northeast Ohio are 7-1-OL familiar with First Energy's pathetic record in protecting the safety of people who live in this region. In a series of recent articles in the Toledo Blade, which I am enclosing, the people of our Region are reminded about the 12-minute 7-2-OS interruption to the feed water flow to the steam generators on June 9, 1985, which was cited as a 'potential catastrophe.'

"The people of our region are reminded of Davis-Besse's reactor head 'weakened by years of neglect' which nearly burst in 2002. The people of our region are reminded that your predecessor, Harold Denton, stated in 2004 that these two incidents represent 'the nuclear industry's second and third lowest points after three-mile Island.'

The people of our region are reminded that First Energy employees tried to conceal the truth of the 2002 incident from the Nuclear Regulatory Agency, using tricks, 'schemes or devices' to deliberately mislead your Agency.

"The people of our region are reminded that David Pullman, Chief of the Justice Department's Environmental Crime Section, said that First Energy showed 'brazen arrogance' and 'breached the public trust by withholding information about the reactor head incident.

"The people are reminded that federal prosecutors described the reactor head incident as 'one of the biggest coverups in US nuclear

7-2-OS continued

history.'

"The people of our region are reminded that First Energy paid a record fine of $33.45 Million as a result of its actions. Of that amount, a record $28 Million was a fine that First Energy paid to 'avoid being criminally prosecuted for lying to the government about the dangerous condition of Davis-Besse's reactor head' according to then US Attorney Greg White in 2006.

"While these fines were record fines at the time they were imposed, I pointed out then that the total fine was merely one percent of First Energy's profit in 2004. While these fines may have been record fines, they were a mere slap on the wrist for First Energy and did nothing near to what would have been necessary to change its corporate culture.

"The corrosion of the reactor head started because the Davis-Besse reactor head was made of an alloy that would not withstand this kind of corrosion. All of the other operators and nuclear reactors with similar heads confronted the situation by replacing their reactor heads with new heads of a different alloy that would not be subject to this kind of corrosion.

7-2-OS continued

"In 2004 First Energy chose cost over safety, and it replaced the corroded reactor head with another reactor head made of exactly the same material.

"Six years later First Energy made us shocked to discover that the corrosion was forming on that inferior reactor head as well. Still, First Energy had not learned its lesson. They wanted to postpone the final replacement of the reactor head with a new head made with a noncorroding alloy until 2014.

"First Energy did not abandon that 2014 replacement date until the NRC threatened to require Davis-Besse to shut down for an inspection of the old reactor head every year until it was replaced.

"Only as a result of that threat is First Energy finally going to install a noncorroding reactor head in 2011.

"Recent events suggest that First Energy still has a corporate culture that is more focused on costs and profits than on its safety.

"In 2009 Davis-Besse suffered an explosion and fire in the power switching gear located outside of the reactor building which First Energy

7-2-OS continued

failed to report and did not declare an alert.

"The evidence shows that this culture exists in First Energy beyond its operation of Davis-Besse. The NRC has been keeping a 'close watch' on First Energy's operation at its Perry reactor in Northeast Ohio as well. The NRC remains concerned that Perry's safety culture is not up to industry standards and has maintained a close watch there for the last two years.

"Davis-Besse has been operating for 33 years. It has experienced two of the industry's most serious nuclear incidents during those years. This is not just bad luck. The problems at Davis-Besse are a direct result of First Energy's mismanagement and disregard for the safety of people who live and work in the area and who would be affected by any nuclear incident.

"The NRC should not grant a license to a company that only operates safely while a 'special' inspection team is monitoring its day-to-day activities and when a 'close watch' is being kept on it.

"The NRC must continue to keep a close watch on Davis-Besse between now and 2017 and then to ensure that, first, this aging reactor with a

7-2-OS continued

Commenter: Beth Leggett

deplorable history of operations and maintenance be safely shut down and decommissioned at the end of its current license.

"Sincerely, Dennis J. Kucinich, member of congress."

Thank you.

MR. BARKLEY: Thank you, Steven. We will receive that letter into the record.

Beth?

MS. LEGGETT: My name is Beth Leggett. I'm the Director of the American Red Cross in Ottawa County, part of the greater Toledo area chapter which is a regional chapter for all of Northwest Ohio.

Through my position with the Red Cross, I have seen cooperation that is envied between the Emergency Management Agency and First Energy Davis-Besse amongst the agency's first responders because of the emergency preparedness that we do, we have been educated to do over my 22 years in this position.

In Northwest Ohio, we're envied because of the readiness that we have from the Red Cross standpoint as well as from the whole county and the agencies that are involved.

We have a congressional mandate to prepare, prevent and respond to emergencies through the Red

7-2-OS continued

8-1-OS

Cross. I think the Emergency Management Agency, Fred Petersen, spoke to the cooperation with all things that we do to help us be ready and to protect the citizens of Ottawa County.

8-1-OS continued

We also because we have the mandate but we do not receive government funds, I can speak to what Chris Galvin of United Way said with regards to the money that comes into the United Way. We are a United Way Agency, but even besides that, we have profited, the Red Cross organization, from financial support on many levels from First Energy and Davis-Besse as well as from the volunteer aspect of the employees that respond through the involvement of their families.

We have three or four blood drives that we conduct at Davis-Besse that are very successful. We have had a lot of leadership that has come out of the Davis-Besse plant. Chuck Witt was a six-year chairman for our local advisory board.

Currently, Terry Mortis, who is the Regional Manager also of the Ottawa County District with First Energy that provides a lot of leadership, a lot of guidance to the Red Cross.

8-2-SE

And, I'm going to take my Red Cross hat off, and I want to say that May 15, 1979, I became a new mom for the very first time, and when my daughter was

Commenter: Brad Goetz

two years old, had not the rain storm come the afternoon of the protest march in front of Davis-Besse, I would have been in it.

And, I sat here today and thought how far I've come and how grateful I am to have had the exposure, educationally through the community, through my friends to see the Davis-Besse plant in a whole different light. I was young in the Nineties. I'm a little bit smarter now about how those things work, and I ask hard questions and I sometimes like the answers, sometimes I'm not so sure about the answers, but I am confident in the safety of the Davis-Besse plant and the good that it does in the community for the people that are involved. 8-3-SL

Thank you.

MR. BARKLEY: Thank you, Beth.

Brad?

MR. GOETZ: Good afternoon. My name is Brad Goetz, and I'm the Business Manager of the International Brotherhood of Electrical Workers, Local 1413. We represent security at Davis-Besse.

I just want to say that I'm a 26-year employee at Davis-Besse, and over the years, the safety culture has improved greatly and continues to improve every day. The plant is well protected, not only for 9-1-OS

Commenter: Ann Heckerd

the safety inside the plant but also for the members of 1413. 9-1-OS continued

Davis-Besse over the years has provided a good living, a good income for many residents of Ottawa County and surrounding counties and especially now in a time when unemployment is high. 9-2-SE

We support the license renewal, and we ask the NRC to support it as well. 9-3-SL

MR. BARKLEY: Thank you, Brad.

There are three people who are still signed up to speak. If there are any other people who would like a speak, please come and see me.

The last three people I would like to call up are Ann Heckerd of the St. Vincent de Paul Food Pantry, Brian Boles of FENOC, and Larry Tscherne of IBEW, Local 245.

MS. HECKERD: I am Ann Heckerd, the Food Coordinator for the St. Vincent de Paul Food Pantry, and I'm going to talk more on the economic aspect.

Davis-Besse has been very generous with their donations to the Food Pantry in the past years. I also would like to say that if it were to close, they may be coming to our Food Pantry, and I would hate to see that. 10-1-SE

MR. BARKLEY: Thank you, Ann.

Brian?

Commenter: Brian Boles

MR. BOLES: Good afternoon. My name is Brian Boles. I'm the Plant Manager of Davis-Besse.

Our license renewal is a high priority item for the state and for the county. We have had a number of people working on this project now for well over a year -- I see a number of those members are here -- to put together a good product which we have submitted to the NRC for their review.

It's a priority for us as a company because Davis-Besse is a significant asset to our company. It provides a large source of safe, reliable, environmental friendly electricity to the surrounding area. 11-1-AL

It is also important from a license renewal aspect, 20 additional years of this asset to provide for the employment opportunities for the local community, and many of our young engineers are graduating from college today who wonder if nuclear power is a viable future and a career path. It's important to know that plants such as Davis-Besse and others are undergoing renewal process have a future that they can depend on. 11-2-SE

At Davis-Besse we do commit to ensuring the public safety and protecting the environment. I'm sure the review as we go through this license renewal process will bear that out, and as evidenced by a number of the speakers here, we do enjoy a very good relationship with 11-3-OS

Commenter: Larry Tscherne

the surrounding community. We look forward to extending that relationship for another 20 years. 11-3-OS continued

Thank you.

MR. BARKLEY: Thank you, Brian.

Finally, Larry?

MR. TSCHERNE: Thank you and good afternoon. My name is Larry Tscherne. I'm the Business Manager for IBEW, Local 245, the International Brotherhood of Electrical Workers.

We represent 22 counties here in the Northwest Ohio, including Ottawa County here. But, in addition to that, we also represent over 200 physical workers at Davis-Besse that provide operations, maintenance, chemistry, radiation and protection of the plant.

Now, what I'm going to talk about here briefly isn't an opinion. It's a fact. I know that from our members and the involvement that I have with the plant, and not only with the plant but with senior management. I'll go as far as the President of FENOC, Jim Lynch, who includes all the other business managers, the leadership of the local unions from the entire FENOC. We meet on a regular basis a couple times a year with the President. We share and open up any type of discussion that we have. Nothing is held back, open communication all the way through.

We do the same thing with the Plant Manager at Davis-Besse, with the Maintenance Manager at Davis-Besse.

We have worked over a number of issues, going into outages, we have heard testimony here about the head incident. Let me tell you the type of relationship that we have been able to develop in the goal of working together in a good labor-management relationship which is important and critical, especially in this type of industry.

During that incident, the plant, as you know, was down for, what, two years, maybe a little less. Over that period of time and the hundreds of man hours that were involved, multiple shift changes. You can't imagine what we had to go through to get that plant back up and running. We had four grievances filed; four out of the entire period of time.

I only use that as an example because when we meet, we continue to talk about the safety culture and good maintenance practices which leads me to my next point.

The safety culture, the dedication of the employees, training and the craftsmanship are second to none. Again, that's not an opinion. That's a fact. We

12-1-OS

had the opportunity to review all of that and we participate not only in the training but in the development of the training.

So, with that said, I would have to say that First Energy has been open and honest in all of their discussions with us. There's never been a time where I haven't been able to call either Akron or the plant and get an answer. It's just been terrific.

In addition to that, we not only work out local issues but something more important or just as important. We work together on issues in Washington also through our labor management committee. A lot of people probably aren't aware of that, but we do that through our Land Pact Committee. 12-2-SL

By extending the license here at Davis-Besse, it would continue to provide good clean power that's critical. 12-3-AL In addition to that also supporting the much-needed tax base, not only to this area but to the state, 12-4-SE and I'm confident along with our members, that IBEW, Local 245, that Davis-Besse will continue to be safe, not only for the employees but also for the area. 12-5-OS

Thank you.

MR. BARKLEY: Thank you.

I'll make one last call for anyone who would like to make a statement.

Commenter: Mark Stahl

leave here tonight, please do not hesitate to contact us.

This concludes my presentation. Mr. Barkley?

MR. BARKLEY: Okay, thanks very much.

The first three people I would like to call are Mark Stahl, Ottawa City Commissioner; Jere Witt, Ottawa County Commissioner; and Mike Drusbacky of Ottawa County EMS. Thank you.

MR. STAHL: Good evening, ladies and gentlemen, and thank you for coming out on such a rainy night. My name is Mark Stahl. I'm the President of the Ottawa County Board of Commissioners.

And, the county isn't successful unless you're surrounded by successful community partners, and I can tell you that Brush-Romley (ph) is one of those partners. They contribute tremendously to the good of this community. We also cherish the NRC's partnership that we have. You are our eyes and our ears. You are what helps us maintain the public safety here, and we appreciate that as well. 1-3-SE

With that said, we're going to have a few people from the Agency describe what Davis-Besse does for Ottawa County, and on behalf of the Ottawa County Commissioners, I would like to extend our full support 1-4-SL

Commenter: Jere Witt

in regards to their application. 1-4-SL continued

Thank you.

MR. WITT: Thank you, Mark. It's not proper to correct your boss, but you meant Davis-Besse.

Now, most of you were here at the first session, so I will make my comments brief and not repeat everything I said. The one thing I think I want to make sure everyone understands, and for those of you who were not here, I am the County Administrator for Ottawa County. I also serve on the County Nuclear Review Board for Davis-Besse, I also was a part of the restart overview panel when they had the head issue.

So I've had some broad experience with the Davis-Besse people and with the Nuclear Regulatory Commission, and I think this process and the processes that the NRC uses are great processes, but I think it's important to know that when we look at what Davis-Besse has done over the years and how they have responded to Ottawa County as a community, we couldn't have asked for anything more. 2-5-SE

And, we certainly fully support how they have changed their safety culture; frankly, how they have changed many, many personnel from the days when 2-6-OS

Commenter: Mike Drusbacky

they had issues, and those people are not there any longer. This is a new company. It has better oversight from the corporate level, and I think most importantly as we urge the NRC to approve this process, let's remember that this is the lives of people in Ottawa County and not let people with political agendas somehow impede that process. The people in Ottawa County have and will support Davis-Besse, and we as a county on behalf of the Board of Commissioners certainly do support them.

2-6-OS continued

Thank you.

MR. DRUSBACKY: It stinks to get old. My name is Mike Drusbacky, Deputy Director of the Ottawa County Emergency Management Agency. Commissioner Stahl and Jere Witt are a couple of my bosses.

I've been with the Ottawa County Emergency Management for 21 years, and I would like to speak today on what Davis-Besse has meant to us as not only the Emergency Management Agency but what Davis-Besse and what we do affects Ottawa County as a whole, not just on the nuclear side.

Our plans and procedures that we have for Davis-Besse are very thorough, well maintained and tested regularly because of the requirements of the plant. This ultimately makes us better able to respond to other types of natural disasters, technological hazards.

Unfortunately, we have had our share of natural disasters with tornados in our community, and we had one just this past June. And, we had Davis-Besse's support in our Emergency Management Agency and our emergency operation center in helping to mitigate and respond to that disaster. We've had train derailments, we've had electrical outages, and we have had very good support from the plant.

So, the emergency operating center of the EMA are better equipped, we're better prepared and we have one of the largest staffs than those of other counties in Ohio. This has been very good for our radiological preparedness requirements. We exercise regularly because of these requirements of the plant.

Other benefits also have been a very good working relationship through Ottawa County's emergency response departments, our local fire departments, our local EMS departments, law enforcement, other organizations because of the training and exercise that we do to meet the requirements that we have for Davis-Besse.

We have a county-wide siren warning system

13-1-OS

Commenter: Joseph DeMare

that is used for all hazards, not just Davis-Besse, not just for the emergency planning zone, but all our county is covered by alternate warning sirens.

All these I've mentioned, the training, the preparedness and responses that we do, all this ends up in that we have a very solid relationship and that relationship has benefited the residents of Ottawa County.

13-1-OS continued

Thank you very much.

MR. BARKLEY: Thank you, Mike.

Okay, the next three people I want to call are Joseph DeMarr, the Green Party at Wood County; Jane Ridenour of OPEIU, Local 19, and then finally Patricia Marida of the Sierra Club.

MR. DEMARR: Good evening. Like most people in the Northwest Ohio area, I first found out about the scoping meeting earlier in the week when there was a story in the Blade. So, I had not had an opportunity to completely read the Environmental Impact Statement that's been prepared with the application for the license renewal.

But, I think that that is one of the issues that should be dealt with in the scoping process at either another later meeting or perhaps further announcements, and at the very least, I would

14-1-LR

like to request a hard copy also be placed in the Wood County Library in Bowling Green, Ohio. 14-1-LR continued

There are several unique aspects of the location of Davis-Besse that should be dealt with in any environmental review and proposed continuation of this plant, most of them having to do with being on the shores of the Lake.

One of them is that we must consider in the case of a worst case scenario, coordination with Canada in terms of the effect of an accident that might occur at this plant. 14-2-OS

Another is the possible effect on the seven-billion-dollar fishery in Lake Erie. Specifically, I think you should look at how the wastewater and how the temperature effluent from this plant would affect and possibly affect indicia species such is the Asian carp. In other words, does the operation of Davis-Besse make it more or less likely that indicia species could come in here and ruin our fishing. 14-3-AQ

There are several safety issues that impact on the environmental questions. First of all, I personally know a first responder. We've had conversations about Davis-Besse. He told me that they have been told that in the event of some sort of 14-4-HH accident, the only thing they have to worry about is radioactive iodine, and since they will be given pills for radioactive iodine, they don't even have to worry about that.

14-4-HH continued

This suggests to me that the front line first responders may not have an adequate idea of how dangerous, meaning the radioactive nuclear heads are, even to neutrons to spot them, and this could lead to bad decision-making in the event of an accident which could lead to increased contamination of the earth.

14-5-OS

The siren system, I have lived in northwestern Ohio off and on for 20-some years, and about 24 years when my son was about one year old, there was a short circuit at Davis-Besse, and the evacuation sirens were all sounding, and no one reacted at all in Northwest Ohio. I finally called the state police and asked why the sirens were going, and they told me, "Oh, it's just a short-circuit at Davis-Besse." I believe the siren system is completely adequate.

14-6-OS

The plant has been operating long enough with the nuclear radiation weakening the structure. We've learned at Chernobyl that eventually this weakening can proceed to such an extent that the concrete or a portion of the concrete can actually

14-7-OS

fail, collapse.

I think an environmental review needs to look at what would happen if the concrete wall either collapsed from radiation or if the perimeter was destroyed through the attack of a plane or through the attack of some motorist or some terrorist group planting explosives. What would happen to the radioactive dust and the containment structure because of the weakening? 14-8-PA

We are in an area of the country that could be affected by the fault if there is a large earth quake, and I think this may not have been examined sufficiently in the environmental impact study. 14-9-PA

Also, downwind from Davis-Besse in the local communities here, there is a cancer cluster. The state studied this cluster and it was woefully inadequate. It consisted of dosimeters, given to about a fifth of the families. They went out in the yards and ran the dosimeters themselves looking at the sky. They didn't find anything, but I'm not sure they -- I believe this happened when Davis-Besse wasn't actually running, and it doesn't address the fact that there may have been emissions in the past, and there could be emissions in the future. 14-10-HH

Commenter: Jane Ridenour

So, I think that any federal environmental impact statement would have to look at known emissions from Davis-Besse which are routine, such as I have, and correlate those with the cancer cluster in these local counties and look for cancers that are specifically known to correlate with the nucleates that we know of at least, such as thyroid cancer.

I know I only have about five minutes here. I want to say that I know -- as an environmentalist, I know that the NRC is given an impossible task here. Any process that generates radioactive pollution that will be able to cause cancer, birth defects and hurt people for the next -- for millions of years in some cases, by definition, it can't be done safely.

14-10-HH continued

In this specific case, Davis-Besse has one of the worst operating records in the industry. That's widely known.

14-11-OS

This will actually be a very interesting test case to see if the NRC is able to deny any license. I think if any license should be denied, it would be Davis-Besse.

14-12-OL

But, thank you for your attention and have a good night.

MR. BARKLEY: Thank you, Joseph.

MS. RIDENOUR: Thank you. Good evening.

My name is Jane Ridenour, and I am President of the OPEIU, Local 19. OPEIU stands for Office and Professional Employees International Union, and we represent the clerical support staff at Davis-Besse.

And, on behalf of the Union, I would like to voice our support at this public meeting for a multitude of reasons. The renewal of this license will promote maintaining employment of not only our members who live and shop and send their children to the schools in this area, but it will also ensure the delivery of reliable electric service to all of our customers.

15-1-SL

15-2-SE

Research has shown that nuclear power is clean, it is efficient and it produces more energy at a lower cost than any other means of generation. So, it is important that we keep this plant in operation.

15-3-AL

Local 19 is proud of their safety record and their operations at Davis-Besse as well as the work that we do here and the service that we provide to the public. OPEIU, Local 19, would like to continue to be a part of that team for the next 20 years.

15-4-OS

Thank you.

MR. BARKLEY: Thank you, Jane.

We'll call Patricia Marida.

Commenter: Patricia Marida

MS. MARIDA: My name is Patricia Marida. I'm the Chair of the Nuclear Issues Committee of the Ohio Sierra Club. And, we had a whopping four days to know about this meeting. I had four days ahead. I learned about it this morning and have come up from Columbus here. 16-1-LR

The Sierra Club opposes nuclear energy in its entirety, citing serious environmental health and public expense issues throughout the nuclear field cycle. 16-2-OL

The time frames needed to guard the radioactive nuclear waste generated from this process are geologic in nature. Isolating the radioactive nuclear waste will consume all our time and money for generations to come. The only viable solution for radioactive waste is to stop generating it.

Radioactive contamination and waste are a major reason to discontinue the use of nuclear power, and I might add that the environmental effects occur across the United States, and all of this should be come under NRC's consideration. 16-3-OS

The risk and reality is that radioactive contamination has occurred, is occurring and will continue to occur throughout the nuclear power cycle. Mining is leaving radioactive plants exposed to the air and water of our First Nation Plan in the United States, Canada and Australia. The story in Australia that's devastating.

Contamination occurs throughout the milling, refining, transport and conversion of uranium to uranium hexafluoride and then enrichment in which the gaseous diffusion process took as much energy as a large city to enrich the uranium. Then additional uranium must be formulated to ground.

An enormous waste -- uranium hexafluoride which is 99 percent of the original uranium but is not cushionable and, therefore, not useable for energy. However, it is just as radioactive and must be then converted back to the more stable uranium oxide. A newly-operated plant at Piketon will take 25 years running around the clock to deconvert the 40,000, 14-ton canisters containing hexafluoride that are already on the site, and that is not counting how much more that might be generated from other conventional facilities, enormous amounts of energy due to this process.

Added together, the disposal to support the industry's nuclear power also comes with a heavy carbon price, which means that nuclear power will not address the pollution, global warming. Centralized

16-3-OS continued

16-4-RW

16-5-AM

electric power complete with centralized corporate profits for the nuclear and coal industry has been heavily subsidized by corporate for many years. Without corporate subsidies, loan guarantees and liability limits for which the public must bear the burden, no nuclear power plant would ever have been built.

In Ohio, the use of electricity has been increasing for a number of years. Now, with progressive legislation and Ohio Senate Bill 221, energy efficiency and conservation combined with the renewable sources of solar, wind and geothermal, these are providing so much additional and conserve energy to all plants and new coal plants in our state have been cancelled, and there's a strong movement to shut down the old polluting coal-fired plants. 16-6-AL

The argument of rising energy is irrational at best, and at worst, the resulting global warming would threaten our life support system and, yes, our way of life. 16-7-AM

There is good reason why there are no nuclear power plants coming on line to replace the old ones. Wall Street will not support them. The normal up-front cost and a 12- to 20-year length of time for completion makes it financially uncompetitive with 16-8-AL wind and solar. On the latter, decentralize, meaning that jobs are being created all over the state. As compared to Davis-Besse's extended shut-downs, if the wind stops blowing or the sun is behind a cloud somewhere, it is likely not too serious or a long-term power shortage problem.

16-8-AL continued

A 20-year extension of the Davis-Besse operating license is unfounded on the grounds of future electric generating needs. Even without the afore- mentioned problems plaguing nuclear power in general, the Davis-Besse facility is in a tenuous condition to continue operation even at the present. Continuing for 20 years past 2017 would constitute reckless disregard for public safety and environmental integrity.

16-9-OS

The history of failures and dangers at this plant is well known and well documented, so I will not reiterate that here. However, the process by which First Energy and the Nuclear Regulatory Commission allowed an inspection of the ractor head in 2002 coming within one-eighth of an inch of a nuclear disaster that would have left the Midwest uninhabitable and the Great Lakes, the world's largest fresh water supply, filled with radioactive contamination shows that the public should have no

16-10-OS

confidence whatsoever in the ability of First Energy to self regulate or in the NRC to rigorously enforce and inspect so dangerous an operation of a nuclear reactor.

They were willing to take these incredible risks based simply on profit. Not only that, the corporate culture makes it difficult for any one person to wreck the system or feel responsible for anything other than following the order of their immediate superiors.

16-10-OS continued

So, I live in Columbus, but this could still affect me. Even the 40-year time frame for operations of a parkland does not have an engineering basis, but it was based on the time needed to pay off construction costs. What happened to the engineering responsibility to oversee and advise an operation of this magnitude of danger?

Last but not least, nuclear power is being used to keep the nuclear weapons industry afloat. Facilities and research for nuclear power can be transferred to weapons usage. The USEC, formerly the United States Enrichment Corporation, now calling itself USEC, the enrichment plant at Pikeville under construction is a prime example. More importantly, however, is the need for legitimating the nuclear

16-11-OS

industry. Without nuclear power, the nuclear industry would be only about weapons of mass destruction, taken in a very different light to university research recruiting bright, young scholars to other jobs in research in the industry. The time to protect the current generation from nuclear power plants shutting down approaches. The weapons industry desperate to have a nonmilitary front is the tail wagging the dog in the push for renewed and continued nuclear power.

16-11-OS continued

And, I would like to add also that the pools of radioactive waste are extremely vulnerable to terrorists attacks or to other explosions. So, that certainly should be a consideration of the NRC to look at; that is, how are we going to protect those pools of radioactive waste?

16-12-PA

And, the Sierra Club believes that on-site storage is the most practical way. Instead of shipping these high, most highly radioactive materials somewhere else in the country, that they should stay as reasonably local as possible and put in canisters that are hidden inside buffers.

16-13-OS

Thank you.

MR. BARKLEY: Okay, thank you.

The other two people who have signed up to talk who are Brian Boles, the Davis-Besse plant

Commenter: Brian Boles

manager, and Matthew Heyrman, Lucas County EMS.

MR. BOLES: Good evening. My name is Brian Boles, and I am the plant manager of the Davis-Besse nuclear reactor.

The licensing renewal effort is a current company and safety priority. A number of individuals from the license renewal team are present, and they have worked hard the last year to provide a quality submittal to the NRC.

This effort is important to us for several reasons. This licensing extension will allow us to continue to provide safe, reliable environmentally friendly electricity to our customers for years to come. Davis-Besse is an important asset, and the Company's generation portfolio shows we have a good mix of power generation service. 11-4-SL

We have long-term employment opportunities for the surrounding communities. Younger engineers graduating from college need to know that the nuclear power is very efficient and is a great career.

Davis-Besse has a significant impact on the economy of the local area, providing folks, several hundred people employment, providing materials and services in support of the operation of the plant. We have always had a commitment to ensure public 11-5-SE

Commenter: Matthew Heyrman

safety and a protection of the environment, and that commitment continues today.

As you have already heard from several of those speakers, we enjoy a good relationship with the surrounding communities, and we look forward to sustaining this relationship for an additional 20 years.

11-5-SE continued

Thank you.

MR. BARKLEY: Thank you.

Matthew?

MR. HEYRMAN: My name is Matthew Heyrman. I'm the Director of Lucas County Emergency Management Agency. I just want to add to the things that were said by the Ottawa County representatives.

Davis-Besse has -- although my tenure is not 21 years, it's four. And, the four years that I have worked with them, they have always been a partner to us in our planning, our preparedness and our equipment. I can honestly say that we would not be as prepared for radiological issues or other emergency planning issues, nor would we be as equipped as we are today if Davis-Besse was not there to assist us and push us in ways we probably wouldn't push ourselves.

I'm not sure but I believe every two years we test our plans, our emergency response plans.

17-1-OS

Throughout the two years, we exercise those plans, we review those plans, and Davis-Besse provides us a liaison to work through those plans at a desk in our office.

So, Davis-Besse has always been a very great partner of ours with regard to emergency preparedness and we look forward to working with them.

Thank you.

17-1-OS continued

MR. BARKLEY: Thank you, Matthew.

That was the last person who had asked to speak. Is there anyone else who still wants to speak?

(No Response)

MR. BARKLEY: Okay, thank you for being very concise with your remarks. We have heard a number of the good comments this evening, and I would like to turn it over to Dave Wrona who will talk to you just for the last minute.

MR. WRONA: Thank you, Rich.

I would just like to thank everybody for coming out tonight and participating in our environmental scoping process. There were a lot of good comments. I would like a reiterate that there was an earlier slide that indicates this meeting is not the only way to give us scoping comments.

There are several methods listed on this

The People's Hearing on Davis-Besse Relicensing

The following comments were recorded on December 18, 2010 at St. Mark's Episcopal Church, 2272 Collingwood Blvd., Toledo, Ohio. They are hereby submitted to the Nuclear Regulatory Commission as Public Comments as part of the Scoping Process for the Environmental Impact Statement submitted by First Energy Nuclear Operating Company as part of its Application for operating its Davis-Besse Nuclear Power Station, Unit 1 for an Additional 20-Year Period.

[Docket No. 50-346; NRC-2010-0298]

Speaker	Start	Finish
Anita Rios/ Joe DeMare	00:30	4:20
Anita Rios	4:23	13:40
Kevin Kamps	13:53	33:11
Al Compaan	35:03	57:20
Katie Hoepfl	58:00	1:05:00
Tony Szilagye	1:06:30	1:15:25
Ed McArdle	1:16:08	1:26:13
Phyllis Oster	1:28:04	1:31:15
David Ellison	1:31:42	1:41:00
Michael Keegan	1:41:30	1:53:30
Ralph Semrock	1:54:00	2:02:00
Mike Leonardi	2:02:30	2:09:14
Joe DeMare	2:09:30	2:15:14
Kevin Kamps	2:15:15	

Ms. Rios

...and an activist here in Toledo area and, um. Joe DeMare and myself are going to do our best to facilitate this meeting, make sure things will

1

Commenter: Joseph DeMare

go smoothly and make sure that everybody who wishes to speak can speak.

We are trying to record these proceedings because it is very important that our audio be very clear...um...so that the NRC doesn't have any excuses..[shhhhhh]...Thank you...um, and I would say I know there's going to be a lot of, um, um. communing and a lot of people sharing information so if you...if you feel like you need to do that, you can always step into the hallway because it is very important that the quality of the sound be absolutely as good as we can get it because we don't want to give the NRC any excuse for discounting this testimony.

Um, I don't know if any of you are, um, aware, but they...they have said that they have never taken video testimony before so this is unprecedented, and with the kind of hoops that they have been making us jump through in order just to have a voice in this process, I think it's probably inevitable that they will try to discount these proceedings. So, for that reason, we are trying to record as...as, um, best as we can with the equipment that we have so let's all be very patient with each other. I'm going to, um, give the mike over to Joe.

Mr. <u>DeMare</u>

OK, thanks, so, uh, if you're one of the scheduled speakers, this is the microphone, this little one here, this is the one that's, uh, actually making the recording for the NRC. So this, this one is for our benefit, so you need to...you need to hit both. So just, uh, a little bit of...imagine it's papparazzi, and, uh, you know, a crowd of reporters that really want to hear it.

So, um, I'd like to welcome you all. Uh, my name is Joe DeMare and I spoke at the official NRC hearing on November 4. And I have to tell you, it was a, uh, a rather disappointing experience, because almost everyone there was either employed by Davis-Besse or they were from an organization that received money from Davis-Besse. And I, I know 14-13-LR

2

Commenter: Anita Rios

that there are many people, thousands of people, in the Northwest Ohio area, that don't want this license renewed and think it's an insane gamble with our health and safety to run this plant for another 20 years. And though...I felt at that time, those people should be at this hearing, but most people didn't even know it happened. It went by before people could get their thoughts together. And so we asked the NRC to hold another one here in Toledo, they refused, but we have decided to hold our own and that's what this is..that's what.this is about. 14-14-OL 14-15-LR

So, uh, we have a lot of very educated, very well-informed speakers. And we have people that are just plain citizens that, uh, but I think most of the people that we've scheduled to speak...feel that Davis-Besse should not be renewed. Uh, we have opened this up to the public and if anyone here wants to, to speak that hasn't been asked to already, you just need to sign up, there's a little sheet outside, I'll ask you to sign. 14-16-OL

And, I think, we're going to learn, we're all going to learn a lot here. I've already learned a lot about Davis-Besse that I didn't know just talking to people as we all organized this. And I just want to publicly thank both the Green Party and the Sierra Club of Ohio, because without them this event would not have been put together. And, uh, and, of course, Beyond Nuclear with Kevin Kamps, and Coalition for a, a Nuclear-Free Great Lakes, and, uh... Am I missing any organization... I think, that's all the organizations, and all the individuals that have come here to, to work on this. So thank you very much, and, uh, let's get started with, uh, Anita, who's going to give a few words. Anita?

Ms. Rios

OK, so, um, a couple of things, a little bit of background about myself and, and, um, just to...put my comments in context. Sorry, I was just forgetting the first thing. Um, just to put my comments in context, um, I was born about 5 miles from here. I live about a mile from here, and, um, a couple years ago, I googled, you know now that we have computers and we can figure things out so easily, how far Davis-Besse

3

was from me. And Davis-Besse is about 20 miles from here. And, um, I...I have been opposed to nuclear power for a very long time. But as I was thinking about, um, what we are doing here today and, um, what I wanted to talk about today, it kept, um, coming back to me that I think that even if I was in favor of nuclear power, this is still a nuclear power plant that I would want shut down. 18-1-OL

It has had numerous problems, and the other thing that kept occuring to me is, in the context of the, um, the, um, financial meltdown that, um, so many of our government entities were, if not having a hand in at least complicit in not, um, in the fact that they did not follow through in the type of vigilance that they were supposed to, um, be making, to keep unscrupulous individuals from gutting our economic system. And we saw what happened with the SEC, we saw what happened with the banking system, and the mortgage loan system, and that was truly a, a, a financial meltdown. 18-2-OS

Now we're looking at what the NRC is doing in, in its laughable oversight of all the nuclear power plants but Davis-Besse in particular. And it occurs to me that, that...the NRC is a rogue agency and just as the, as the, SEC failed us, failed us, the citizens that it should be, um, watching out for, that is our goals, that is our tool, that is the thing that, the entity that we have put in place through our government to make sure that everybody plays by the rules. And that is what the, um, Nuclear Regulatory Commission is as well. However, it is failing to do that, it has, it has absolutely failed to do that. And what it has done in reference to Davis-Besse and the numerous problems that we have seen is, at Davis-Besse, demonstrates that very clearly. 18-3-LR

So, um, as, as I consider my comments, as I consider my motivations for being here today, and, that they're, they're all motivations of an activist, an activist who, who cares about this community, who is a life-long Toledoan, who has raised my children in this community. My children went to pre-school in this church, and, um, they're grown now. But everytime I think about that, and I think about the proximity of that

4

nuclear power plant, and what it would have done to my children and everybody else's children, there's a certain sense of outrage. And, um, I, I absolutely refuse to feel helpless about this. I think that we, we must speak out.

This is the beginning. Certainly, we don't have enough people in this room. We never do when we try to do something like this. We fit it in between all of the things that we do as, as mothers, as fathers, as, as parts of families, as parts of communities, we fit it in with our jobs, and we are determined to make a change. So as we approach that process here, in, in making comments, that the Nuclear Regulatory Commission will do their utmost to ignore, as, as we approach this process, we have to understand that this is the beginning of the process. This is the beginning of the process of us as citizens, and I believe that "We the People" is one of the most powerful statements that anybody can make. And "We the People" embodies our democracy, so "We the People" will be the ones who will have to challenge not only Davis-Besse but the NRC. 18-4-LR

And what I hope that comes out today is: 1) how dangerous that nuclear power plant is; and 2) how lax the NRC is in its oversight of that, that nuclear power plant. And as I said, I believe that the NRC is a rogue agency. And I think that one of the, the most crucial next steps that each of us must take is to put pressure on all of our elected officials to take a stand on, on this issue, and not just about the relicensing of this nuclear power plant, but on the, the way that the NRC has simply failed, it has simply failed to, to live up to, um, to live up to what it must do in order to keep us safe. 18-5-OS

So, um, a couple of things about Davis-Besse. Um, we, we all remember when it, um, when it corroded to the point where it, um, almost sprang a hole in the nuclear vessel head. And what happened in response to that, um, was that, the first step was they held hearings, they had open hearings. 18-6-OS

5

I attended most of those hearings. Um, they're usually held out in, in Oak Harbour. And certainly anybody who, who depends on public transportation cannot go out there. But I attended all of those hearings. And I recall hearing over and over and over again from, um, FirstEnergy in response to how did this happen and what would they do in response, their, in response to future problems. Their response, again and again, was "It's a learning process," "It's a learning process." And, you know, to me that seemed like the flimsiest of, of reasons, the flimsiest of justifications, the flimsiest of plans for the future, in terms of what they could do to make all of us safer. Um, and, as they kept on, "We're learning," "This is the learning process," um, it occurred to me that if they were criminals, and I consider them criminals. I think that their lack of oversight of the nuclear power plant has been absolutely criminal. If we had somebody, um, who was, who was on trial and they went up before a judge and said "Oh, well, I robbed that bank, but it was a learning experience." I don't think anybody would accept that. Nobody would accept that as justification. We wouldn't just slap them on the wrist and say "Oh, well, now you know better." 18-6-OS continued

Um, and in the face of that, in the face of that lack of responsibility and lack of planning for the future, the NRC has continued to do nothing. They just slapped them on the wrist for that, they slapped them on the wrist, they fined them. But if you look at, uh, First Energy's profits, they have gone up, they have, they have never gone down, they never had to really pay for, for what they did here at Davis-Besse. They have shown, uh, a complete lack of responsibillity to the people they serve. And the NRC has failed to hold them accountable. 18-7-OL

Now the other thing about FirstEnergy is, First Energy holds a corporate charter from here in Ohio. And I think that one of the next steps that, that we should be pushing towards is to revoke that corporate charter for FirstEnergy. Um, they are, they are a rogue corporation. They have failed to, um, to provide oversight of their own facilities, and they have failed to, um, show any real determination to actually learn from that situation that transpired back when the, um, Davis-Besse almost, um, 18-8-OL

6

Commenter: Kevin Kamps

melted down actually. So I hope that these proceedings are the first step towards preventing, um, a nuclear meltdown. In the face of the failure of First Energy to be vigilant and maintain its, its facilities appropriately, and in the face of, of the failure of the Nuclear Regulatory Commission to provide adequate oversight, and I would invite each of you to be a part of that next step because certainly we must grow this movement if we are to be effective. Thank you. (Appause)

18-8-OL continued

OK, our next speaker is Kevin Kamps. And I'm sorry but we don't have a microphone stand so you just have to hold this one and speak into that one.

Mr. <u>Kamps</u>

Hello everybody, Uh, I'm Kevin Kamps. I work for Beyond Nuclear, uh, based in Washington, DC. And, uh, I just wanted to start by saying thanks so much to Anita, and to Joe, uh, to the Sierra Club, to the Green Party, for pulling this event together so quickly, and to, you know, many others who I look forward to meeting and working with, uh, uh, folks running the video cameras so we can get this official public comment to the NRC. [pause] Man, where to start! [laugh]

Um, first thing I'll do is hold this up. [Holds up report entitled, "Davis-Besse Atomic Reactor: 20 *MORE* Years of Radioactive Russian Roulette on the Great Lakes shore?!"] If you haven't heard about this, uh, these handouts are available on the table in the hallway there and, um.... When I heard about Davis-Besse's move to get a 20-year license extension on top of its original 40-year operating license, the first thing I realized I needed to do was to, uh, educate myself on the past history of this reactor. I had heard bits and pieces from several colleagues, uh, Michael Keegan who's in the back here from Don't Waste Michigan and Coalition for a Nuclear-Free Great Lakes, uh, Terry Lodge, she works with the Toledo Coalition for Safe Energy. But I didn't have it, um, in my head all the near-misses and not so near-misses, and, uh, leaks, and

7

accidents, and incidents, problems that this reactor Davis-Besse has had over the decades. And, uh, so I tried, uh, to get it in here, what I thought was going to be a two-pager ended up being in the end a seven-and-a-half-pager with two and a half pages of footnotes, just in case sceptics thought we were making this stuff out of thin air. And, uh, there were some doozies in there, that I'll just go over them real quickly here. Um, a lot of dodged bullets, a lot of, uh, really scary events. And, uh, you know, credit to Tom Henry of *The Blade* for his extensive coverage, uh, especially since the, the hole in the head incident. So you can see in the footnotes that I, I, um, I cite his work in *The* Blade quite a bit.

Um, the first one that's on this list is the Three-Mile Island meltdown pre-cursor incident of September 1977, about 18 months before Three-Mile Island suffered its 50% meltdown. Uh, Davis-Besse is a twin reactor to Three-Mile Island Unit II and had the exact same accident sequence, uh, underway 18 months earlier. And long story short, fortunately one of the, uh, operators in Davis-Besse's control room recognized what was going on and ended it before, uh, a meltdown occurred. But incredibly, that news, that, uh, "learning experience," as, uh, Anita [laugh] mentioned there from the NRC's perspective, uh, was not communicated to the industry. It was not communicated to the Three-Mile Island, uh, despite the best efforts of an inspector from the NRC's Chicago office, um... So, 18 months later, we have a 50% meltdown at a, at a US atomic reactor. And, uh, for the 30th anniversary of that incident, uh, Three-Mile Island over there, it held a press conference in preparation in Harrisburg. Uh, Harvey Gunderson, who is an expert witness, a nuclear engineer who's working with us up at Fermi III to oppose that new reactor proposal up there, uh, spoke at the press conference for TMI's 30th anniversary. Uh, did a re-evaluation of how much radioactivity, uh, he calculated got out from the meltdown, and take the official version and multiply it by 100 is what Harvey Gunderson says. So, were there health, uh, effects of that? You bet there were. Steve Wayne at the University of North Carolina at Chapel Hill, epidemiologist, uh, has documented several increases in different 19-1-OS

8

cancers downwind of Three-Mile Islands and the near proximity, including lung cancer. The official version of things, uh, don't recognize this, unfortunately. 19-1-OS continued

So, moving on in, uh, Davis-Besse's history, um, "the worst accident since TMI" was a loss of coolant to the reactor core for 12 minutes, that was in June of '85. Uh, moving on, a direct hit by a tornado in June of '98, where, uh, the emergency diesel generators were breaking down and had to be jerry-rigged time and time again, uh, for the course of 24 to 48 hours, with a very hot reactor core despite being shut down already. And a pool full of irradiated nuclear fuel that was in danger of heating up. 19-2-OS

Uh, the next one down was the hole in the head, that's been mentioned already, uh, within 3/16 of an inch of a breach of the reactor pressure vessel. And as Tom Henry put it in *The Blade*, that would be, uh, the first time since Three-Mile Islands that radioactive steam would, uh, form in a reactor containment building. So all of these threats to the reactor core, you better hope that the reactor contaiment building functions as designed. But if the meltdown is bad enough and it melts through the foundations of the containment building, the radioactivity is going to get out. 19-3-OS

Uh, in accidents and that are a habit here is the Northeast blackout of 2003. Um, did Davis-Besse's hole in the head expenses and distraction have anything to do with, uh, lack of maintenance on its infrastructure, such as, uh, power lines sagging into trees, which, whoa, just so happens to be the, uh, the start of the Northeast blackout. What do you know? Huh! Wonder if there's any connection there. 19-4-OS

Uh, more recently, March of 2010, a new leak in a reactor lid at Davis-Besse. This, uh, replacement lid is from Midland Nuclear Power Plant in Michigan, which was nearly completely built but never fired up, and it wasn't an exact fit on Davis-Besse's, uh, reactor pressure vessel. But, um, you know, I wanted to mention that there have been victories 19-5-OS

9

over the years, and one of the victories was when the first lid leak at Davis-Besse occurred, the first proposal by First Energy, and the NRC is pretty infamous for just rubberstamping what companies want, was a plug. They were going to plug the, uh, corrosion hole in the lid. And so a lot of folks showed up with, uh, giant bandaid bumper stickers, and, you know, giant banners that looked like bandaids, and the public pressure had a lot to do with that proposal not flying. But we've got, you know, a new, a new leak in the lid. So they have another replacement lid on the way. Something that should be mentioned about that, speaking of NRC's lack of enforcement of the safety regulations. In the aftermath of Davis-Besse, uh, six lids have been replaced in the United States at pressurized water reactors . Uh, Peach Bottom would be one. 19-5-OS continued

Uh, something that we had learned that has not seen the light of day in the media to this point, the New York Times was sniffing around a story, we did a lot of groundwork for them to try to get them what they needed to run the story, it still has not run, and that groundwork we did was back in early 2007. So, this story has remained silent. The story is that at Palisades in southwest Michigan, a pressurized water reactor with a badly-corroded lid, needing a replacement, the company said by July 2007 the lid needed to be replaced. Well, here we are, how long? Three and a half years later? That lid has not been replaced. Why hasn't that lid been replaced? Well, it turns out that the replacement lid from a company called Babcock and Wilcox Canada was defective. The replacement lid, brand-new lid, fabricated especially for Palisades, had cracks in its bolt holes. And the inspector from Palisades who went up to the factory to check it out let them know that this was the case, and for doing his job, he was fired by the owner of Palisades, because he was messing with the schedule. There was a mutiny of the lid replacement crew. They said, "Hire him back or we're, we're not going to do any work" and they did hire him back. So for a brief period of time, this whistleblower was in communication with Dave Lochbaum of the Union of Concerned Scientists. 19-6-OS

10

There were six lids replaced with Babcock and Wilcox Canada lids in this country. They were put on at the other nuclear power plants. So the question is: How are those bolt holes on those other lids? So you can see there are serious problems in this industry. Um, moving on down the schedule, I mentioned in here, um, radioactive risks piling up. It should say "on the Lake Erie shoreline," I put "Lake Michigan." There's been problems with that, too, though. I've got Lake Michigan on the mind, here. 19-6-OS continued

So the current amount of waste at Davis-Besse is 557 tons of irradiated nuclear fuel. The only reason we know that figure is because spring of 2010 was a magic date in the history of radioactive waste in this country. It's when Yucca Mountain, Nevada. would have been full if it had ever opened. So, uh, spring of 2010, there, there existed 63,000 metric tons of commercial irradiated nuclear fuel in this country, the legal capacity for Yucca Mountain, Nevada, to have accepted as a national dumpsite. So, uh, that's how much, uh, was at Davis-Besse at that time. 557 tons. So it could have been said that every ton of waste generated after spring of 2010 would have been excess to Yucca. The thing is, every ton of waste ever generated in this country is excess to Yucca, because Yucca Mountain is not going to happen. It's geologically unsuitable. It's an earthquake zone. It's a volcanic zone. There's a drinking water aquifer below. If waste is ever buried there, would have ever been buried there, it would have leaked massively over time, ending up in that drinking water supply, created a nuclear sacrifice area over a, a wide region of agricultural land, Native American land, national parkland, national wildlife refuge, all that is downstream. It's not happening. Uh, President Obama and Energy Secretary Chu have canceled the Yucca Mountain dump. They have zeroed out the funding as of last February. That fight is still on. The other side is pushing back. And just last week in federal court in DC, uh, appeals court, the second highest court in the land, agreed to hear a suit brought by the state of Washington, which has a lot of military hi-level radioactive waste, the state of South Carolina, which also has military hi-level radioactive waste, not to mention a lot of commercial waste within its borders. That court case is 19-7-OS

11

now proceeding in, uh, appeals court. So that fight is still on. But President Obama, who will at least be in office for 2 more years, has decided to, uh, zero out the funding. 19-7-OL continued

And there's ongoing problems with Davis-Besse, um, to the present day. Um, I'd like to just share some figures for, um, what might happen if there were a major radioactivity release at Davis-Besse. This comes from a 1982 NRC report entitled "Calculation of Reactor Accident Consequences," or CRAC, which is a nice little acronym the NRC came up with. So, if there were a major radioactivity release from Davis-Besse, the NRC and the Sandia National Lab in New Mexico, which conducted the study, uh, determined that there could be 1,400 peak early fatalities, they call them, 1,400 peak early fatalities, 73,000 peak early injuries, and 10,000 peak cancer deaths. And they attributed a dollar figure of 84 billion dollars for property damage. So, that study came out in 1982. NRC tried to cover it up. Uh, Congressman Ed Markey of Massachusetts, uh, got it outed by subpoena by holding a hearing and out came the figures. So if you increase, uh, all those casualties due to the increase in population since 1982, if you, uh, increase, due to inflation the, uh, property value damages, that would go up to $185 billion dollars. And a little update to mention, just came out in , uh, mid-September, uh, "Inside the EPA," which is a trade press, uh, publication in Washington, DC, [cough] uh, scooped the story that they did a freedom of information act release to the NRC, the EPA, and the Federal Emergency Management Agency, and discovered, uh, internal emails between the agencies, the lawyers of the agencies, uh, fighting with each other over a little minor detail of after a major radioactivity release who would, uh, be in charge of the clean-up and how would it be payed for. So it turns out that the lawyers at these 3 agencies, uh, were discussing how Price-Anderson, the national liability, uh, coverage for major nuclear power plant accidents, will not cover the clean up costs. It would cover other things, property damage and, and some very strictly controlled categories, but not clean up costs. So, that's a little issue. 19-8-OL

12

Uh, Davis-Besse, which is deteriorated with age, has already had so many close calls, 2 major accidents. So, you can see things are pretty out of control. Anita mentioned the, uh, NRC as a rogue agency. And we keep trying to figure out what the NRC stands for. Is it Nobody Really Cares? Is it Nuclear Rubberstamp Commission? Uh, it might be Nuclear Rubberstamp Commission, because of, uh, the 60 license extension applications they've considered so far, they have rubberstamped every single one of them. And, uh, these are oldest reactors in the country with major problems. 19-9-OL

Uh, for a long time, groups like this gathered today stopped challenging these license extensions because it was such an obvious rigged process and such waste of time that they didn't even engage with it. There may be other avenues to fight these things. Well, when it came to Palisades in Michigan, first of all we were shocked that the company would even try to get a license extension because this plant, Palisades, was a lemon before it even, even started up. So it was incredible that they, uh, ... and they got it. We, we fought them, we got steamrolled. But the silver lining, I think, uh, was that we learned some things. So Paul Gunter, my coworker at Beyond Nuclear, learned a thing or two about the NRC license extension procedure. And the next one up was Oyster Creek, New Jersey. And, uh, he gave them hell and shined a bright spotlight on Oyster Creek, on a major technical problem, a corrosion of the radiological containment barrier. Had an excellent lawyer from Rutgers University, Richard Webster. Had a great expert witness, uh, who had served us at Palisades in the past, a corrosion expert, a metallurgist named Rudolph Housner. And the 3-man team there really took on Oyster Creek. Got a split decision from the licensing board, which is very rare, a 2 to 1 vote in favor of license extension. Got a split decision at the NRC commission itself, a 3 to 1 vote. And the man who voted against the license extension at Oyster Creek is currently the NRC Chairman, Greg Jaczko. So, that was a huge victory.

Uh, we just learned within the last few days that Oyster Creek, New Jersey, uh, Exelon Corporation of Chicago, under pressure from not only

13

citizen groups but the state of New Jersey itself, has said "OK, OK, OK, we're not going to operate for 60 years, we'll only operate for 50 years, but don't make us build a cooling tower, we don't want to spend the 200 million, the 300 million on a cooling tower." So unfortunately, a deal's been brokered. They're going to go for 10 more years into the future, but they're not going to go for 20. And so we still need to fight them on the 10, because that plant has so many problems that should require its immediate shutdown. One that I'll mention is that its, uh, waste storage pool is very vulnerable to accident or terrorist attack.

So, just to conclude, I'd like to leave you all with some hope that now license extentions are being seriously challenged, almost the minute that they're brought up. Uh, another one to mention is Indian Point, New York, River Keeper, Hudson River Keeper headed by Bobby Kennedy Junior, has seriously challenged the Indian Point license extension. The state of New York has joined that proceeding. The Attorney General of New York, uh, the Environmental Department of New York, they are also requiring now Indian Point to install cooling towers, uh, to lessen the thermal damage to the Hudson River, just like the thermal damage, the, uh, just, uh, catastrophic destruction of marine organisms going on at these plants that lack cooling towers. That's not an issue at Davis-Besse because they have a cooling tower. But as we raised at Fermi III, we add up all the thermal impacts, of all power plants in this neck of the woods, and all the toxic chemicals they're releasing, I'm talking nuclear and coal and others. Uh, you got to look at even the thermal impacts going on now, the destruction of the, of the eco-system in Lake Erie, um, especially when Fermi III is being proposed. 19-10-AQ

And, uh, there was another, uh, license extension, that I wanted to mention, that's being challenged. I brought some things to look at over here, some old posters from Seabrook New Hampshire, in the mid-1970s. Uh, you know, fifteen hundred people got arrested on a single day in 1977 trying to block the construction of Seabrook. Well, Seabrook has gone for a 20-year license extension and they've gone for it 20 years early, incredibly. They're only 20 years old. They have 20 19-11-AL

14

Commenter: Joseph DeMare

more years on their license, and they've asked for a 20-year license extension. So Paul Gunter, my coworker, has challenged this 20-year early application, uh, and his main challenge is the wind power potential off the gulf of Maine, which is tremendous. So showing that wind power is a great alternative. And, I'll just close now, uh, by saying that the wind power potential of the Great Lakes is there. That will be one of our contentions against Davis-Besse for 20 more years. And add to that the solar potential, with the biggest solar, uh, panel manufacturing factory in the country right here in Toledo. Add to that the efficiency potential, and there's no need for 20 more years of radioactive Russian roulette on the Lake Erie shoreline. Thank you very much. (Applause)

19-11-AL continued

Ms. Rios

OK, just, just a couple of things. I just wanted to remind people that this microphone down here, that's the crucial one, OK? We, we have to make sure we speak into that one. Um, I'm also going to go over the list of speakers, just so everybody knows, OK? Um so that was Kevin Kamps. Our next speaker's going to be Al Compaan. The next person's going to be Kate Hoepfl. Um, then Tony Szylagye, um, Ed McArdle, um, David Ellison, um, did Ralph Semrock ever come? OK, um, Phyllis Oster, and then Michael Keegan. Did Bev Apel come? OK, so that's just so you folks know what our roster looks like so far. So our next speaker is going to be Al Compaan.

Mr. DeMare

OK, so while Al's setting up, I just want to mention that, um, technically what these comments are going to be is part of the Environmental Scoping comments for the Environmental Impact Statement, which is part of the application for the 20-year renewal. So part of that process is that if we could show that there are cheaper, safer, more environmentally friendly alternatives to doing nuclear power, to renewing this license for another 20 years, technically the NRC is supposed to say "OK, you're right, uh, nuclear power isn't that, we won't extend this, uh, licensing

14-17-OL

15

Commenter: Al Compaan

application." So right now, uh, Al Compaan's going to give the talk and I think he's going to speak to some of this...to some of these very issues.

Dr. Compaan

Thanks, Joe. Uh, I wonder if we could, could we turn these lights down? It may be...the screen may be a little more visible if we turn the lights down. [Turns on Slide Projector] OK, uh, so, uh, Kevin has anticipated, uh, much of what I'm going to say actually. Uh, but let me just give you my background. Uh, I recently retired from the University of Toledo, I'm an Emeritus professor at this point, although I'm maintaining an active research program and my, uh, research area is in, uh, photo-voltaic, so in solar electricity. Um, so what I'd like to focus on are, are the alternatives to, to Davis-Besse, and, uh, uh, first I'll give you an overview of, uh, what, I just want to make a couple of, uh, comments about the history of Davis-Besse which Kevin, uh,actually covered in very nice detail, and his, uh, position paper is, uh, was eye opening to me as well. Uh, one of the things that, uh, that, oops...

One of the things that I think is important to keep in mind is that First Energy and Davis-Besse, um, provides about 8.3% of, uh, First Energy's baseload power generation, so, uh, that's important to recognize in terms of the alternatives. Now, um, in Ohio, Senate bill 221, which was passed in the spring of 2008, uh, mandates for the investor-owned utilities that they should, um, achieve a higher efficiency by reducing demand by 2025 by 22%, a much larger number than the 8.3%, uh, generation that's provided by Davis-Besse. And in addition, achieve 12 1/2% generation from renewals by 2025 and another 12 1/2% generation from so-called advanced energy, which may include new, new advanced nuclear, uh, but, uh, but continuation of Davis-Besse would not qualify for that, uh, additional gen..., for that 12 1/2%.

20-1-AL

Distributed generation will also qualify for a, a credit under that Senate bill 221. And, um, alternative sources are very attractive for...wind, as Kevin mentioned, and also solar. Uh, so, uh, Kevin already mentioned

16

this, but, uh, the expectation when Davis-Besse and all the other nuclear reactors were built was that would mean that there would be a federal repository for all of the hi-level nuclear waste and that is not available. And as Kevin mentioned, uh, the Yucca Mountain, uh, facility has been, uh, the funding for it has been discontinued, it has no operating license. That means that for 33 years, all of the high-level radioactive waste generated at Davis-Besse are still being stored on-site, initially in a cooling pool, as I understand it, and then, uh, a few years ago, they, they constructed above-ground containers for the fuel after it cools off, uh, in this pool. 20-2-RW

So, uh, my, uh, position would be that no nuclear plant license extensions should be granted until there's a long-term storage facility available for these nuclear wastes. And, one of the troubling indicators, I think, is I read through the Environmental Study that is, is mandated for this license extension. This is a study by Davis-Besse. In Appendix E, that's the Envronmental Report, on this page (Page 2.3-2), uh, I quote here, they're, they're required, uh, by their operating license to have monitoring wells to monitor the quality of the groundwater in the, uh, within the perimeter. And one of their wells in 2..., in the spring of 2009 showed a tritium level that was rising, uh, 4000, uh, pico curies/liter. And, uh, this is a quote from their study. "As a reult, the First Energy Nuclear Operating, uh, uh, Company," notice that that's a separate operating company from First Energy, from the rest of First Energy, "is pursuing a root cause approach to identify the source of the tritium in the wells. Uh, no tritium concentrations of...have been detected above the, uh, US EPA drinking water limit of 20,000 picocuries." But, this to me is very troubling. Even though the, the, uh, concentration is not that high yet, but it's an increasing amount, the question is where does it come from? 20-3-HY

So tritium is an isotope of hydrogen, it's hydrogen-3, which means one proton and two neutrons, and, uh, it is not naturally occurring and has a half, half-life of 12.3 years. Um, so it is produced in nuc...in all nuclear reactors by a neutron bombardment either of lithium-6, uh, or boron-10. 20-4-HH

17

And, uh, some of you may remember boron is the acid, uh, well, there's boron in the, the cooling water that is in the pressure vessel, and it was that leaking of boric acid, uh, that was responsible for going through 6 inches of carbon steel in the reactor head. So, the presence of that boron is, uh, uh, under neutron, uh, uh, impact, uh, can produce the, uh, tritium. It's radioactive, it decays, uh, in 12.3 years half-life, and it emits a high-energy electron which is, uh, known as a, a beta particle, um, and, and there's another particle which is an anti-neutrino, which, which almost interacts, uh, uh, so, so, so little that, uh, neutrinos can,pass completely through the earth. So we don't worry about the neutrinos or the anti-neutrinos, but the beta particle is 5.7 kilo, uh...KEV, kilo electron volts, and, uh, this also has a fairly, fairly low penetration. It, it barely gets into your skin, uh, it stops almost with the dead layers of the skin. However, if you ingest it, uh, or you breathe it, then it's very dangerous because it, it has a very short, uh, penetration distance in your lungs or, or in your intestinal tract. So, bec...it's likely to be ingested either as water vapor, as, uh, hydrogen, actually it would be an analog ...isotope, one, one, uh, one atom of hydrogen, one atom of, of normal hydrogen, one atom of tritium, or it, it forms, uh, H2O, water, as, uh, most likely a normal hydrogen isotope and a tritium isotope together with oxygen, so you will ingest it if you drink water from one of these contaminated wells. So, just a couple of things to, uh, to remind us of the danger of, of these reactors. Even if there is not a catastrophic meltdown, there are ever-present dangers in these, in the operation of these nuclear reactors. 20-4-HH continued

Let's talk about the, uh, alternatives. So, I would argue that, uh, certainly before you extend the 40-year license, this is the design, uh, uh, intended design life for the nuclear reactors, 40 years, uh, uh, Davis-Besse, uh, First Energy wants to extend it by another 20 years. The incident and the accident record that, uh, Kevin talked about should be enough to, uh, not ask for any, any further justification for not renewing their license. 20-5-OS But we, uh, should also know that there some very good alternatives for, uh, generating electricity, and one of those normally not thought about as generation, but it's energy conservation. 20-6-AL

18

And that is now widely accepted as the cheapest way to get more effectively, to get more energy, it's to use our energy more, uh, more wisely. And then there's a very strong wind resources and solar resources. So, the important thing that, uh, we need to recognize is that, is that these components, energy conservation, wind and solar, are already mandated by Senate bill 221 in the state of Ohio. And, uh, windmills are, uh, used by the, uh, uh, the publicly-owned, uh, utilities, uh, they are allowed by Ohio law to pass through, to pass those costs on to the customers, so, on to the consumers of the electricity. That, that might not have been my favorite way of doing it, but that's the way, uh, the legislators have decided in the Public Utility Commission of Ohio. 20-6-AL continued

So, just a couple of details about Senate bill 221. One component of that is the alternative energy portfolio standard, that's, uh, now embedded in the Ohio Revised Code, this, uh, this, uh, paragraph. It requires, uh, as I've mentioned, 25% electricity generation by advanced energy by 2025, 12 1/2% by renewables, the rest 12 1/2% may be, uh, uh, done through, uh, alternatives such as clean coal, that is, coal-fired power plants that, uh, the carbon dioxide is sequestered, for example. It may be done by advanced nuclear, and that's requiring, uh, NRC Generation III. Uh, Davis-Besse, I believe, is Generation II technology, but Generation III incorporates a passive safety, uh, systems. So even if the power goes out, such as when the tornado came through and disconnected the power plant from its, uh, uh, emergency diesel generators, uh, there would be passive safety equipment in the Gen-II, Gen-III design. And the Gen-III design would be for 60 years of operation instead of 40 years. 20-7-AL ORC, the second part of the Ohio Revised Code allows net metering, which, uh, has been implemented. Uh, my home, for example, has photo-voltaics on the rooftop and we can feed power back into the, uh, into the grid and get, uh, full retail value for the power. That's been in place for several years now. And then there's an energy efficiency standard, uh, embedded in another of the Ohio Revised Code paragraphs which requires a 20...22% reduction in, uh, the use of energy from each one of the public, uh, utilities. Furthermore, there is a 7%, uh, requirement for a 7% reduction in peak 20-8-AL

19

demand, um, that is the siphoning of power as it increases through the day and decreases at night. Again, these costs may be passed through to the customers, and so there are some very good business reasons why First Energy ought to be doing this, but I think they tend to be stuck in the past, in the technologies of the past.

Here are some additional details, um, that we're going to...that were in the presentation available to the, the NRC. But you can see how the, uh, the requirement for the renewable portfolio standard advanced energy standard increases year by year. And we've now started on that process. There are penalties. If First Energy does not meet those requirements, they will have to pay a penalty. This year, I think it's $400. $400 per megawatt-hour, which is equivalent to 40 cents per kilowatt-hour, First Energy will have to pay. And if they have to pay a fine, they are not allowed to pass that on to the ratepayers. If they stimulate the demand for electricity, whether it's...sorry, demand for renewable electricity, then they provide incentives to homeowners or for businesses or for large, uh, utility-scale installations of solar, wind, they are allowed to pass those costs on to the ratepayers.

20-8-AL continued

So, let's take a little bit closer look at the resources that are available for wind. Uh, Lake Erie and the Lake Erie shore, as well as all of the Great Lakes, are great resources for, um, for wind energy. So, I, I'm showing here this, uh, wind energy map. This is for the average wind power across the United States. And it may be hard to see from there, but, uh, we hear a lot about the, the wind corridor in the Great Midwest, from Texas through to North Dakota. That's this, uh, region of the Great Plains. But now, the wind, uh, resources uh, in...increase, the average wind power increases as you go from white, actually the key is down here, from white to the light blue to the darker blue and still darker, and you can see that, uh, Ohio, for the most part, has a lot of wind resources that are similar to Texas.

We hear about Texas because it has the most wind power of any of the, uh, any of the states. And Ohio has similar resources. But if you look

20-9-AL

20

at, in Lake Erie and on the near shore and, uh, up to the border with Canada, you can see it's a very dark blue, and that's similar to some of these mountain passes here. So wind, uh, resource availability in Lake Erie is really, really prime. Uh, much higher than almost any of the places in, in Texas, for example. So that's an indication that there really are tremendous resources out there and wind power is very competitive in terms of, uh, rates for electricity generated by wind power. The big, uh...let me just back up...One of the big issues with Texas, which is now struggling with getting the power, of course they have some major cities, but they can generate more than what can be used in their cities, is how you arc going to get the power out to the big metropolitan areas like Chicago and Cleveland and Toledo and so on, and Detroit. That is not a problem when you generate the power in Lake Erie, we have a lot of major metropolitan areas that are very nearby.

20-9-AL continued

For solar, Ohio has, uh, actually very good solar insolation as well. Uh, and I want to point out that in this, in this Environmental Report, uh, that's part of the First Energy petition for the renewal, there are some errors in that, in that report. For example, they, they say that the amount of sunlight in Ohio is less than half of what it is in some of the best areas in the country. Uh, that's a bit of a, uh, an error and I'll point out why in just a moment. And then, they also used some data for the costs, which came from back in 1988, and the costs for solar photo-voltaic electricity has come down dramatically since 1988.

One of the mistakes that is commonly, uh, made when you think about solar, is you think about being able to see a sun, uh, the sun in a clear day. And you think, you think, that, well, it's only on those clear days that photo-voltaics will generate usable power. And this is the kind of map that you would use if you were really worried only about direct sunlight, being able to have a clear sky, and being able to see a clear sun out there. And then when you take and you compare Toledo or, or Lake Erie with some areas in the Southwest, and I did the numbers here. Actually, for the...for the South. Uh, when you compare Toledo with Orlando, even when you consider only direct sunshine, Toledo gets 75%

20-10-AL

21

of what Orlando does, down here in Florida. But it's not as good as San Diego, it's almost 60% of San Diego, ???. Uh, and if you go out to the Mojave Desert, Toledo gets about 45%. So that's a number that's consistent with what, uh, First Energy claimed in that report. However, the real data that you need to look at are the, uh, the full sky radiation.

The point of...Most solar panels are flat panels and they will accept light which is indirect, that is, as it comes scattered in hazy days or light cloudy days and light is scattered from those clouds and still make it to those panels. And so this is the appropriate math that needs to be looked for, uh, the amount of electricity that can be produced by solar panels over the years. So, in that case, if you compared Toledo with Orlando, or Toledo with San Diego, uh, Toledo gets 86% of what, uh, Orlando gets, 79% of what San Diego gets. So the argument that the solar resources in Ohio, in Northern Ohio, are not very good, and actually you can see that the best resources here are Western Ohio and in certain...that's an argument that doesn't, uh, work when you address solar. And the last point that I'd like to make about solar is that there are huge changes that have been happening in the last several years in terms of the costs of solar panels. And the cost driver on this is actually FirstEnergy, uh, First Solar, sorry, First Solar, which is, uh, started here in Toledo, by Toledo industrialists such as Harold, Harold McMaster, and our only US generating, uh, US manufacturing facility is in Perrysburg.

20-10-AL continued

They've been, uh, leading the cost reductions. So if you look here, this is a study that was done by Deutsch Bank and updated in 2009. It doesn't go back, uh, to 1998, which is when, when First Energy pulled their numbers, but, uh, you can, you can extrapolate back further if you want. There, it was something on the order of 40 cents/kilowatt-hour for the levelized cost of electricity, as it's called. Um, but in 2010, the cost is about 20 cents/kilowatt-hour for cadmium teluride. This is, this is the type of material in the panels that are made by First Solar. Some of the other kinds of solar panels are shown here, a little bit higher in cost. But what Deutsch Bank projected is that there's going to be a crossover,

20-11-AL

22

a convergence between the cost of solar-generated electricity, as you go out here to, what is the number, it's like 2017 or so, so, 2017, at about the time when, when FirstEnergy wants to extend the license on the plant, solar is going to be, uh, completely competitive, if not lower cost than, uh, the electricity, than the conventional electricity. Notice that Deutsch Bank is using an average over the United States. Now the cost of electricity in the FirstEnergy territory is actually higher, those of you who live in FirstEnergy territory, your home costs, your home electricity costs are something like 12 or 12 1/2 cents/kilowatt-hour, so the curve for us should really start a little bit higher, and that convergence will happen even sooner.

So, FirstEnergy has the option of extending, uh, a nuclear generating plant with all of its associated dangers and also its costs. The cost of nuclear generated power is high, higher than most of the baseload, um, generating capacity of FirstEnergy. And its cost is continuing to increase. The alternative is to jump on some of the new technology, jump on those bandwagons, and those costs are decreasing. So that's the kind of options that FirstEnergy has, and you'd think that if they really look at it seriously and look at the options that they ought to conclude, that some of these alternative forms of electricity are the ones that ought to be, uh, the ones, uh, that are developed for the long-term future of their, of their company. So, just to make one final point, and that is alternative, uh, alternative energy resources generate lots of jobs.

20-11-AL continued

They actually generate, uh, many more jobs than what nuclear power does. Energy conservation, retro-fitting of homes and businesses and so with the more energy-efficient lights, uh, and motors, uh, and thermal efficiency saves, saves, saves energy for everyone. It reduces the need for, uh, uh, generating capacity. Uh, Ohio has a lot of manufacturers that supply components for wind turbines. The maintenance of wind turbines generages many jobs. Uh, I've already mentioned, First Solar is the largest manufacturer in the world. So manufacturing creates jobs. And there are several other PV manufacturers that are beginning, uh, in Ohio, most of them actually in northwest Ohio, in the Toledo area. PV design and insulation creates a num...a large set of jobs.

20-12-AL

23

Commenter: Katie Hoepfl

So this is the final slide with some references for where I pulled some of the data. And, uh, uh, places where you can go for finding the backup material that will support the comments that I just made. Thank you. (Applause)

Ms. Rios

Thank you, Dr. Compaan. And again, I would like, folks, this is, this is the microphone that it's very important to speak into. Um, we will double-check on all this though. If you have your, uh, comments in writing, we would like to submit those along with this, um, this videotape, OK? Our next speaker is going to be Kate, Kate, Hoepfl, Hoepfl.

Ms. Hoepfl

Hello everybody, my name is Katie Hoepfl, student of Professor Compaan's at the University of Toledo. I'm a major in physics. My research is in this renewable energy area. So, what I'm going to be talking about today is alternatives to nuclear power. In FirstEnergy's license renewal application, they dismissed the possibility of almost any form of renewable energy to replace the power production that would be lost by the closing of Davis-Besse. [Displays Slides] 21-1-AL

A lot of the reasons that they used for this dismissal is that intermittency or the volatility of power production by wind and solar, the large land requirements that are used to produce the same equivalent amounts of energy that is produced by Davis-Besse with wind and solar. They mentioned the low wind and low light compared to other states which Professor Compaan has already disputed for us, the associated aesthetic impacts of wind, and the high cost per kilowatt of capacity for solar which, again, Professor Compaan has already disputed for us.

So, what I have done is looked at specific resources here in Ohio, and

24

this better understanding of systems that are already in place will help us see that their reasons for dismissal aren't exactly correct.

So what I have done is done some statistical modelling using systems that are already in place here in northwest Ohio. I used one of the wind turbines in Bowling Green, owned by Bowling Green municipalities, and a solar array mounted on the home of Professor Compaan.

This model is a little bit confusing. What it is here is on the X axis we have the volatility or the intermittency of the system that FirstEnergy mentioned. So what that means is that at some points throughout the day it can be high, it can be low. It's unexpected, the power production that would be produced. On here [indicating the Y axis] it's the actual output of the system. So along our curve here we have an entire wind, only wind system, and at the other end we have only solar. And, along the middle is a combination of the two.

So, what I'm going to show you today is that it's not a matter of using one or the other. The combination of these different forms of renewable energy that's really going to help us offset the loss of nuclear power by closing Davis-Besse. So over here on the end of the curve is where we have the least volatility in the system. For this specific northwest Ohio that turned out to be about half wind and half solar that's going to produce the best outcome for us. 21-2-AL

Just an example here of what I mean by this. So in a 100% wind system has a volatility something like this. This is the power production over the course of the week by the Bowling Green wind turbine. You can see it's pretty unexpected what it's going to produce throughout the day. And on the opposite end, a 100% solar system, follows a pattern, you only get power production during the day, but even throughout the day you not sure if you're going to get a sunny day, cloudy day things like that are unexpected...So, by optimizing the system, using similar rating, say one megaWatt wind turbine farm and one megaWatt solar array, you get something that's quite a bit more predictable.

25

Now put this here against a demand curve. This is from EBCOT it's in Texas, but the demand curve for any big city is gonna look about the same. A lot of high peaks during the afternoon, evening hours and lower at night time when we're sleeping. It's quite a bit more predictable, it follows the demand curve.

What I want to point out here, though is that my graph is still quite a bit volatile here, but it's only taking into consideration two specific sites. We only have one wind turbine and one solar array. But, if FirstEnergy were to take their resources and erect, um sorry, use the wind and solar throughout their entire area that they service. Solar, it's not going to be cloudy in all the areas that they service. It's not going to be not windy in all the areas that they service. That's exactly what the (Go to my summary slide, here) European Wind Energy Association in their annual report in 2009. They said exactly that. That as wind and solar is developed across the entire area, the volatility in one specific area does not infect the overall baseload that it's generating.

That's another thing I'd like to point out in FirstEnergy's application for Renewal, they kept mentioning that solar and wind are not a good replacement because they can't satisfy a baseload. But, as Dr. Compaan mentioned in his speech, Davis-Besse only produces 8.3% of FirstEnergy's baseload. So, we're not trying to make these curves fit identical. It just has to back up the coal and everything else that's already being produced. So we're using a combination of wind, solar and all the other existing technologies that are out there. They'll be able to easily offset the production lost by Davis-Besse.

21-2-AL continued

The only other thing that I was wanting to mention is the jobs that are going to be created. As he had already mentioned, the maintenance of the wind turbines; the installation of the projects; and also the forecasting that can be done. This was also mentioned in the European Wind Energy Association's annual report. The new technologies. They are able to forecast four hours ahead exactly what the wind speeds are

21-3-AL

26

Commenter: Tony Szilagye

going to be. So that they can predict if they need to have boost up the coal or other forms of production. It makes it really a lot more stable. So, this argument of volatility doesn't quite hold.

So, if FirstEnergy acts now, we can be prepared for the energy production loss by closing Davis-Besse in 2017. We can also have a head start on meeting the requirements of Ohio Senate Bill 221.

21-3-AL continued

And that's that. (Applause)

Mr. DeMare

Alright, thank you Kate. That was excellent. I think that a lot of people know and believe the points that you guys are making, but it's wonderful to have the actual numbers provided to us. It's very heartening to not only know that you're right, but to actually see it proved scientifically.

Our next speaker is going to be Tony Szilagye. Tony is a member of the Sierra Club, and I would like to say that the only other person at the hearing that spoke out against the license renewal was named Pat Marida. She was also from the Ohio Sierra Club, and she has also gotten testimony from other people. She has recorded the comments, I think, of 15 other people, who couldn't make it here today. People who live in places like Columbus and Cleveland, and so those will also be entered into the record along with these comments. So um, the depth of opposition to this is very deep.

Thank you, Tony for coming.

Mr. Szilagye

Water is the foundation of life. Um, And it's our most precious resource in Ohio. Nuclear energy is not needed for life here in northwest, Ohio. 22-1-OL

We need to protect our water resources first from the effects of nuclear forms of pollution. Lake Erie provides drinking water and other 22-2-AQ

27

consumptive uses to millions of people and many different industries in northern Ohio. We rely on Lake Erie for recreation, and we are entrusted to care for and protect the Lake for future generations as well. They have as much a right to the use and enjoyment of Lake Erie as our present generation, even if the comments do not agree.

Davis-Besse is one of the greatest threats to the health of our Lake. Davis-Besse was strategically located on Lake Erie to meet the tremendous needs of Davis-Besse for water as a coolant. This is great for Davis-Besse but not so good for the Lake. Davis-Besse uses water from thc Lake and spews it back as thermal pollution. Over the years, this has had consequences for Lake Erie. We have once again had increasing algae problems for Lake Erie. The growth of *lyngbya wollei,* a toxic algae, has accelerated over the past few years along with *microcystis*. These toxic algae have numerous conditions which contribute to their growth. One, of course, is the presence of ample amount of phosphorous and nitrogen. Another ingredient is an abundance of warm water. We have billions of gallons of thermal pollution from the power plants surrounding Lake Erie.

22-2-AQ continued

Now, part of these comments were also, um, written by Sandy Benz and below are Sandy's comments.

Um, studies on water use, fish kills, and the thermal impacts at the bay shore park land are over 30 years old. The intake for Davis-Besse is in less than 30 feet of water in the Great Lakes...should have been...in the Great Lakes, in Lake Erie's shallowest most biologically productive waters. Davis-Besse uses an estimated 50 million gallons of water a day which causes fish kills and thermal impacts. While cooling towers at Davis-Besse limit water use and fish kills with the best available technology, there should be an assessment of water use and fish kills. This request is made as the number of walleye are declining from an ODNRS estimate of 80 million about 5 years ago to less than 20 million in 2010.

22-3-AQ

28

In addition, the amount of toxic algae has increased over the last, uh, 10 to 15 years, so much that the Ohio EPA reports that physical contact with the toxic algae in Lake Erie probably causes illnesses, probably caused illnesses to 10 people in the summer of 2010. If Davis-Besse were to close on schedule, there would be fewer fish killed and no more warm water discharge. The estimated number of fish that would not be killed is unknown because there are no counts of fish impingement, that is, fish caught against screens, and entrainments, fish that go through screens. In assessing whether Davis-Besse should remain open or closed, an updated, independent analysis of the Davis-Besse water impacts, uh, to fish impingement and entrainment and thermal impacts using Clean Water Act 316 A and B protocol needs to be conducted. If the incremental increase in fish kills and added temperature to the water in aiding algae growth and in decreasing walleye numbers, the environmental and economic impact of the fish kills and algae growth should be considered in the requested re-licensing of Davis-Besse. Furthermore, um, should the licensing go forward, the license needs to require periodic impingement and entrainment fish counts and thermal mixing zone plume impacts on algae growth and water quality.

22-4-HH

22-5-AQ

My comments will continue. Um, there are many different incidents that can be used to demonstrate a lack of, of oversight by the NRC and Davis-Besse failures. The following are quotes from the Lessons Learned Report in regard to the hole in the reactor head.

The NRC and the industry regarded the boric acid deposits on the RPV head as an issue that required attention. However, the NRC and the industry did not regard the presence of boric acid deposits on the RPV head as a significant safety concern. The recurring nature of alloy 600 nozzle cracking and boric acid corrosion events indicates that industry actions in general, and Davis-Besse Nuclear Power Plant actions in particular, were less than adequate. Similarly, given that the NRC has issued multiple generic communications addressing these two issues, the recurring nature of these events also indicates the NRC failed to effectively review, assess, and follow up on [unintelligible] operating

22-6-OS

29

experience. The NRC's AIT concluded that Davis-Besse staff missed several opportunities to identify the boric acid corrosion of the RPV head at an earlier time. In the task force's view this means that Davis-Besse Nuclear Power Station staff missed these opportunities because Davis-Besse staff failed to assure that the plant safety issues would receive appropriate attention. The NRC missed prior opportunities to identify the VHP nozzle leaks and the RPV head degradation. In the task force view, the NRC failed to integrate known or available information into a safety assessment. Babcock and, and Wilcox and CE plants appear to be highly susceptible to boric acid leakage and corrosion. One hundred percent of their plants have reported boric acid leakage-related problems. Given the high incidence rate of boric acid leakage problems, problems at B&W plants, uh, Davis-Besse should have been alerted and taken appropriate, appropriate corrective actions prior to the discovery of the leaking VHP nozzles and the degraded RPV head. 22-6-OS continued

Um, and there's other quotes too, but I'll move on. To summarize the meaning of these quotes, um, the NRC spoke about these leaks and they gave warnings of the leaks, and at the same time, relaxed in their oversight of Davis-Besse. The question about lessons learned, um, is not whether, uh, they will learn. Uh, it's, it's also whether we should entrust Davis-Besse to be operated safely and is it safe now? The answer is no. Davis-Besse should not be re-licensed. The other question that has to be considered - is the safety culture within Davis-Besse changed? And if one were to assess the safety culture in personnel...Technology doesn't fail on its own, technology fails...People operate technology. Is the safety culture at Davis-Besse different today? The answer is no. And we believe this should be taken into account in any re-licensing. It is well known that the economic concerns are top priority for the NRC and First Energy, no matter how many of us are fried in a major safety blunder.

22-7-OL

22-8-OS

Here are a few suggestions. In the year 2021, Senate bill 221 will eliminate or generate as much power as Davis-Besse produces. If First 22-9-AL

30

Commenter: Ed McArdle

Energy takes seriously the opportunities available for generating power through energy efficiency and making agreements for a better payoff for exceeding the energy efficiency targets the Senate bill 221 mandates, they can be more profitable without Davis-Besse. If they take an aggressive look at the potential of combined heat and power, wind, compressed air storage, solar, they can generate either through efficiency or through greater uses of existing resources, the needed capacity that the loss of Davis-Besse will create. There are solutions for generating capacity. For every one cent invested in elec...in energy efficiency, three cents profit is gained. The solutions and incentives...alternative to the continuation of nuclear power to thc elimination of nuclear power are already out there. Thank you. (Applause)

22-9-AL continued

Mr. DeMare

Alright, thank you very much, Tony. And I just wanted to give credit, right now. The idea of this People's Hearing was actually, initially Kevin Kamps' from from uh. This was his notion. He mentioned, "Well we could just hold a hearing. If they're not gonna give us one" And I'm really glad we did. I've already learned a ton so far, and I'm grateful to everyone who has spoken so far. And our next speaker is Ed McArdle.

Mr. McArdle

Hi folks. Um I prepared written comments for the NRC. I'm really pleading with you all because I'm not sure they'll listen or read them.

23-1-LR

My name is Ed McCardle I'm a Michigan resident that resides within the approximate 50 mile radius of the Davis-Besse nuclear installation. I'm speaking today for approximately 22,000 members and supporters of the Sierra Club of Michigan. Which I point out, I'm not a staff person. I'm a volunteer. I've been working on various pollution issues for a long time. I am the Chapter, the Michigan Chapter Conservation Chair, and I'm just recently getting involved in the nuclear issues. I'm trying to pull more of the Sierra Club to this um crucial issue.

31

So, we urge the Commissioners to deny the 20 year relicensing. If there ever was a candidate for the first denial of a relicense, this is it. As the history of this facility proves, it is too dangerous and expensive to continue this operation, especially since it is not needed for present or future power generation. I would like to refer the Commissioners to two articles quoting studies that support this latter statement. 23-2-OL

I would first like to quote excerpts from an article in *The Nation* magazine dated February 15, 2010, "The Case for Grade Power." This is generally referred to as using waste heat or cogeneration from large facilities of which Ohio has plenty of. The article uses Ohio as an example for this opportunity. The article states that according to an analysis by Recycled Energy Development, the Libbey Glass Plant in Toledo, the Arselor (unintelligible) Middle School in Cleveland and the (unintelligible) Chemical Plant in Cincinnati together produces enough waste heat to produce between 145 and 185 megaWatts of additional electricity. The study also indicates that Ohio has enough cogeneration potential to retire up to 8 nuclear power plants. According to Oak Ridge National Laboratory this strategy will cost less than half of a coal plant. 23-3-AL

A recent report by Policy Matters of Ohio estimates that recycling 7.7 GigaWatts would require a $10.5 billion investment with a three year payback. This would have the further effect of making Ohio industries more competitive, more profit, saving both jobs and the environment.

The second article I refer is the November, 2009 cover story in *Scientific American.* I bought this issue and bring it with me to almost everything I go to. This article is entitled "A Plan for Sustainable Future. How to Get All Energy from Wind, Solar and Water by 2030 using Present Technology." The article by Mark Z. Jacobsen of Stanford University and Mark A. Delucchi of University of California, Davis it is describe by the editors of *Scientific American* as a "pragmatic hard headed study." Supply 100% clean energy by 2030 at the same or lower 23-4-AL

32

cost of traditional fossil and nuclear resources. Frankly, I'm amazed by this article. This is something, I think, we've been waiting for, and something we should push.

Um. Ok. Besides adding all the GigaWatts and the TetraWatts, the article discusses, "How do we get there?" and the answer is we need the political will to pass legislation to give incentives to producers of clean energy. The most effective strategy is based on the feed-in tariff concept. That's f*e*e*d-i*n-t*a*r*i*f*f*. This is a concept that is kind of foriegn to Americans, but this is what the rest of the world calls it. We were thinking of calling it "clean mobile energy", but then wc'll have to refer to it as "like the feed-in tariff" in Europe and Asia so I may as well go with the feed-in tariff or FIT. You can check this concept out at FITcoalition.com or .org. There's a lot of it on the Internet um I'll be talking more about that but let me continue with comments.

Okay um feed-in tariff has been widely, wildly successful in Europe, Asia and now, most recently in Ontario. Germany claims that they created over 300,000 jobs with their version of a feed-in tariff. They have cancelled new coal plants and they have a moratorium on new nuclear proposals. Although there is debate to remove the moratorium. The cost to the German rate payer, the public, is approximately \$3 to \$4 a month, about the price of a beer.

Since the passage of the Ontario feed-in tariff last year, the Province has promised to shut down the largest coal plant in North America at Nanticoke and has cancelled several new nuclear proposals. I'm not sure if it's four that are cancelled or six because two are maybe refurbished. So, I'm not sure about that. But they've already started shutting down two coal units at Nanticoke. The articles coming out of Canada are just amazing for this type of legislation.

More than 70 countries and a few states have passed versions of this legislation. I think it's far more than 70 countries, now. But Vermont has passed it's version. There's the Gaines bill for the utility for the State

23-4-AL continued

33

owned utility that's passed for feed-in tariff solar. Consumer's power in Michigan passed a very teeny-tiny one and it was filled up within hours.

Okay according to a report by the National Renewable Energy Laboratory, U.S. Department of Energy, "a well-designed feed-in tariff is far more effective and less costly than the renewable portfolio standard."

23-4-AL (continued)

It's past time to admit that we can no longer afford this complicated and dangerous technology--not the feed-in tariff, I'm referring to Davis-Besse. It is not carbon free as claimed, and not sustainable. There's no place to put the waste and we believe that it is immoral to burden our children and generations far into the future with deadly waste. Thank You.

23-5-OL

23-6-AM

23-7-RW

But, I do want to say one more thing about the feed-in tariff. I've been following this issue ever since our state legislator in Michigan, who got term limited and didn't get re-elected, Kathleen Law introduced the first feed-in tariff legislation in North America. And Dr. Herman Schearer from Germany who instituted the concept in the German Parliment long before the United States. She had the same as well as I did. Dr. Schearer died this past year I'm sorry to say. She introduced the first feed-in tariff in the Michigan Legislature. She says she got calls from all over the world. People wanting to, you know, companies wanted to located whoeever had passed the feed-in tariff. Because the feed-in tariff actually guarantees not only do you get the capital costs and a fifteen to twenty year contract, usually, and a profit, a modest profit.

Boy. You know, let's go get 'em. Let's get that money. But it's especially well suited to a um to solar, because then you don't have to build out the grid. You can have more distributed power and therefore you don't have to have a big utility be part of the feed-in tariff until an excess is given. Extra power is produced. But, you know, anyone can do it. Anyone can get one of these contracts, if they can get the finance them. That includes farmers, that includes, you know communities, towns, villages,

34

churches, individuals, etc. So this is really the most effective thing that we can do, and we need to do this.

Thank You. (Applause)

Ms. Rios

Okay, just to let you know, we have um one, four more speakers scheduled and I don't think we're going to have anybody else coming in um if we have somebody else coming in we'll certainly accomodate them. But then we will be able to take a brcak to share information, and also to let you know that one of the things that we're hoping to do today, before you all leave is that Kevin has um some information that um.. He has a contention. Which is a part of the next process in front of you. The process after we oppose the licensing.

But those of us who live within fifty miles of Davis-Besse have to validate what Kevin and Beyond Nuclear are saying for that for them to have standing. We'll talk about that. We'll bring Kevin up again before we finish up so that he can explain that process so that those of us who are willing to go ahead and sign on to his contentions.

Mr. DeMare (interrupting)

Uh Anita?

Ms. Rios

Yes?

Mr. DeMare

Um we need to swap out our video card. It will take about 5 minutes.

Ms. Rios

Commenter: Phyllis Oster

Do we want to take a five minute break?

Mr. DeMare

For technial reasons, yes, I do.

Ms. Rios

Okay, we'll take a five minute break. Bathrooms are out in the hallway.

Ms. Oster

I had been involved in the initial opposition to granting a license for the building of Davis-Besse and I certainly didn't expect to be at a relicensing opposition meeting.

My husband was a geneticist in the biological sciences department Bowling Green State University, and his research focused on the effects of radiation and chemical mutagens on the genetic material of *Drosophilia Melanagaster*, commonly known as fruit flies. A group from Bowling Green State University came to the hearings to testify in opposition. Opposition to the building of the plant was based on the fact that tons of radioactive waste would be generated in order to produce electricity. At that time, planning for the long term containment of the radioactive waste was to be done in the future. We now know that we still do not have any methods approved for the long term storage and isolation of the tons of spent radioactive rods and other radioactive material that is made during the mining and processing of the fuel.

24-1-RW

This material will be dangerously radioacitve to humans and other living things for hundreds of thousands of years. To put that into perspective, we will be starting on the year 2011 of the common era on January 1st.

Davis-Besse has proven to be one of the most unreliable plants in the

24-2-OS

36

Commenter: Davis Ellison

U.S. as other people have testified here. FirstEnergy has been very negligent in maintaining the safety of the plant. Renewing the license of this aging facility will place the population of northwest Ohio and probably parts of lower Michigan in great danger. 24-2-OS continued

As a very senior citizen, I would like to encourage the members of the audience who are opposing the relicensing of the plant to keep fighting. It can sometimes get discouraging, but the opposition that was mounted to the original building of nuclear plants in the 1960's and 70's did result in enough added expense for the electrical industry to put a halt to the building of new plants, although Davis-Besse was approved. 24-3-OL

Originally nuclear power was touted as power that would be produced so cheaply that it would not even have to be metered. Now we are being told that it will solve the problem of pollution generated by using fossil fuels. We will be replacing carbon problems of pollution, generated by using fossil fuels, with problems of radioactive pollution for which there is no cleanup but time. (Applause) 24-4-RW

Ms. Rios

Thank you, Phyllis. Okay, our next speaker is going to be David Ellison from um Cleveland.

Mr, Ellison

Good Afternoon. I'm going to try and make a few remarks before my voice completely goes out. My name is David Ellison. I live in Cleveland. I'm an architecht. I just finished a race for the newly created Cuyahoga County Executive, a position that replaces the three County Commissioners in Cuyahoga County.

I ran on the Green Party ticket because this year was the first year that the Green Party was actually on Ohio's ballot, and uh if there was better representation from either the Republican or Democratic parties we

37

might not be having to have this hearing today.

Um the uh. Some people may remember me from the early 90's. I know at least Mike Leonardi was here in the room. There he is! That's when we fought off the whole proposition to build a low level radioactive waste dump here in Ohio. I'm sorry I wasn't here in the 70's to resist against the Davis-Besse, but if I lived in Ohio then, I would've. Um. 25-1-OL

We need to broaden the idea of what environmental consequences, environmental impact means when it comes to nuclear power and something like Davis-Besse, and other people who have spoken here today have done a bettter job at talking about what specifically those.. the common definition of what environmental impacts might be. But I'd like to say something about the political environment that that is affected by the operation of nuclear power plants and Davis-Besse and the NRC in Ohio at this time. In relationship to the Davis-Besse relicensing, the potential licensure of a plant down in Piketon a new power plant that our Democratic Governor invited in to this uh situation that Kasich will probably go right along with and that is the credibility and the competency of something called the Nuclear Regulatory Commission.

And Uh. Already while the residents of this area would be most directly affected by the power plant, Cleveland is not that far away and the NRC should have solicited input from people from a broader radius around the power plant including Michigan and Indiana. Because what we've found from the Chernyoble accident is that radioactive waste doesn't stop at municipal boundaries or national boundaries. And the environmental impact is much broader than how some fish that get caught in an intake pipe or the other kind of more immediate sort of environmental impacts that people might think of. 25-2-LR

The fact that the NRC didn't hold multiple hearings on this is a problem, but they shouldn't and I'm speaking directly to the NRC at this point. The NRC shouldn't take as the expression of the people of Ohio the testimony of just those people who attended the hearing on November

38

6th or 4th or whenever it was right after after election day. That the people that are economically benefitting from the conduct of FirstEnergy by the operation of that power plant whether it's through their jobs or through charitable contributions, that is not a legitimate expression. We have a political problem in this country of disengagement and alienation and generally, the government and its regulatory bodies are treated with contempt by the mass media. And a culture of contempt is built among the people for our government and for the mechanisms that we as people use collectively to monitor things like the banking industry or the nuclear industry. It's not to our benefit that that is happening, but it is. So that small group of people who testified in favor of this relicensing is not a complete or an inclusive representation of the people that are concerned with this. And I would suggest that most of the people that are concerned with this are disengaged and are not paying attention. And the credibility of the NRC is at stake. 25-2-LR continued

When it comes to evaluating power plants for relicensure, this power plant is one that should be denied relicensure on the grounds of its past performance. It hasn't performed well enough to bother relicensing, and it should be taken off line. 25-3-OS

We should come up with energy conservation and efficiency measures that replace that 8.3%. Forget creating any alternative fuels or advanced nuclear. Just energy in energy conservation efficiency alone, we make up for this. The system that requires that we maintain the amount of consumption that we currently have uh as part of the licensure relicensure application is absurd because so much of the future depends on our reduction of and our conservation and our efficient use of energy. It's absurd to perpetuate the existing system. 25-4-AL

So when and if there's a problem, when and if they relicense Davis-Besse, their credibility notche notches, ratchets down. Already the public is disengaged and doesn't have a lot of respect or a lot of confidence in the over all system. We saw at Chernyoble when you take 800 people from around the Soviet Union, and you put them to work

39

Commenter: Michael Keegan

cleaning up that mess and then send them all back home, it doesn't take long for the competency and the credibility of the federal government to fail to exist. And what we have now is a much different government and a much different country in the former Soviet Union than existed prior to the Chernybole accident. And I propose that it was that evidence of incompetence in the government that ultimate, through exhibited through their reaction to Chernybole that eventually to their collapse.

And economically, as we all know, and others have testified to, nuclear power does not make economic sense. In as much as our economy is the management of our household, I think it relates directly to the ecology of our household or our State or our community here, and that ecological system that we are all part of and that this nuclear power plant and the NRC and the other governmental leaders and the other citizens that aren't here, that ecosystem is very much a part of the environment, and any hearing that focuses on environmental impacts has to inlcude all of that as the one ecosystem or evironment that we're in. 25-5-SE

And uh I think that will be about what I have to say. Thanks for listening. (Applause)

Mr. DeMare

Alright, Thank You. And uh next up we have Michael Keegan who um was one of the people, who along with Anita and Kevin and myself, one of the main people who planned this event and brought it all together. So come on up, Mike.

Mr. Keegan

Thank you, Joe.

We are...My name is Michael Keegan I'm with the Coalition for a Nuclear Free Great Lakes and I'm also with the organization Don't Waste Michigan and Davis-Besse is just about 15 miles from Michigan,

40

obviously.

We are blessed in that we live in 20% of the world's surface freshwater here in the Great Lakes the most precious resource on the Planet. Without it life is not possible. And yet we have a nuclear power plant that has an abysmal record, Davis-Besse. But I'm here to tell you that it's not about the generation of energy. It's about the concentration of wealth and power. Political economy. 26-1-OL

We've heard that there are several alternatives to Davis-Besse. Replacement power is available now. Could be generated much cheaper. It is about the consecration of wealth and a cartel of the utilities that like the monopoly status that they enjoy, and they are locking out the people. It is not power, not energy for the people. It is power and political power against the people. 26-2-LR

We looked at the Davis-Besse in 2002 and we saw the hole in the head the size of a football, ate through six inches of carbon steel down to the stainless steel liner which was now bulging through that hole and started to show signs of cracking as well, 3/16ths of an inch. And the NRC came in and said, "Well there's got to be lessons learned here. We're going to learn lessons and we're really going to put the thumb, put the foot down and things are gonna, got to improve. We won't allow a relicensing, a reopening of the plant without proper scrutinization." A series of meetings, dog and pony shows, were held, and the last one was, "Wow, they really turned it around. They really surprised us and turned it around. Doing a good job and we're going to allow them to put on this compromised lid that they got from the Midland nuclear power plant and operate."

And six years later, we learn, I think this past March, We learned about the cracks in the control rod mechanisms. And the lessons that I learned are that the NRC is incapable of learning lessons.

The reason Davis-Besse did not shut down to examine the head back in 26-3-OS

41

2001 when the NRC had told the entire industry that they must all shut down and inspect, the utility, FirstEnergy, pushed forward because it was profit over safety, production over safety. And the NRC promised us that would not happen again. But, lo and behold, now we see again a compromised lid at the Davis-Besse plant. And, once again the NRC allows production over safety, profit over people. 26-3-OS continued

So the lesson I take out of this was I learned that the NRC is incapable of learning lessons. As mentioned earlier, they are indeed a rogue agency. This past week, the 61st nuclear power plant that had applied for relicensing was relicensed. They are now batting 1000%. 1000, Batting 1000. 61 for 61on relicensing applications. So, the NRC has not a shred of credibility with the public, and they are there, running interference, keeping the people away from confronting these utilities when they run these abysmal plants. 26-4-LR

Earlier this week I got a e-mail from a woman who lives near Fermi nuclear power plant, and she shared with me a story about living next to Fermi, in the shadow, and all her neighbors having cancers, leukemias, thyroids, early deaths, lymphomas and that this is epidemic throught that area. I've spoken with a number of health care persons over the last year who are very concerned about the cancer rates in the western basin, the horseshoe around Lake Erie beginning from down river area which is north of Monroe right through Sandusky area.

And in fact there is a cancer cluster near Clyde, Ohio which is about 15 to 18 miles as the crow flies from Davis-Besse. So, the comment that I have on Scoping is that I am requesting that baseline epidemiological studies be done. And that we explore what is coming out of that nuclear power plant. They are allowed by licensing to release gaseous, liquid from the plant. Below "permissible" levels. But there are cancers over in Clyde, and families are decimated. And I would request that baseline epidemiological studies be done in the entire region. 26-5-HH

Earlier again, this week, I got several documents from Connie Klein 26-6-HY

42

who was one of the intervenors at Davis-Besse on the first Operating. And she shared with me photos of the flooding of the Davis-Besse in 1972. This was during construction. The entire site was flooded for two to three weeks. Um I have concerns about the Davis-Besse flooding. As you all know Lake Erie is very shallow. The western basin is very very shallow, and it is subject to something called a seiche where the wind blows out the water, blows it east. Then the water comes back, like a bathtub, and floods the western shore. I'm concerned about the potential flooding of that Davis-Besse Plant. 26-6-HY continued

In addition, it was mentioned earlier that there were Tritium leaks in 2009. There was also a Tritium leak in 2008. The grounds are contaminated. I'm concerned about the buried piping at the Davis-Besse plant, about the leaking of Tritium, about the potential of flooding externally, the potential of flooding internally at the Davis-Besse plant. This is an aging plant. And with that Tritium leak and as you run a nuclear power plant into the ground, which is being proposed, another 20 years there are going to be increasing leaks, increasing contamination. 26-7-HH (HY)

So I'm requesting that the NRC, my comments of Scoping are such that there needs to be an increased decommissioning fund for the next 20 years that they're proposing. That there needs to be a mechanism put in place that comes out of their bottom line, not the ratepayers. Because the more, and longer they run that plant the larger the cost of decontaminating, decommissioning will be. We saw this phenomenon over at the Yankee, the Vermont-Yankee plant. The decommissioning costs are soaring there. There's not enough money that's been set aside to decommission the plants properly and the longer they run, the higher the price tag goes for decommissioning. 26-8-OS

In addition, a scoping comment I have is the thermal pollution coming off the nuclear power plant. It's about a thousand nine hundred, about nine hundred megaWatt facility. That's close to three thousand megaWatts of thermal heat coming off of that. And, as we've seen, Lake 26-9-AQ

43

Erie is beyond the tipping point when it comes to algael blooms. We are beyond that point. We have several facilities in the western basin of Lake Erie; several coal plants, and several nuke plants and the Lake cannot take the load.

So I am requesting that the algael blooms that are ocurring on Lake Erie, the *lyngbya wollei*, which is a toxic algae--it's leading to the eutrophication of Lake Erie, the death of Lake Erie, I am requesting that this concept of algael blooms be investigated, and thermal pollution from the nuclear power plant be considered.

26-9-AQ continued

In years past, about five years back, we challenged the nuclear power plant, the Pallisades on their relicensing. They made several promises to the Advisory Committee on Reactor Safeguards. They made promises that they would upgrade equipment, that there would be replacement on major components. They have not done so. With that promise, the NRC, the regulator, allowed them to relicense. They have not done the work since. The plant got sold to an Entergy Company which has now ten nuclear power plants that they basically buy like used cars and run them into the ground. They do not do proper maintenance, the proper repairs. These are limited liablilty companies that once they have a major accident, they will walk away and leave the public to with the clean up.

So, I do not have confidence in the NRC to force about proper equipment, maintenance. Perpetually, there are exemptions that are requested and just as a matter of rubberstamping--the Nuclear Regulatory Commission, the Nuclear Rubberstamp Commission, allows them exemption time after time. Again. Production over safety. Profit over people.

26-10-LR

In addition there is a IFSC, IFFSC. It's dry cask storage of high level nuclear waste. High level nuclear waste is currently stored outside at the Davis-Besse. This has a.. there's..No one wants this nuclear waste. Yucca Mountain is not going to happen. It's not geologically sound. It's not scientifically sound. It's not going to happen. Nobody wants this

26-11-RW

44

Commenter: Ralph Semrock

stuff. Yet, the NRC runs a con game. They have "confidence" a "waste confidence" decision. It is a con game. They're asking the public, the folks of Toledo, of Ohio, "Please accept our promise to take this waste at some point. We don't know what to do with it just yet. But, we'll figure it out later on. But, in the meantime just let us go and make more."

It's been said that nuclear power is the gift that keeps on giving. It keeps on giving the radioactive waste, and the power is fleeting. But we are left with the deadly lethal legacy for tens of thousands of years. Now we've got to stop the production of this material, and I say do not relicense this and the plant should be shut down immediately. Thank You. (applause)

26-11-RW continued

26-12-OL

Mr. DeMare

Okay, alright, next up is Ralph Semrock.

Mr. Semrock

I'm Associate Professor over at Owens. And, um It's very interesting. I'm so glad to see a lot of people here, and I want to thank Joe for um inviting me. Um my wife, Lee, and I, we live 12 miles from Davis-Besse. Out in Ottowa County.

And I was one of the few people, I guess, that actually took one of four tours they had back in 1977 when it was opening. And, I don't know how many of you have been able to take a tour through there, but the word "awesome" is so often over used. It is truely awesome to see the extent, the scope, the size of the systems that they're talking about.

I remember, just what you said [pointing to audience member] the lady here in front, the tour guide said, "The power is going to be so cheap, they won't be able to meter it." We all wondered about that, in awe.

Of course, it's been anything but that. And um, I guess the thing that

27-1-OS

45

irritates me, I teach CAD, I'm more technically involved. Um and what really irritates me when I look at the history of their um operating procedures is that they cared so little for safety, as the previous speaker indicated. And the fact that they cared so little that, um to the point when this terrible pineapple, football sized hole occured, they should have been monitoring that. The engineers should have been monitoring that. And yet, I'm quoting now. It says, this is from *The Cleveland Plain Dealer*, "For more than two years, the radiation detectors at the Davis-Besse nuclear power plant insistently signalled that something was wrong inside the reactor that houses the reactor." It says, "Although they suspected a coolant leak somewhere, Davis-Bessc personnel couldn't find one. So, instead of pursuing the cause, they moved the monitors' intakes to a different spot. So that they don't get these signals. But finally, they even bypassed one of the device's three sensors because it kept triggering alarms and they didn't want to listen to it anymore."

That just scares the heck out of me, because as we've all seen with Chernyoble, this is going to continue for a quarter of a million years. At least over there. And, as close as we were, they cared so little about safety, and all they cared about was keeping the plant running.

27-1-OS continued

Now what further irritates me is that, when they finally did open it up in 2002 and found this hole at the site, even Babcock-Wilcox, the manufacturer of the plant, reccommended to them "You shouldn't replace the head." And um. Because the one that they got from the middle of Michigan had the same, poor quality alloy, steel in the control nozzles that are welded on to the top of the reactor head for where the control rods go down.

It had the same steel! As what was made originally. Davis-Besse had ordered a replacement head from Europe, but it wasn't going to be done until 2014. Well, they didn't want to wait twelve more years. It was back in 2002. So what'd they do? Go get the one that wasn't quite finished from Midland Michigan. And bring that down. Against Babcock-Wilcox's advice, they put it on.

46

So guess what? They're seeing the same cracks as was mentioned before. The same cracks with the lower alloy quality steel, around the openings, the nozzles. And they're having trouble. And they're having to repair those expensively and when they dye checked them, after the repairs, they're still finding a few leaks.

This is what we have to look forward to, because they *did not wait to do it right.* If they were going to replace it. The one that they're supposed to get in 2014 has the higher quality alloy steel that can take the heat, four, five hundred degrees and 650 pounds per square inch pressure. But no, they won't do that. They had to get it in now. They had to spend $220 million doing it. So now, this is what we have, six years later, eight years later.

And they said that... This is very interesting to me. As other people have mentioned, you can't trust the NRC. I certainly don't trust them. But as they said back in 2002, all misinformation and the cover ups that FirstEnergy did to the NRC, they said that that was the worst in the nuclear industry in America. The worst!

27-1-OS continued

And then they make a scapegoat out of the engineer who was a whistle-blower. And the NRC, I don't know if you... I did some research. I didn't know it but I found out that they banned him from working in the nuclear industry for five years. The engineer! Did they do anything to the people above him? No. They still have their jobs. Maybe FirstEnergy fired a few, I don't know. But they blamed it on this guy. Like he was the sole cause of this horrible, potentially horrible, accident. Really. Really. One person.

That just amazes me. That right there that just loses the credibility right away. Now. They want to license it for another 20 years. Do you know why? They want to get their money back from the head that they put on, obviously. But, assuming they can even get that working correctly, and safely as mentioned previously again, what about all the other

47

Commenter: Mike Leonardi

equipment? All the other, the piping, steam generator, everything? What's going to happen for another 20 years with that?

They have a miserable record. They do not care about public safety. They say they do, but their actions speak differently. The very fact that they tried to cover things up speaks differently. So.

And the fact that after the accident and everything after 2002, 2004 and into 2005 the NRC had this wonderful policy, making potassium iodide pills available to everyone. Within a ten mile radius. They were contacting all the pharmaceutical, all the pharmacies, to make sure that you could get, you'd get a coupon in the mail. And, then you'd go to the pharmacy and get your two pills. To help you. In case a...what did they call it euphamistically?..an "incident" happened. An incident.

27-1-OS continued

That pisses me off. So, I just agree that they should not get relicensing whatsoever. They have done the *worst* job in managing this plant. They *do not* follow good engineering principles. They're making the same mistakes all over again. They should be shut down permanently, and they should not be relicensed. Thank you. (applause)

27-2-OL

Mr. DeMare

Alright, we just have one more speaker, and then I'll have a few, concluding comments, and then this official People's Hearing will be done. But right now, we'd like to hear from Mike Leonardi.

Mr. Leonardi,

Good afternoon, everybody. I've been living in Italy for about nine years since, um...I remember just before leaving we organized a demonstration to shut Davis-Besse down. It was in a park in the shadow of the uh um plant. A few years before that we organized the Zebra Mussel Alliance, taking the name from the mussels that had clogged the intake valves, to try to shut down Fermi II nuclear power plant. We were

48

successful in shutting it down for a day.

My wife who's from Naples, Italy (indicated on this map right over here). You can see. Italy is one of the only countries in Europe that is nuclear free. And the reason why it is nuclear free is because they voted by citizen's referendum in 1994 to not allow the generation of nuclear power within the country. Um It did have nuclear plants, before.

Where I'm coming from most recently is in the South of Italy, Calabria. A region in the south where there is no industry to speak of. There were textile mills that are all shut down. Other than that, there are no um major industrial plants of any kind. It's a rural, agricultural area.

Along the river valley in Calabria called Fume Oliva, the river Oliva that flows directly into the Mediterranian Sea -- a beautiful coastline. They found Cesium-137. Nuclear waste. High level nuclear waste. It can only be found in nuclear power plants.

This was brought there and dumped illegally by a network of Mafia and State governments that have used the south of Italy and the South of the World as a virtual dumping ground, a real dumping ground, of high level radioactive and hazardous wastes.

In Basilicata, which is a region right to the north of Calabria in the south of Italy, they discovered that there are high level radioactive wastes, spent fuel rods, from a nuclear power plant in the United States. I believe the nuclear power plant is called Falls Creek. But, I'm not sure. I can't be sure of this. And it's stored in Basilicata in the South of Italy. So under the Nuclear Regulatory Comission's so called "watch" high level radioactive waste has ended up in the South of Italy. From the United States. Italy which doesn't have nuclear power plants. Basilicata which does not have a nuclear power plant. It has a mothballed plant.

I would go farther than to say the Nuclear Regulatory Commission is a "rogue" organization. I would call it a "terrorist" organization. And I 28-1-HH

49

would say that the cancer that people are suffering from in Clyde, Ohio, I know that Lucas County, when I left ten years ago had the highest cancer rates of the State of Ohio. We're all facing cancer as our future. And this cancer, I would say is on the most part, is on the hands of... It's a legacy of industrial capitalism, but this cancer is on the Nuclear Regulatory Comissions hands because they have done nothing to police or regulate or control this industry. It's disgusting, it makes me sick to my stomach. 28-1-HH continued

When I tell people stories about living between Fermi II and Davis-Besse, they think of Toledo as somcthing out of "The Simpsons" a popular TV show in across the world, and that's how they imagine it. It's like a colonization of the people's minds that live here, as well. There is this disengagement. The people don't have time to think in this, you know...

I was listening to public radio the other day and they were talking about how they felt like "the Rust Belt" was kind of offensive terminology to use for this area of the country. And the thought crossed my mind well why not "The Cancer Belt" instead? Because that's the number one killer in this area. So, if the "rust belt" is too nicey-nice. You know, they want to consider it the "water belt" but the "water belt" is contaminated. 28-2-HH

I was hearing on NPR a couple days ago, too, Mike Keegan, and I'm pretty sure there's something going on. They said that there was a low level radioactive waste leak from the Fermi II nuclear power plant. They interviewed some guy that representeing Fermi saying, "Oh yes. It was just a minor leak into the water supply. We can guarantee that it won't happen again. We're sure that there's not going to be any releases that are gonna endanger the public in the future." This is what we were trying to shut Fermi II down about, what fifteen years ago, twelve years ago. The same radioactive releases that they were doing then.

I want to thank Tom Henry and his work at *The Blade* because I've been following the situation at Davis-Besse like a horror story from Italy.

50

Commenter: Joseph DeMare

And, you know, I'm really happy to be back. And I want to also say that *The Blade* when I was talking to John Robinson Blach years ago, he suggested doing something that I think that we might try to do. Which is to do a maybe in cooperation with the urban affairs department at the University of Toledo and the sociology department is a scientific poll of the citizens of northwest Ohio, Ohio in general, get their opions on nuclear power. For Toledo, it might just be the Toledo residents. John Robinson Blach was quite confident that the majority of people would be opposed to nuclear power here, especially having watched the story unfold in the paper. Even though I don't think that the majority of the people read the paper anymore. But, it's something worthwhile doing. I think that the majority of the citizens are opposed.

I don't have any faith in the Nuclear Regulatory Comission to do anything about the issue, but, thanks. That's all I have to say. (applause) 28-3-LR

Mr. DeMare

Alright, well, I just have one or two things to add to all the excellent comments and observations that were made here all afternoon.

I want to thank everyone here for having the patience to sit through the process, and for having the patience to keep dogging this industry for more than forty years. Because without that dogged opposition I'm confident, I'm certain that by now we would have had at least one nuclear power plant melt down. Um you know, as hard as it is, I believe that environmentalists have prevented disasters from occurring.

We haven't done enough. We haven't killed this monster yet. But, I think I had hopes that it would die a natural death. That as each plant reached the end of its operating license it would simply be pulled off the market for economic reasons. Now they're trying to give us undead nuclear power plants. Nuclear zombie power plants. 14-18-OL

I have just a few very quick observations. First of all I've been asked to

51

Commenter: Unidentifiable Woman,

tell everyone my e-mail. Especially if you made comments and if you have a written version you can e-mail me for inclusion in the submission to the NRC. My e-mail is electricity2.. That's the number 2 as in you know, other electricities. electricity2@cs.com. "C" "s" That's short for compuserve. Oh question, Yes?

Unidentifiable Woman

Um. I just wanted to. All the comments that this is going to be played um in front of a panel. The comments recorded.

Mr. DeMare

These comments will be submitted to the NRC, and the other thing I wanted to tell everyone is that I'm going to take the film and the video that we've made and create a compilation of it, and I'm going to have it available. I'm going to put it on TransferBigFiles.com, and I'll send e-mails around to interested people so that they can download it and review it. Because there's been a ton of information. I know I haven't absorbed it all. I've tried my best but, uh. There's been a lot. Yes?

Unidentifiable Woman

I just wanted to know, um, I don't know if we have a scientist here or anyone from the Lake Erie um I'm so sorry. But the Lake Erie um

Mr. Compaan

Resource Center?

Unidentifiable Woman

Resource Center and talk about the rise in microcystine levels due to the thermal pollution. And how that. I mean are they aware that did anyone comment on that 29-1-AQ

52

Mr. DeMare

Yes...

Unidentifiable Woman(Interrupting)

Are they aware! That did anyone comment on that for them. 29-2-AQ

Mr. DeMare

Yes we've had comments on Microcystine.

Unidentifiable Woman

levels.

Mr. DeMare

Levels.

Unidentifiable Woman (Interrupting)

I mean I know that inadvertently...

Mr. DeMare (Interrupting)

If you have questions maybe you could ask Anita...

Unidentifiable Woman (Shouting)

It's not a question! I just want the panel to know that inadvertently when people start dying or getting sick because the levels occur. Is there any way that they could possibly be held responsible or get sued? 29-3-HH

53

Commenter: Joseph DeMare

Mr. DeMare

Well that's a good question. I hope so. (laughter) And I don't know the answer. Um if you have...

Unidentifiable Woman. (Interrupting)

Because there...

Mr. DeMare

If you want want to ask, if you want to ask what we've been over for the last three hours...

Unidentifiable Woman.

No they don't. I just wanted to make sure that someone said that to them. And realize that the microcystine levels are are rising. 29-4-AQ

Mr. DeMare

Yes. Someone has said that. Tony Szilagye mentioned that in his comments.

Unidentifiable Woman

I'm sorry. It's like I just mention

Mr. DeMare

Now another question from the back. Oh. Ok. Well. Um. Actually. Let's see. I think we're reaching the point of winding up here. So. Um.

Something else I just wanted to mention that Tony Mangano, Anthony Mangno has pointed out that thyroid cancers in Ottowa County, right 14-19-HH

Commenter: Kevin Kamps

around the plant, went from below the national average before the plant started operating to above the national average now.

And, in fact, research says that cancer rates, thyroid cancer rates particularly, just about double when you put a nuclear power plant in.

So, Iodine, radioactive iodine is very rare. Thyroid cancer is very rare. Pretty much you can count on the fact that those people who are dying from thyroid cancer are dying because of radioactive releases from the plant. Radioactive releases that are casual, that are average, that are "normal," part of their normal operations.

14-19-HH continued

So, people are dying. They're in the hundreds now. If we keep doing this plant and radioactive thyroid, uh. Iodine, radioactive isotopes of Iodine stay radioactive for 20 million years. So the more we generate the more we'll be. People will die from the cancers caused by this radioactive Iodine. They're in the hundreds now. Another 20 years they'll be in the thousands.

So what we are trying to do here is prevent thousands of people from being killed by an unneccessary form of energy. We've heard testimony here today about just exactly why that's so unneccesary.

So, I wanted to thank everyone here for keeping up the fight. And um I think Kevin has one more comment about the next step would be after this comment period is over. We'll submit comments. But after this is finished then we're going to have interventions. Once they grant the license. We're expecting they'll grant it. We'll be able to perhaps put in one last line of defense to stop this monster. Let it die a natural death. So, here's Kevin one last time.

14-20-OL

Mr. Kamps,

Thank you again for organizing this Joe and Anita really appreciate it. Thanks everybody for coming out today to come out.

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So on this intervention deadline, we face a December 27th deadline to file our contentions, our intervention against the 20 year license extension. It's also the deadline for environmental scoping comments.

Umm.. the um *Federal Register* Notice appeared on October 24th. They have a very short window of Intervention opportunity of sixty days which fell on December 24th which is an official holiday, and the technical rule is the next business day. That becomes the deadline. That's December 27th. So, it's an indication, gives you an idea of how brutal the NRC's process is. That extends right into the technical requirements of intervening.

One of those is to obtain standing, and that's the main thing I'd like to talk about. Anyone who lives within 50 miles of Davis-Besse could, almost automatically, receive Standing to be a Party to this proceeding. And it's important for a group like Beyond Nuclear. We do not live that close, we're about 500 miles away. So for us to enter a contention and get standing, we're gonna need supporters in the local area. And if you're a member of another environmental group you could encourage that group to join with Beyond Nuclear and become a Party to the proceedings as well.

So if you are interested and you do live within 50 miles, please afterwards come see me. I'd love to get your contact information. We can discuss it further. You don't need to decide today.

It's a simple form; it's a one sheet form. We already have the language. Not with us; we didn't have enough time to pull it together. But we've used it in other proceedings like Fermi III, like Pallisades, and all you have to do is agree to it. It gets you individual standing, and it also gets organizations standing. We can actually file this paperwork in time.

And, um just to close, I would like to say that Italy was mentioned, and I took a lot of inspiration several years ago from (if I pronounce it

56

correctly) Scanzano, Italy where Berlesconi came out of the blue and said, "We've figured out where we're going to put all the nuclear waste. We're going to put it in Scanzono." Just announced it one day, and within couple weeks, there were hundreds of thousands of people in the streets: blocking the train tracks; occupying the site that was targeted; and um two weeks later, Berlesconi said, "Well, we're going to study it some more." (laughter from audience) He reversed himself.

In Germany, what I was getting to here, in Germany the Angela Merkle Government has reneged on a ten year old agreement called the "nuclear consensus" that the Social Democrats and the Greens prioritized to phase out nuclear power plants at the end of their operating licenses. And so, what Merkle has done is to push for extensions at certain of the reactors. Just like as proposed at Davis-Besse. And what this has led to is just incredibly large protests in the streets.

Several months ago, 120,000, 150,000 people formed a human chain between two nuclear power plants. It stretched 75 miles long. More recently, a few months back, about 100,000 people in the streets of Berlin, protesting the license extensions.

Then most recently, there's annual protests against radioactive waste shipments to um they call it a "centralized interim storage site." A warehouse which is right next door to a targeted deep geological disposal site. What a coincidence, Ha! And every year there's protests. I was there in 2001 there were 10,000 protestors 15,000 police.

So, it takes police state tactics to move a few containers of waste. At a huge cost. We're talking $100,000,000 for one of these shipments. And this past protest was 50,000 people.

So, I just wanted to leave on the hopeful note that, in other places where license extensions are proposed there are huge groundswells of opposition. So, inspiring stuff. Thanks. (Applause)

Eric Britton

If it helps anyone, we have space at the Perrysburg library reserved for the first Wednesday night in January. For a follow up meeting.

Ms. Rios

Okay, that's the first Wednesday night in January. If we have your e-mail address you'll get that in the e-mail. That's the Sierra Club. Okay Thank you for everyone. (Applause)

Mr. DeMare

And if anyone is concerned about the issue of transporting nuclear wastes across the Great Lakes, Ed McArdle is....

(Unintelligible)

Commenter: Suzanne Patser James Whitaker

Suzanne Patser

Hello my name is Suzanne Patser and I live in Columbus Ohio and I'm very concerned about the Davis-Besse plant coming back online. I can't think of anything that would be a worse idea for our state. 31-1-OL

I believe that we have plenty of electricity. We do not need to bring this power plant back online. I don't care how many jobs you think it might create or how much you want to justify the expense of building the plant to begin with but nothing is worth the lives of the people that are going to live near that plant and all of us because it's going to affect everybody if there was any type of accident. 31-2-OS

I know there is always just radioactive leakage anyway that we aren't even told about.

There are so many other clean ways to provide energy. Wind Solar geothermal there is no reason to bring a nuclear plant online. There would have to be some other agenda involved we hope that is not military agenda. But we know that we don't the electricity from that plant in this state. 31-3-AL

And we know that it had a hole in a very vulnerable spot earlier. We don't trust the people that run these type of plants that the safety is there and regardless if it takes a million years to get rid of radioactive waste how is that a benefit to anybody and human kind or on this planet. 31-4-OS

So I am absolutely 100% against any nuclear plant opening anywhere. It is not the type of energy that our country needs, our state need, that Toledo needs that anybody needs that lives or works in that area. 31-5-OL

James Whitaker

Hi my names is James Whitaker and I'm from in Columbus Ohio and as far as the creation of more radioactive waste here in the state of Ohio I don't think we need to do that I think that the any of the fuels that we have as far as fossil fuels is adequate if it's done properly. But I certainly don't want to create more nuclear waste. 32-1-RW

Commenter: Scott Robinson, Simone Morgen, Emily Journey, Bob Patraicus

Scott Robinson

Hello my name is Scott Robinson from Worthington Ohio and I'm opposed to the relicensing of the Davis-Besse nuclear power plant. Thank you. 33-1-OL

Simone Morgen

Hi my name is Simone Morgen I'm a Columbus resident and I just want to say that a facility such as Davis Besse that has had numerous failures cumulating in that lovely hole that endangered people with a possible meltdown has no business having a renewal without stringent oversight if it should have renewal at all. 34-1-OS

It puts people in Toledo especially in danger and could possibly extend as far south as Columbus. So I really do not think that this should be renewed. 34-2-OL

Emily Journey

I'm Emily Journey and I'm from Westerville Ohio. I'd like you to know that I do not support the relicensing of the Davis-Besse Atomic reactor. 35-1-OL

I believe we should be going in different directions when it comes to supplying energy to our communities. Direction that is not destructive that can provide new green jobs. Thank You. 35-2-AL

Bob Patraicus

Hi my name is Bob Patraicus, I have a PhD in political Science. I am a JD. My concerns with Davis-Besse begin with the obvious. There has been contamination. Radioactive contamination at that plant in the past it continues to occur.

Moreover the entire process of mining transporting and allowing radioactivity as a fuel source is inherently contaminating. 36-1-RW

It is located there on the great lakes, the largest clean water source in the world and it seems extremely dangerous and unnecessary since there is other alternative fuel sources to allow for Davis-Besse to ever be reopened with its incredibly bad history safety history with its dome. 36-2-AL 36-3-OS

Commenter: Bob Patraicus, Kevin Malcolm, Doug Todd, Connie Hammond

Bob Patraicus (continued)
So because of the ongoing contamination and the inherent nature of the radioactive contamination in the process of it being mined and transported. I would like the commission to look very closely at this and do what we all know is correct and keep Davis-Besse closed. 36-4-OL

Kevin Malcolm
Alright. I'm totally against the nuclear power. I just I'm an old guy and I've been around for many years and I know the history damages that it can cause and I'm really opposed to it. That's why I'm on camera here. That's why I'm on camera and I will do whatever I can to support the cause against it. The actions, take actions against it. That what all I got to say. Thank you very much. 37-1-OL

My name is Kevin Malcolm Jones originally from Cleveland Ohio but I've been here in Columbus for 6 years.

Doug Todd
Hi my name is Doug Todd I'm from Columbus Ohio. I'm very concerned about the Davis-Besse Plant. From what little I know the most recent containment failure a few years ago was a result of laxed inspection. I'm aware that FirstEnergy had requested a delay in inspection on the plant. And it was this delay that almost led to the containment break down which would have been a Chernobyl type disaster 38-1-OS for Northern Ohio. By all means please do not approve the relicensure of Davis-Besse. Thank You 38-2-OL

Connie Hammond
My name is Connie Hammond I live in Columbus Ohio. I'm a member of the Sierra Club nuclear issues committee and the Ohio Green party. My primary concern is with the toxic legacy that we are leaving for our Children and Grandchildren. Beyond the obvious radioactivity and pollution that these plants produce. 39-1-RW

The process of production of nuclear energy from mining through disposal of waste is very carbon intensive and would contribute heavily to global warming. 39-2-AM

Commenter: Bernadine Kent, Unknown, Pete Johnson

Connie Hammond (continued)
We need to invest our money into green technologies that would create job and also help our economy which is leaving the toxic legacy for our children as well as these nuclear power plants. 39-3-AL

Davis-Besse is not a safe plant it has a very bad track record and the Nuclear Regulatory Commission has been laxed in its inspections. I really am concerned 39-4-OS I'm very disconcerned for the future of our children and future generations in terms of the toxicity and global warming. Also we don't need this energy and it is just not a good way for our country to be going. Thank You 39-5-OL

Bernadine Kent
My name is Bernadine Kent and I'm from Columbus Ohio and I have been informed of the Davis-Besse power plant in Toledo. I'm concerned about this plant extending their license for the next 20 years. To me that doesn't make any sense especially since they have problems. 40-1-OL

Rather than extending the license there should be some type of investigation or some kind of attempt to resolve these problems instead of just saying ok for the next 20 years these problems can continue. So my concern is that anyone that anyone that would allow this license to continue is not acting in the best interest of the citizens. 40-2-OS

Unknown
I wish to join the wave of the future. Which is alternative energy sources. Fossil fuels and nuclear energy are part of the past. 41-1-AL

Pete Johnson
My name is Pete Johnson I'm associated with the Columbus free press and citizens alliance for secure elections and I'm definitely opposed to relicensing Davis-Besse. 42-1-OL

It's dangerous, it's been mismanaged for a long time and I'm definitely opposed to the relicensure of Davis-Besse. Thank you. I live in Franklin County, Ohio. 42-2-OS

Commenter: Constance Gadwell-Newton Esq

<u>Constance Gadwell-Newton Esq</u>

This is Connie Gadwell-Newton I'm an attorney. I'm active with the Ohio Green party and I wanted to express my opposition to the relicensing of Davis-Besse for 20 years.

Basically I mean I've heard a lot of the science about it and I can't really say a
whole lot about that. But what I can say is that you know it's going to be relicensed
supposedly for 20 more years and that would be to 2037, I believe, so I'm opposed 43-1-OL
to the relicensing of Davis-Besse because I think it's a youth issue and basically
this is an important youth issue its important to the young people who are not
allowed to vote and be politically active and children and the future generations. A
lot of the people who are working to relicense this nuclear facility are going to have
died of old age by the time its finished and then when it's finished we are going to
need to worry about cleaning it up keeping it in repair and I don't think that people
are really looking ahead to the future and considering you know the work that
going to be involved to make sure that its safe.

Nuclear waste and radioactivity has a half life of gabillion years to put it in kids
terminology and you know a lot of the people who are going to be effected by 43-2-RW
nuclear waste are not even born yet. And So speaking on behalf of the youth,
babies, people who cannot speak for themselves. I just wanted to say that
relicensing Davis-Besse and using nuclear energy is wrong. It may be expedient
so for the people who are only planning on living you know 10 or 20 more years
then fine but they don't care if the world is going to be destroyed. But there are
people who that effects and I would just urge the people who are making this
decision to think of the future generations and to be able to think about somebody
other than yourselves really.

Yeah I want to make a statement on behalf of kids whose environment is being
destroyed. There used to be a lot more nature to go to and tromp around in and
now kids don't have that we have urban environments that are polluted kids getting 43-3-HH
cancer because of this kind of stuff and it's really not ok. So this is Connie Gadwell
Newton urging you to not renew the licensing for Davis-Besse. Thank you.

Commenter: Patricia Marida

Patricia Marida

Hi my name is Patricia Marida. I'm the chair of the nuclear issues committee at the Ohio Sierra Club. I gave a presentation before the Nuclear Regulatory Commission on November 4, 2010 as to why the Sierra Club opposes the extension of a license at Davis-Besse. 16-14-OL

Tonight I'm going to give my personal statement. I think that it's well recorded there are 10 pages of documentation of very serious violations and illegalities, and actually nuclear accidents at Davis-Besse. It is the most accident ridden power plant, nuclear power plant in the nation. It is very clear that we have a serious problem here also because the Nuclear Regulatory Commission has been very laxed in enforcing Davis-Besse. In fact allowing them to, allowing FirstEnergy and Davis-Besse Operating Company to continue operating the plant when it was supposed to be shut down for an inspection. And the reactor head came within 1/8" of metal left between containment and a nuclear holocaust. So It is very clear that the regulatory and the supervision is lacking were also would like the NRC to be sure to cover the safety issues there, there are many safety issues. 16-15-OL

Apparently when an accident, when there is an alarm there is no response. People say oh that's just a false alarm. So no one seems to get very excited, when an alarm goes off at Davis-Besse. 16-16-OS

We are also concerned about fish and Lake Erie and the heat coming out of the plant.

Even more we are concerned about the possibility of contamination of all the water in the great lakes from a reactor accident. This would be a nightmarish… 16-17-AQ

So the fleeting use of electricity in the past has left us with a legacy of nuclear waste. But However we understand that the nuclear regulatory commission does not have to even consider that when they are deciding whether or not to license Davis-Besse because in the past the Nuclear Regulatory Commission has made a decision that they are not going to, that this doesn't have anything to do with a new license despite the fact that much more of this dangerous radioactivity is going to be stored at the plant there is no solution for it there is no magic solution that will turn lead into gold it will remain radioactive for millions of years and will gradually spread itself around. It is so important for the Nuclear Regulatory Commission to look at issues of the onsite storage and to look at containing and at least in the near future making this waste safe. The new waste is going to be generated there 16-18-RW

Patricia Marida (continued)

really does need to be a plan for isolating it onsite. We are not asking for a plan to isolate it for a hundred million years because we all know that's an impossibility.

We are asking for some sort of a plan working with Doctor Arjune Macajohny of the institute for environmental and economic research in Washington DC, we are asking for you the NRC to work with him and look at some serious ways of isolating this waste in canister that are hidden in bunkers where they are safe from terrorist attack.

16-18-RW continued

So this fleeting use of electricity when we don't even need any more electricity. What happened when Davis-Besse was shut down? We got along fine.

16-19-OS

We are closing down Coal plants now because Ohio is actually using less electricity than they used to. We've got efficiency we've got solar we have wind we have geothermal we have all kinds of sustainable ways.

16-20-AL

We don't need more nuclear power and we need to have the Nuclear Regulatory Commission look at wether or not more electric is needed especially the large amount that Davis-Besse produces because we think it could be shut down today we think it should be shut down today.

16-21-OS

Dr. David Lochbaum has sent you a very well documented statement as to why that this plant needs to be shut down now, it is dangerous to operate and the NRC dismissed it out of hand with what Dr. Lauchbaum characterized as superfluous reasons.

16-22-OS

Commenter: Patricia Marida

Nov 30 10 09:26p Patricia A. Marida 6148907865 p.1

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Office of Administration, Mailstop TWB-05-B01M
US Nuclear Regulatory Commission
Washington DC 20555

Fax 301-492-3446

Docket ID: NRC-2010-0298
Subject: Proposed 20-year operating extension for the Davis Besse nuclear reactor

This is the cover letter for 2 further pages being submitted by the Ohio Sierra Club. This letter includes testimony given at the Nov. 4 environmental scoping meeting held at Camp Perry, plus further comments.

Thank you.

Patricia A. Marida

Patricia A. Marida, Chair
Ohio Sierra Club Nuclear Issues Committee

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (pec)

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Ohio Sierra Club
131 North High Street Suite 605
Columbus, OH 43215-3026
614-461-0734

Chief, Rules, Announcements and Directives Branch
Division of Administrative Services
Office of Administration, Mailstop TWB-05-B01M
US Nuclear Regulatory Commission
Washington DC 20555

Docket ID: NRC-2010-0298
Subject: Proposed 20-year operating extension for the Davis Besse nuclear reactor

My name is Patricia Marida and I am the chair of the Nuclear Issues Committee of the Ohio Sierra Club.

First let me say that the Sierra Club is disappointed that the NRC only gave 10 days notice of these scoping meetings in the Federal Register, and that the public only had 3 days notice from an article in *The Toledo Blade*. The Davis-Besse Environmental Report and License Renewal Application were almost 2000 pages, not including the NRC Generic Environmental Impact Statement for Nuclear License Renewal. Therefore, we would like to request that the NRC hold at least one additional scoping meeting, and that this be held in Toledo, close to the population center with residents who are informed by the *Blade*. Also, setting the comment deadline during the holiday season makes it difficult for people to have time to digest the material and comment. Therefore, we would also like to request an extension of the comment period, preferably until the end of January. 16-23-LR

The Sierra Club opposes nuclear energy in its entirety, citing serious environmental, health, and public expense issues throughout the nuclear fuel cycle. The time frames needed to guard the radioactive nuclear waste generated from this process are geologic in nature. Isolating the radioactive nuclear waste will consume public time and money for generations to come. The only viable solution for radioactive waste is to stop generating it. Radioactive contamination and waste are a major reason to discontinue the use of nuclear power.

The risk and reality is that radioactive contamination has occurred, is occurring and will continue to occur throughout the nuclear power cycle. Mining is leaving radioactive tailings exposed to the air and water on First Nations land in the US, Canada and Australia. Contamination occurs throughout the milling, refining, transport, conversion of uranium to uranium hexafluoride (UF6), and then enrichment—which in the gaseous diffusion process at Piketon Ohio took as much energy as a large city. Then the fissionable uranium must be formulated into rods. An enormous waste stream is the depleted uranium hexafluoride (DUF6), which is 99% of the original uranium but is not fissionable and therefore not usable for energy. However, it is just as radioactive and must be deconverted back to the more stable uranium oxide. A newly operating plant at Piketon will take 25 years running round-the-clock to deconvert the 40,000 14-ton canisters of DUF6 already on the site, not counting how much more will be generated from other enrichment facilities. 16-24-RW

The environmental effects that occur in other parts of the United States should come under consideration when the NRC develops the Environmental Impact Statement. 16-25-LR

Enormous amounts of energy go into this process. Added together along with disposal, these supporting industries cause nuclear power to also come with a heavy carbon price, which means that nuclear power will not address but will worsen global warming. 16-26-AM

-continued-

Centralized electric power, complete with centralized corporate profits for the nuclear and coal industries, has been heavily subsidized by the public for many years. Without public subsidies, loan guarantees and liability limits, for which the public must bear the burden, no nuclear power plant would have ever been built.

In Ohio, the use of electricity has been decreasing for a number of years. Now with progressive legislation like Ohio's SB 221, energy efficiency and conservation, combined with the renewable sources of solar, wind, and geothermal, are providing so much additional and conserved energy that all plans for new coal plants in our state have been cancelled and there is a strong movement to shut down the old polluting coal-fired plants. The argument of US rising energy needs is irrational at best and at worst the resulting global warming would threaten our life-support system, and yes, our "way of life". 16-27-AL

There is good reason why there are no new nuclear power plants coming online to replace the old ones. Wall Street will not support them. The enormous up-front costs and 12-20 year length of time for completion makes them financially uncompetitive with wind and solar. And the latter are decentralized, meaning that jobs are being created all over the state. As compared to Davis Besse's extended shutdowns, if the wind stops blowing or the sun is behind a cloud somewhere, there is likely not to be a serious or long-term power shortage problem. 16-28-AL

A 20-year extension of the Davis Besse operating license is unfounded on the grounds of future electric-generating needs. 16-29-OS

Even without the aforementioned problems plaguing nuclear power in general, the David Besse facility is in tenuous condition to continue operation, even at the present. Continuing for 20 years past 2017 would constitute reckless disregard for public safety and environmental integrity. The history of failures and dangers at this plant is well known and well documented, so the Sierra Club will not reiterate them here. 16-30-OS

However, the process by which First Energy and the Nuclear Regulatory Commission allowed a delay in the inspection of the reactor head in 2002, coming within 1/8 inch of a nuclear disaster that would have left the Midwest uninhabitable and the Great Lakes, the world's largest supply of fresh water, filled with radioactive contamination shows that the public should have no confidence whatsoever in the ability of First Energy to self-regulate or in the NRC to rigorously enforce and inspect so dangerous an operation as a nuclear reactor. They were willing to take these incredible risks simply based on profits. Not only that, but corporate culture makes it difficult for any one person to buck the system or feel responsible for anything other than following the orders of their immediate superiors. 16-31-OS

Even the 40-year time frame for operation of a power plant does not have an engineering basis, but was based on the time needed to pay off construction bonds. What happened to the engineering responsibility to oversee and advise an operation of this magnitude of danger? 16-32-LR

The NRC should take into consideration that spent fuel rods at the site must be secured from terrorist attack or accident. The pools and casks holding the rods constitute by far the most vulnerable area at the plant for attack. Some canisters are old and brittle. Any loss of water from the pools, by accident, earthquake or terrorist attack, would have catastrophic results. Most nuclear organizations around the country recommend hardened onsite storage (HOSS) for spent fuel rods. This technology consists of isolating cooled rods in canisters, but these canisters have much stronger specifications than the casks that are currently used. The filled canisters would be secured behind earthen bunkers. The NRC can get information on this process from Dr. Arjun Makhijani at the Institute for Energy and Environmental Research (www.ieer.org). 16-33-OS

Last but not least, nuclear power is being used to keep the nuclear weapons industry afloat. Facilities and research for nuclear power can be transferred to weapons uses. The USEC enrichment plant at Piketon is a prime example. More importantly, however, is the need for "legitimating" the nuclear industry. Without nuclear power, the nuclear industry would be only about weapons of mass destruction, giving a very different light to university research, recruiting bright young students, and other jobs and research in the industry. As the prospect of the current generation of nuclear power plants shutting down approaches, a weapons industry desperate for a non-military front is the tail wagging the dog of the push for new and continued nuclear power. 16-34-OS

– end –

Commenter: Lee Blackburn

PUBLIC SUBMISSION

As of: December 07, 2010
Received: December 02, 2010
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Comments Due: December 27, 2010
Submission Type: Web

Docket: NRC-2010-0298
Receipt and Availability of Application for License Renewal

Comment On: NRC-2010-0298-0003
FirstEnergy Nuclear Operating Company; Notice of Intent to Prepare an Environmental Impact Statement and Conduct the Scoping Process for Davis-Besse Nuclear Power Station, Unit 1

Document: NRC-2010-0298-DRAFT-0001
Comment on FR Doc # 2010-27276

Submitter Information

Name: Lee Blackburn

General Comment

I would be very interested in a scoping meeting taking place in Toledo, Ohio where more people would be able to attend. I also think more time should be allotted for the comment period as December 27, 2010 falls in the middle of the holiday period. perhaps an additional 30 day period would be appropriate. 44-1-LR

75 FR 57299
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Commenter: Mary Knapp

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Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

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December 16, 2010

Cindy Bladey, Chief RADB
Division of Administrative Services
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

10/28/10
75 FR 66399
(2)

Subject: Docket ID NRD-2010-0298

Dear Ms. Bladey: TAILS #: 31420-2011-TA-0097

This is in response to the Nuclear Regulatory Commission's October 28, 2010 Federal Register Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to conduct the scoping process for Davis-Besse Nuclear Power Station, Unit 1. FirstEnergy Nuclear Operating Company (FENOC) has submitted an application for renewal of Facility Operating License No. NPF-003 for an additional 20 years of operation at David-Besse Nuclear Power Station, Unit 1, located in Oak Harbor, Ottawa County, Ohio. The EIS is being prepared as part of this application process.

There are no Federal wilderness areas or designated critical habitat within the vicinity of the proposed site. Davis-Besse consists of 954 acres, of which approximately 733 acres are marshland that is leased to the U.S. government as part of the Ottawa National Wildlife Refuge.

In a letter dated December 16, 2009, we provided comments to FENOC on the proposed 20-year renewal of the operating license for Davis-Besse. At this time we have no additional comments.

45-1-TR
45-2-AQ

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Angela Boyer at extension 22 in this office.

Sincerely,

Mary Knapp

Mary M. Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, Ohio

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Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (pec)

Commenter: John P. Froman

PEORIA TRIBE OF INDIANS OF OKLAHOMA
118 S. Eight Tribes Trail (918) 540-2535 FAX (918) 540-2538
P.O. Box 1527
MIAMI, OKLAHOMA 74355

CHIEF
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December 8, 2010

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U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

RE: Request for scoping comments concerning the Davis-Besse Nuclear Power Plant, Unit No. 1, License renewal application review

Thank you for notice of the referenced project. Please note that the contact person has changed, Frank Hecksher is the new Section 106/NAGPRA representative. The Peoria Tribe of Indians of Oklahoma is currently unaware of any documentation directly linking Indian Religious Sites to the proposed construction. In the event any items falling under the Native American Graves Protection and Repatriation Act (NAGPRA) are discovered during construction, the Peoria Tribe request notification and further consultation.

The Peoria Tribe has no objection to the proposed construction. However, if any human skeletal remains and/or any objects falling under NAGPRA are uncovered during construction, the construction should stop immediately, and the appropriate persons, including state and tribal NAGPRA representatives contacted.

46-1-AR

JPF

John P. Froman
Chief

xc: Bud Ellis, Repatriation/NAGPRA Committee Chairman

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (PEC)

Commenter: Chris Galvin

United Way

United Way
of Greater Toledo

First Energy's United Way Involvement
November 4, 2010

9/20/2010
75FR57299
6

- The Davis Besse Nuclear Power Station, and on a larger scale, the First Energy Corporation, are a **tremendous community partner** to the local United Way.
- Since 1993, First Energy has **contributed more than $13.5 million** to United Way of Greater Toledo which serves Ottawa, Wood, and Lucas counties.
    - $3.1 million came from corporate gifts.
    - $10.4 million from its incredibly generous employees.
    - First Energy has also earned **United Way's Pillar Award** each year since at least 1992… which means they consistently give more than $100,000 each year to the greater Toledo campaign.
- Not only does this community consistently get solid financial support from First Energy and its employees, but executive leadership has also demonstrated exceptional personal commitment to our work.
    - In 1993, **Don Saunders** chaired the local United Way campaign, raising $12.5 million.
    - In 2005, **Jim Murray**, now retired, but formerly First Energy President of Ohio Operations, chaired the local United Way campaign. Under Mr. Murray's leadership, the campaign raised $13.3 million.
        - We also presented Mr. Murray with our prestigious **Spirit of Caring** award in 2006 for demonstrating value and concern for our community through vision, leadership, service, and commitment to the people of our community.
    - In 2009, **Trent Smith**, regional president of Toledo Edison/First Energy, became chairman of United Way of Greater Toledo's Board of Trustees and is drawing to a close on his second year of service.
        - Mr. Smith has gone above and beyond the level of service, dedication, and commitment we typically see from Board chairs.
        - He has become involved in virtually every level of our work, digging in and helping find real solutions.
    - In addition to these executive leaders, numerous upper level management have supported United Way by using their voice and relationships to help secure financial and volunteer support as well as advocating on behalf of United Way and the NW Ohio region.
        - In addition to Don Saunders, Jim Murray, and Trent Smith, some of these standout employees include **Debbie Paul, Meg Adams, and Mel Womack**.
        - Additionally, in the 1990s, **Jennifer Shriver** served five years as the chair of our Community Impact Cabinet, the highest level of community impact volunteers who decide how money is allocated in the community. Also joining her on the cabinet was **Jenny Amidon**. Both are now retired.

4-3-SE

RULES AND DIRECTIVES BRANCH USNRC

2011 MAR -7 PM 5: 50

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SUNSI Review Complete

Continued on page 2…

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E-RIDS = ADM-03
Add = P. Cooper (PEC)

- First Energy also demonstrates incredible commitment to the community through sponsorships of or participation in programs and events.
  - In 1993 and 1994, Davis Besse sponsored our **Loaned Executive program**, a program that provides United Way with temporary campaign employees. First Energy began sponsoring this program in1996 and continued for 11 years.
  - Employees consistently contribute to and participate **in Stamp Out Hunger** and/or **Scouting for Food** efforts each year. They were a major sponsor of our **Family Food Fund** in 2008.
  - First Energy was a sponsor of our **Community Building Event** in 2005 and was the initiator and sponsor of our **Veterans' Appreciation Event** in 2006 which continued until 2009.

4-3-SE continued

- Davis Besse and First Energy are a valued community partner, both philanthropically and economically. They have been incredible contributors to our community over the past 20 years and we only hope this will continue for at least another 20.

4-4-SL

Commenter: Jane Ridenour

My name is: Jane Ridenour and I am President of ~~representing~~ OPEIU Local 19. OPEIU stands for Office & Professional Employees Internation Union and we represent the clerical support staff at Davis Besse. On behalf of the Union I'd like to voice our support at this public meeting. A renewal of this license will promote and maintain employment of not only our members, who live and shop and send their children to schools in this area, but… it will assure the delivery of reliable electric service to all our customers. 15-5-SL 15-6-SE

Research has shown that nuclear power is clean. It is efficient and produces more energy at a lower cost that any other means of generation so it is important that we keep this plant in operation. 15-7-AL

Local 19 is proud of the safety record and operations at Davis-Besse as well as the work we do here and the service we provide to the public. OPEIU Local 19 would like to continue to be part of the team for the next 20 years. 15-8-OS

9/20/2010
75 FR 57299

7

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2011 MAR -7 PM 5: 50
RULES AND DIRECTIVES BRANCH USNRC

SUNSI Review Complete
Template = ADM-013

E-RIDS= ADM-03
Add = P. Cooper (pec)

Commenter: Joseph DeMare

9/20/2010
75FR57299
9

Additional Comment from Joseph DeMare, 11/4/10

Transformer fires cause unique pollutants such as dioxin. Since the cause of the 2009 Davis-Besse transformer fire has not been determined, the possibility of another fire must be considered. The EIS must include the impact of emissions created by transformer fires. 14-21-AM

[signature]

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (pec)

Commenter: Dennis Kucinich

DENNIS J. KUCINICH
10TH DISTRICT, OHIO

2445 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515
(202) 225-5871

14400 DETROIT AVENUE
LAKEWOOD, OHIO 44107
(216) 228-8850

PARMATOWN MALL
7904 DAY DRIVE
PARMA, OH 44129
(440) 845-2707

Congress of the United States
House of Representatives
www.kucinich.house.gov

CHAIRMAN,
SUBCOMMITTEE ON DOMESTIC POLICY

COMMITTEE ON OVERSIGHT AND
GOVERNMENT REFORM

COMMITTEE ON EDUCATION AND LABOR

November 4, 2010

RECEIVED 2011 MAR -7 PM 5: 51
RULES AND DIRECTIVES BRANCH USNRC

9/22/2010
75 FR 57299

10

The Honorable Gregory B. Jaczko
Chairman
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Chairman Jaczko:

First Energy should not be allowed to continue to operate Davis-Besse after 2017. The people of Northeast Ohio are familiar with First Energy's pathetic record in protecting the safety of people who live in the region. 47-1-OL

In a series of recent articles in the Toledo Blade, which I am enclosing, the people of our region are reminded about the 12-minute interruption in the feedwater flow to the steam generators on June 9, 1985, which was cited as a "potential catastrophe."

The people of our region are reminded of Davis-Besse's reactor head, "weakened by years of neglect," which nearly burst in 2002.

The people of our region are reminded that your predecessor Harold Denton stated in 2004 that these two incidents represent the nuclear "industry's second and third-lowest points after Three Mile Island."

The people of our region are reminded that First Energy's employees tried to conceal the truth of the 2002 incident from the Nuclear Regulatory Agency (NRC) using "tricks, schemes, or devices . . . to deliberately mislead" your agency. 47-2-OS

The people of our region are reminded that David Uhlmann, chief of the Justice Department's environmental crimes section, said that First Energy showed "brazen arrogance" and "breached the public trust" by withholding information about the reactor head incident.

The people are reminded that federal prosecutors described the reactor head incident "as one of the biggest cover-ups in U.S. nuclear history."

The people of our region are reminded that First Energy paid a record fine of $33.45 million as a result of its actions. Of that amount, a record $28 million was the fine that First Energy paid "to avoid being criminally prosecuted for lying to the government about the dangerous condition of Davis-Besse's old reactor head," according to then-U.S. Attorney Greg White in 2006.

While both of those fines were record fines at the time they were imposed, I pointed out then that the total fine was merely 1% of First Energy's profits in 2004. While these fines may have been

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Add = P. Cooper (Pec)

record fines, they were a mere slap on the wrist for First Energy and nothing near what would have been necessary to change its corporate culture.

The corrosion of the reactor head started because the Davis-Besse reactor head was made of an alloy that would not withstand this kind of corrosion. All of the other operators of nuclear reactors with similar heads confronted this situation by replacing their reactor heads with new heads of a different alloy that would not be subject to this kind of corrosion. In 2004, FirstEnergy chose cost over safety, and it replaced the corroded reactor head with another reactor head made of exactly the same material. Six years later, First Energy feigned shock to discover that corrosion was forming on that inferior reactor head also.

Still, First Energy had not learned its lesson. It wanted to postpone the final replacement of the reactor head, with a new head made of the safe, non-corroding alloy, until 2014. First Energy did not abandon that 2014 replacement date until the NRC threatened to require Davis-Besse to shut down for inspection of the old reactor head every year until it was replaced. Only as a result of that threat is First Energy finally going to install a non-corroding reactor head in 2011.

Recent events suggest that First Energy still has a corporate culture that is more focused on costs and profits than it is on safety. In 2009, Davis-Besse suffered an explosion and fire in a power-switching gear located outside of the reactor building, which First Energy failed to report and did not declare an alert.

The evidence shows that this culture exists in First Energy beyond its operation of Davis-Besse. The NRC has been keeping a "close watch" on First Energy's operation of its Perry reactor in Northeast Ohio as well. The NRC remains concerned that Perry's safety culture is not up to industry standards and has maintained a close watch there for the last two years.

Davis-Besse has been operating for 33 years. It has experienced two of the industry's most serious nuclear incidents during those years. This is not just bad luck. The problems at Davis-Besse are a direct result of First Energy's mismanagement and disregard for the safety of people who live and work in the area and who would be affected by any nuclear accident. The NRC should not extend the license of a company that only operates safely while a "special inspection team" is monitoring its day-to-day activities and when a "close watch" is being kept on it. The NRC must continue to keep a close watch on Davis-Besse between now and 2017, and then should ensure that First this aging reactor with a deplorable history of operations and maintenance be safely shut down and decommissioned at the end of its current license.

47-2-OS continued

Sincerely,

Dennis J. Kucinich

Dennis J. Kucinich
Member of Congress

DJK: mg

Commenter: Marilyn & Paul Nesser

Cooper, Paula

From: Paul Nusser [1537onthelake@freeway.net]
Sent: Monday, December 13, 2010 9:38 PM
To: Cooper, Paula
Subject: Davis-Besse

Paula -

We are area residents near the Davis-Besse plant as we live in Wood County. We would like to have this nuclear power plant eliminated. We say the article about it in our local paper, the *Sentinel-Tribune*. It is an old plant and has had a history of accidents/problems. 48-1-OL

Marilyn & Paul Nusser
1040 Carol Road
Bowling Green, OH 43402

9/20/2010
75FR 57299
11

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2011 MAR -7 PM 5:51
RULES AND DIRECTIVES BRANCH USNRC

SUNSI Review Complete
Template = ADM-013

1

E-RIDS=ADM-03
Add = P. Cooper (PEC)

Commenter: Jessica Lillian Weinberg

Cooper, Paula

From: Jessica Lillian Weinberg [jessicaweinberg23@gmail.com]
Sent: Sunday, December 05, 2010 2:39 PM
To: Cooper, Paula
Subject: Please come and hear what the people have to say about Davis-Besse, Sat. Dec 18

The people of Northwest Ohio, Southeast Michigan, and other communities that would be the most adversely affected by an accident at Davis-Besse deserve a longer comment period and more hearings before the NRC automatically approves First Energy's request to re-license. Please attend our hearing, as outlined below.

PUBLIC HEARING

on re-licensing of the Davis-Besse Atomic Reactor

Saturday Dec. 18 from 12 noon to 3 pm
St. Mark's Episcopal Church
2272 Collingwood Blvd
Toledo, Ohio

20 *MORE* Years of Radioactive Russian Roulette on the Great Lakes shore?!

We are calling for input from all interested parties regarding First Energy's mismanagement of Davis-Besse, and the Nuclear Regulatory Commission's lack of oversight of that facility, in particular residents of Ohio, the Toledo area, South East Michigan, or residents of any community that would be directly adversely effected by an accident at Davis-Besse.

Anyone can testify, sign in will be required.
This hearing will be videotaped and presented to the NRC.
For more information contact: Anita Rios 419-243-8772, rhannon@toast.net

- FirstEnergy has applied to the U.S. Nuclear Regulatory Commission (NRC) for a 20-year operating license extension at its Davis-Besse nuclear power plant near Oak Harbor, Ohio, just over 20 miles east of Toledo.
- Davis-Besse is one of the most problem-plagued atomic reactors in the entire country: it has suffered six "significant accident sequence precursors", three times more than any other American nuclear plant.
- The original license was granted in 1977 and will expire in 2017. If the extension is approved Davis-Besse can operate until 2037.
- In the past 10 years NRC has rubber-stamped 60 of 60 license renewals sought by industry.

49-1-LR

1

- The NRC Office of Inspector General has reported serious problems with NRC's license extension program: NRC staff have "cut and pasted" the nuclear utility's own work, sometimes word for word, falsely presenting it as an independent safety

49-1-LR continued

sponsoring organizations:
The Green Party of Ohio (ohiogreens.org)
The Ohio Sierra Club (*ohiosierraclub.org*)
Beyond Nuclear (beyondnuclear .org)
Coalition for a Nuclear-Free Great Lakes

2

Commenter: Eric Britton

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Eric Britton [ericb_perrysburg@yahoo.com]
Sent: Friday, December 03, 2010 5:03 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -6 AM 11: 38

9/20/2010
75FR57299
5

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Dec 3, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 30-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 30-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 30-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 30-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 30-5-OL

Sincerely,

Eric Britton
745 Heathermoor Ln
Perrysburg, OH 43551-2931

SUNSI Review Complete
Template = ADM-013

1

E-RIDS= ADM-03
Add = P. Cooper (Pec)

Commenter: Matt Trokan

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Matt Trokan [matttrokan@gmail.com]
Sent:	Sunday, December 05, 2010 1:07 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -6 AM 11: 38

RECEIVED

Dec 5, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 90-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
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I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 90-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 90-5-OL

Sincerely,

Matt Trokan
5375 Sultana Dr
Cincinnati, OH 45238-5225
(443) 889-7222

Commenter: Lee Blackburn

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Lee Blackburn [leeblackburn@live.com]
Sent: Sunday, December 05, 2010 3:07 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -6 AM 11: 38

RECEIVED

Dec 5, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 44-2-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
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NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 44-4-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 44-5-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 44-6-OL

Sincerely,

Lee Blackburn
2261 Valley Chapel Rd
Jackson, OH 45640-8941

1

Commenter: Bob Greenbaum

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Bob Greenbaum [bombhumbug@att.net]
Sent: Sunday, December 05, 2010 5:38 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -6 AM 11: 38

RECEIVED

Dec 5, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 59-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
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I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 59-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 59-5-OL

Sincerely,

Bob Greenbaum
4105 Stilmore Rd
Cleveland, OH 44121-3129
(216) 382-4321

Commenter: Robert Kyle

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Robert Kyle [rkyle@wideopenwest.com]
Sent: Sunday, December 05, 2010 9:38 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -6 AM 11: 38

RECEIVED

Dec 5, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 71-1-OL

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Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 71-5-OL

Sincerely,

Robert Kyle
1161 Riva Ridge Blvd
Gahanna, OH 43230-3810
(614) 855-1600

1

Commenter: Tim Wagner

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Tim Wagner [sid@shortnorth.org]
Sent: Tuesday, December 07, 2010 7:51 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -8 AM 7:50

RECEIVED

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 78-1-OL

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I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 78-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 78-5-OL

Sincerely,

Tim Wagner
3089 Ontario St
Columbus, OH 43224-4251

Commenter: Jim Wagner

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Jim Wagner [jimwagner@safe-mail.net]
Sent: Tuesday, December 07, 2010 8:21 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7: 50

RECEIVED

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 75-1-OL

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Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 75-5-OL

Sincerely,

Jim Wagner
4897 E Walnut St
Westerville, OH 43081-9610

Commenter: Sandy Bihn

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Sandy Bihn [sandylakeerie@aol.com]
Sent: Tuesday, December 07, 2010 8:54 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -3 AM 7: 50

RECEIVED

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 58-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 58-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 58-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 58-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 58-5-OL

Sincerely,

Sandy Bihn
6565 Bayshore Rd
Oregon, OH 43616-4477

Commenter: Elisa Young

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Elisa Young [elisayoung1@yahoo.com]
Sent: Tuesday, December 07, 2010 11:55 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -8 AM 7: 51

RECEIVED

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 89-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 89-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 89-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 89-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 89-5-OL

Sincerely,

Elisa Young
48360 Carmel Rd
Racine, OH 45771-9643

1

Commenter: Linda Milligan

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Linda Milligan [xflowers@aol.com]
Sent:	Wednesday, December 08, 2010 5:23 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7:51

RECEIVED

Dec 8, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 88-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 88-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 88-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 88-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 88-5-OL

Sincerely,

Linda Milligan
10620 Belmont Pl
Powell, OH 43065-8698

Commenter: Connie Hammond

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Connie Hammond [chammon@columbus.rr.com]
Sent:	Wednesday, December 08, 2010 11:02 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 8, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 39-6-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 39-7-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 39-8-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 39-9-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 39-10-OL

Sincerely,

Connie Hammond
166 Acton Rd
Columbus, OH 43214-3304
(614) 531-4146

1

Commenter: Paul Wojoski

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Paul Wojoski [pwojoski@hotmail.com]
Sent: Wednesday, December 08, 2010 12:28 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC -8 PM 1: 27

RECEIVED

Dec 8, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 87-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 87-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 87-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 87-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 87-5-OL

Sincerely,

Paul Wojoski
166 W Tulane Rd
Columbus, OH 43202-1927

1

Commenter: Carol Rainey

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Carol Rainey [rainey531@fuse.net]
Sent: Thursday, December 09, 2010 6:39 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 9, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 60-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 60-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 60-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 60-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 60-5-OL

Sincerely,

Carol Rainey
1497 Beacon St
Cincinnati, OH 45230-2818

Commenter: Margaret Holfinger

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Margaret Holfinger [kenandpegh@aol.com]
Sent: Thursday, December 09, 2010 8:41 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 9, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 66-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 66-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 66-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 66-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 66-5-OL

Sincerely,

Margaret Holfinger
2869 N Lake Ct
Columbus, OH 43231-4017

Commenter: Simone Morgen

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Simone Morgen [smorgen@juno.com]
Sent:	Saturday, December 11, 2010 12:39 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 13 AM 9: 41

RECEIVED

Dec 10, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 34-3-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 34-4-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 34-5-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 34-6-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 34-7-OL

Sincerely,

Simone Morgen
38 W Tulane Rd
Columbus, OH 43202-1987

Commenter: Constance Gadwell-Newton Esq

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Constance Gadell-Newton, Esq. [cngadell@yahoo.com]
Sent: Saturday, December 11, 2010 6:11 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC 13 AM 9: 41

RECEIVED

Dec 11, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 43-4-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 43-5-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 43-6-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 43-7-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 43-8-OL

Sincerely,

Constance Gadell-Newton, Esq.
1021 E Broad St
Columbus, OH 43205-1357

Commenter: Mary Beth Lohse

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Mary Beth Lohse [mb@sugarberryhill.com]
Sent: Sunday, December 12, 2010 5:44 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 13 AM 9: 41

RECEIVED

Dec 12, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 80-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 80-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 80-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 80-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 80-5-OL

Sincerely,

Mary Beth Lohse
33070 Cotterill Rd
Pomeroy, OH 45769-9464

1

Commenter: Jean Puchstein

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Jean Puchstein [puch2_1999@yahoo.com]
Sent: Monday, December 13, 2010 9:14 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 13, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 57-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 57-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 57-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 57-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 57-5-OL

Sincerely,

Jean Puchstein
505 E Dominion Blvd
Columbus, OH 43214-2216

1

Commenter: Andy Trokan

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Andy Trokan [matttrokan@gmail.com]
Sent: Tuesday, December 14, 2010 2:17 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 14, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 72-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 72-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 72-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 72-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 72-5-OL

Sincerely,

Andy Trokan
4409 Franklin Ave
Cincinnati, OH 45212-2905

1

Commenter: Christian George

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Christian George [cjgeorge41@gmail.com]
Sent:	Wednesday, December 15, 2010 11:58 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

Dec 15, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 51-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 51-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 51-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 51-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 51-5-OL

Sincerely,

Christian George
1490 Brookforest Dr
Columbus, OH 43204-5029
(614) 274-7157

1

Commenter: Donna Emig

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of donna emig [donnaemig@sbcglobal.net]
Sent: Thursday, December 16, 2010 10:12 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 16 AM 10: 35

RECEIVED

Dec 16, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 82-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 82-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 82-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 82-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 82-5-OL

Sincerely,

donna emig
30023 Young Dr
Gibraltar, MI 48173-9455

1

Commenter: Ben Shapiro

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Ben Shapiro [bensshapiro@gmail.com]
Sent: Thursday, December 16, 2010 5:12 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

DEC 20 AM 7:46

RECEIVED

Dec 16, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 67-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 67-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 67-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 67-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 67-5-OL

Sincerely,

Ben Shapiro
2100 W 32
cleveland, OH 44115
(804) 543-4346

Commenter: Nick Mellis

Gallagher, Carol

RULES AND DIRECTIVES BRANCH

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Nick Mellis [nickmellis@gpnj.org]
Sent:	Monday, December 20, 2010 3:26 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 21 AM 8: 00

Dec 20, 2010

RECEIVED

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 86-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 86-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 86-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 86-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 86-5-OL

Sincerely,

Nick Mellis
135 Harmony Ave
Lawrenceville, NJ 08648-4321
(609) 791-9878

1

Commenter: Kathleen Bodnar

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Kathleen Bodnar [kathybodnar@aol.com]
Sent: Monday, January 03, 2011 11:24 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -3 AM 11: 43

RECEIVED

Jan 3, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 65-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 65-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 65-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 65-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 65-5-OL

Sincerely,

Kathleen Bodnar
2386 Roth Dr
Cuyahoga Falls, OH 44221-3026
(330) 922-0290

1

Commenter: Joan DeLauro

RULES AND DIRECTIVES
BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Joan DeLauro [joandelauro@sbcglobal.net]
Sent: Monday, January 03, 2011 7:39 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -4 AM 7: 40

RECEIVED

Jan 3, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 73-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 73-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 73-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 73-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 73-5-OL

Sincerely,

Joan DeLauro
2434 Queenston Rd
Cleveland Hts, OH 44118-4316

Commenter: Virginia Douglas

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Virginia Douglas [ginny133@aol.com]
Sent: Monday, January 03, 2011 4:39 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -4 AM 7: 40

RECEIVED

Jan 3, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 79-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 79-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 79-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 79-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 79-5-OL

Sincerely,

Virginia Douglas
133 Brandtson Ave
Elyria, OH 44035-3931
(440) 366-1333

Commenter: June Douglas

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of June Douglas [junedouglas1@yahoo.com]
Sent: Friday, January 07, 2011 3:58 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Jan 7, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 76-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 76-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 76-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 76-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 76-5-OL

Sincerely,

June Douglas
318 Garfield Dr
Port Clinton, OH 43452-1619

1

Commenter: Jeremy Bantz

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Jeremy Bantz [jeremybantz@yahoo.com]
Sent: Saturday, January 08, 2011 4:31 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN 10 AM 9:08

RECEIVED

Jan 8, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 55-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 55-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 55-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of potentially everyone that lives in the entire midwest. The risk is unacceptable. 55-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 55-5-OL

Sincerely,

Jeremy Bantz
6031 Perimeter Lakes Dr
Dublin, OH 43017-5209

Commenter: Leeza Perry

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Leeza Perry [leezajp4@yahoo.com]
Sent: Thursday, January 13, 2011 4:43 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN 14 AM 7: 31

RECEIVED

Jan 13, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 54-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 54-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 54-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 54-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 54-5-OL

Sincerely,

Leeza Perry
2339 Valley Rd
Salem, OH 44460-9727
(330) 942-7107

1

Commenter: Lance Wilson

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Lance Wilson [wtool128@aol.com]
Sent: Thursday, January 20, 2011 7:44 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Jan 20, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 84-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 84-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 84-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 84-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 84-5-OL

Sincerely,

Lance Wilson
53 Village Green Dr
Crooksville, OH 43731-9763
(740) 982-2445

1

Commenter: Erika Agner

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Erika Agner [erika_lynn2006@hotmail.com]
Sent: Wednesday, February 09, 2011 2:39 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

Feb 9, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 50-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 50-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 50-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 50-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 50-5-OL

Sincerely,

Erika Agner
215 W Main St
Leipsic, OH 45856-1133

Commenter: Liz Loring

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Liz Loring [lizniche@gmail.com]
Sent: Sunday, February 13, 2011 10:23 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

RECEIVED

Feb 13, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 83-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 83-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 83-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 83-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 83-5-OL

Sincerely,

Liz Loring
2781 Westbrook Dr
Req
Cincinnati, OH 45211-7614
(513) 460-5022

1

Commenter: Cate Renner

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Ohio Chapter [christian.george@sierraclub.org] on behalf of cate renner [flamingpi6@aol.com]
Sent: Friday, April 22, 2011 12:50 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 APR 22 PM 12: 54

Apr 22, 2011

9/20/2010
75 FR 57299

RECEIVED

27

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 62-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 62-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 62-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 62-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 62-5-OL

Sincerely,

cate renner
250 Henry St
Dayton, OH 45403-2316
(937) 222-2736

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (pdc)

Commenter: George M Williams

RULES AND DIRECTIVES
BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of George M. Williams [gwilliams59@woh.rr.com]
Sent: Wednesday, January 05, 2011 3:56 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -6 AM 7:33

Jan 5, 2011

9/20/2010
75 FR 57299
21

RECEIVED

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 81-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 81-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 81-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 81-4-AL

We are moving to Westlake, Oh. soon and don"t want to have to worry about unsafe Davis-besse blowing up near us.

I have read this petition and agree with it all.

Thank you. 81-5-OL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse.

Sincerely,

George M. Williams
309 E Edgewood St
Sidney, OH 45365-1603

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (pec)

Commenter: Amanda Baldino

RULES AND DIRECTIVES BRANCH USNRC

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Amanda Baldino [sunshineinmyeyes47@yahoo.com]
Sent: Wednesday, January 05, 2011 10:56 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -6 AM 7:33

Jan 5, 2011

9/20/2010
75FR 57299

22

RECEIVED

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 52-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 52-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 52-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 52-4-AL
This concerns me much.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 52-5-OL

Sincerely,

Amanda Baldino
9645 Feather Wood Ln
Dayton, OH 45458-9309

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Call = P. Cooper (PEC)

1

Commenter: Joan Lang

RULES AND DIRECTIVES BRANCH USNRC

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Joan Lang [jlang@csjoseph.org]
Sent:	Friday, January 07, 2011 9:59 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN -7 AM 10: 39

RECEIVED

9/22/2010
75FR 57299
23

Jan 7, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 74-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 74-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 74-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant.

I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 74-4-AL

Davis-Besse not safe and we seem to want to wait until something really disastrous happens before anything is done--when it is too late!
Nuclear energy is NOT clean energy and we have the perpetual problem of what to do with nuclear waste.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 74-5-OL

Sincerely,

Joan Lang
3430 Rocky River Dr
Cleveland, OH 44111-2954

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (PEC)

Commenter: Susan Jones

RULES AND DIRECTIVES BRANCH USNRC

Gallagher, Carol

From: Sierra Club Membership Services [membership-services@sierraclub.org] on behalf of Susan Jones [jones8204@roadrunner.com]
Sent: Monday, January 17, 2011 1:25 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN 18 AM 10: 27

RECEIVED

Jan 17, 2011

9/20/2010
75 FR 57299

24

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 68-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 68-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 68-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. So Please stop the relicense of this very dangerous power power plant it is not worth risking the lives of millions of people for energy when there are safer and cheaper options out there. 68-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 68-5-OL

Sincerely,

Susan Jones
241 McKinley Ave
Newcomerstown, OH 43832-1145

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper

Commenter: George M Williams

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of George M. Williams [gwilliams59@woh.rr.com]
Sent:	Saturday, January 15, 2011 1:53 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN 18 AM 10: 27

RECEIVED

9/20/2010
75 FR 57299
25

Jan 15, 2011

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 81-6-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 81-7-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 81-8-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 81-9-AL

Thank you for your prompt action on this matter for the sazfety and health of the People of Ohio.

(I have read this petition and agree with it all !!!!

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 81-10-OL

Sincerely,

George M. Williams
309 E Edgewood St
Sidney, OH 45365-1603

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (PEC)

1

Commenter: Leonard Bildstein

RULES AND DIRECTIVES BRANCH USNRC

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of leonard bildstein [leonardbildstein@yahoo.com]
Sent: Friday, January 21, 2011 12:45 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2011 JAN 21 PM 1:50

Jan 21, 2011

9/20/2010
75 FR 57299
26

RECEIVED

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 61-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 61-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 61-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones.This plant has the worst safety record in the U.S.A. and should be closed!You have no right to continue operating this unsafe plant..We have two coal plants in this area that produce more then enough electricity for this area,and our safe! 61-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 61-5-OL

Sincerely,

leonard bildstein
766 Centennial St
Geneva, OH 44041-9221
(440) 466-5952

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (pec)

Commenter: Mike Fremont

RULES AND DIRECTIVES
BRANCH
USNRC

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Mike Fremont [mike@mikefremont.org]
Sent:	Tuesday, December 07, 2010 11:23 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7: 51

RECEIVED

9/20/2010
75FR 57299
13

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 85-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 85-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 85-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones.

In the early 80's Cincinnati's Zimmer Nuclear Plant was adjudged, according to The Wall Street Journal, to be the worst-built nuke plant in the U.S., for a number of reasons,one being that much of the crucial reactor steel was bought from a local scrap dealer. It could have ruined the Ohio River downstream from Cincinnati all the way to New Orleans. Davis Besse could wreck Lake Erie and quite a land area around Toledo. 85-4-AL

Save us from that! We can do it cheaper, safer and cleaner with windmills in the lake.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 85-5-OL

Sincerely,

Mike Fremont
816 Van Nes Dr
Cincinnati, OH 45246-4307
(513) 258-1356

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = J. Cooper (JEC)

Commenter: Stephen & Connie Caruso

RULES AND DIRECTIVES
BRANCH
USNRC

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Stephen and Connie Caruso [dael4@columbus.rr.com]
Sent:	Wednesday, December 08, 2010 12:25 AM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7: 51

RECEIVED

Dec 7, 2010

9/20/2010
75 FR 57299

Carol Gallagher

14

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 70-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 70-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 70-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 70-4-AL

These plants have been a financial leach on the people long enough!

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 70-5-OL

Sincerely,

Stephen and Connie Caruso
6463 Blacks Rd SW
Pataskala, OH 43062-7756

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (pec)

Commenter: Leslie Stansbery

RULES AND DIRECTIVES
BRANCH
USNRC

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Leslie Stansbery [llpstansbery@wowway.com]
Sent: Wednesday, December 08, 2010 1:22 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7: 51

RECEIVED

Dec 8, 2010

9/22/2010
75 FR 57299
15

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 69-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 69-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 69-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 69-4-AL

Now is not the time to expand nuclear energy in Ohio.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 69-5-OL

Sincerely,

Leslie Stansbery
526 Van Heyde Pl
Columbus, OH 43209-2271
(614) 231-6954

SUNSI Review Complete
Template = ADM-03

E-RIDS = ADM-03
Call = P. Cooper (Pec)

1

Commenter: Karen Hansen

RULES AND DIRECTIVES
BRANCH
USNRC

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Karen Hansen [klh.ohio@gmail.com]
Sent:	Tuesday, December 07, 2010 8:53 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 7: 50

RECEIVED

9/20/2010
75 FR 57299
16

Dec 7, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 63-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 63-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 63-3-RW

There have been too many near-disasters at this plant. This, because of its proximity to the Great Lakes, is unconscionable! To continue to put resources into this risky plant and to continue to endure the toxic side effects is insane! We should be putting all our energy investments into clean, safe, green alternatives, and that does NOT include nuclear power! 63-4-AL

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 63-5-OL

Sincerely,

Karen Hansen
145 S Monroe Ave
Columbus, OH 43205-1085

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = J. Cooper (JCC)

Commenter: Inez George

RULES AND DIRECTIVES BRANCH USNRC

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Inez George [dg743@sbcglobal.net]
Sent: Wednesday, December 08, 2010 8:27 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 AM 8: 45

9/20/2010
75FR 57299
17

RECEIVED

Dec 8, 2010

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 53-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 53-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 53-3-RW

I do not want Davis-Besse to continue generating electricity and want the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 53-4-AL

Until nuclear power can be made safe for the environment by solving the waste problem, I do not want it to continue in operation.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 53-5-OL

Sincerely,

Inez George
1043 S Roosevelt Ave
Bexley, OH 43209-2544
(614) 338-0507

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (pec)

1

Commenter: Natalie Schafrath

RULES AND DIRECTIVES
BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Natalie Schafrath [nschafrath@hotmail.com]
Sent: Wednesday, December 08, 2010 11:35 AM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC -8 PM 1:27

RECEIVED

Dec 8, 2010

9/20/2010
75 FR 57299
18

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 64-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 64-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 64-3-RW

It's high time we step up our efforts to help protect the future generations by doing what we can to ensure a safe environment for species diversity. We can not live in this world without being connected to the web of life that exists in every ecosystem. The nuclear waste generated from this plan would not only effect ourselves, and our children, but every species that struggles to survive as well. 64-4-AL

As someone who is SUPPOSE to represent the demands of their constituents I hope it is clear to you that Ohioans DON'T AGREE with this form of energy!

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 64-5-OL

Sincerely,

Natalie Schafrath
125 W Blake Ave Apt B
Columbus, OH 43202-2826

SUNSI Review Complete
Template = ADM-013

1

E-RIDS=ADM-03
Add = P. Cooper (PCC)

Commenter: David Greene

RULES AND DIRECTIVES
BRANCH
USNRC

Gallagher, Carol

From:	Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of David Greene [dgreene624@yahoo.com]
Sent:	Thursday, December 09, 2010 5:30 PM
To:	Gallagher, Carol
Subject:	Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 13 AM 9: 41

RECEIVED

Dec 9, 2010

9/20/2010
75FR57299

19

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 56-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 56-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 56-3-RW

The Davis-Besse power plant must stop generating electricity and the Nuclear Regulatory Commission must end the operating license for the plant. In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. Nuclear power has too many problems from waste to extreme expense to oversight. This is not an environmentally sound solution. 56-4-AL

I support clean energy solutions such as energy efficiency and renewable power. The Davis-Besse plant compromises my safety and the safety of my loved ones. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 56-5-OL

Sincerely,

David Greene
806 Francis Ave
Columbus, OH 43209-5412

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Call = J. Cooper (JEC)

1

Commenter: Tekla Lewin

RULES AND DIRECTIVES BRANCH

Gallagher, Carol

From: Sierra Club Membership Services [membership.services@sierraclub.org] on behalf of Tekla Lewin [ttl@wideopenwest.com]
Sent: Thursday, December 09, 2010 5:59 PM
To: Gallagher, Carol
Subject: Davis-Besse Relicense Docket ID: NRC-2010-0298

2010 DEC 13 AM 9:41

RECEIVED

Dec 9, 2010

9/20/2010 20
75 FR 57299

Carol Gallagher

To Gallagher,

Ohioans are concerned about the environment, the rising costs of energy, and the dangers associated with nuclear power! However, that has not stopped First Energy from irresponsibly pursuing to get the Davis-Besse nuclear plant on Lake Erie relicensed to continue operation until 2037. 77-1-OL

NO NUCLEAR POWER PLANT IS SAFE AND DAVIS-BESSE IS ONE OF THE WORST!
In 2002 the Davis-Besse plant nearly melted down almost causing a nuclear disaster. Neither First Energy nor the Nuclear Regulatory Commission discovered an enormous rust hole in the reactor head until it was almost too late! According to the Nuclear Regulatory Commission, 2 of the top 5 most dangerous nuclear incidences since 1979 have happened at Davis-Besse. 77-2-OS

NUCLEAR ENERGY IS NOT CLEAN OR GREEN ENERGY!
Every nuclear reactor generates about 20 tons of highly radioactive waste per year, and after 40 years of nuclear power, the U.S. still has not found an acceptable solution for the waste. The waste can cause cancer, birth defects, and even death. Nuclear power uses and pollutes significant amounts of water, while the mining, transportation, and enriching of uranium is carbon intensive which contributes to global warming. 77-3-RW

Davis-Besse should not continue generating electricity; I urge the Nuclear Regulatory Commission to end the operating license for the plant. I care about the environment and support clean energy solutions such as energy efficiency and renewable power, and I know that Davis-Besse compromises my safety and the safety of my loved ones. 77-4-AL

Davis-Besse is far too dangerous.

Dear Nuclear Regulatory Commission, please say NO to Davis-Besse! Make them accountable for the lapses in safety and help protect Ohioans from a potential disaster at Davis-Besse. 77-5-OL

Sincerely,

Tekla Lewin
5100 Kingshill Dr
Columbus, OH 43229-5564

SUNSI Review Complete
Template = ADM-013

1

E-RIDS = ADM-03
Add = P. Cooper (PCC)

APPENDIX B
NATIONAL ENVIRONMENTAL POLICY ACT ISSUES FOR LICENSE RENEWAL OF NUCLEAR POWER PLANTS

B NATIONAL ENVIRONMENTAL POLICY ACT ISSUES FOR LICENSE RENEWAL OF NUCLEAR POWER PLANTS

NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (referred to as the GEIS), document the results of the U.S. Nuclear Regulatory Commission (NRC) staff's (staff's) systematic approach to evaluating the environmental impacts of renewing the licenses of individual nuclear power plants. The GEIS was originally published in 1996 and Addendum 1 to the GEIS, which only addresses transportation issues, was published in 1999. Of the 92 total environmental issues that the staff identified in the 1996 GEIS, the staff determined that 69 are generic to all plants (Category 1), while 21 issues must be discussed on a site-specific basis (Category 2). Two other issues, environmental justice and the chronic effects of electromagnetic fields, are uncategorized and must be evaluated on a site-specific basis.

Table B-1 in this appendix lists all 92 environmental issues, including the possible environmental significance (SMALL, MODERATE, LARGE, or uncategorized) as appropriate. This table is provided in Chapter 9 of the 1996 GEIS.

On June 20, 2013, the NRC published a final rule (78 FR 37282) revising its environmental protection regulation, Title 10 of the Code of Federal Regulations (10 CFR) Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." Specifically, the final rule updates the potential environmental impacts associated with the renewal of an operating license for a nuclear power reactor for an additional 20 years. A revised GEIS (NRC 2013b), which updates the 1996 GEIS, provides the technical basis for the final rule. The revised GEIS specifically supports the revised list of NEPA issues and associated environmental impact findings for license renewal contained in Table B-1 in Appendix B to Subpart A of the revised 10 CFR Part 51. The revised GEIS and final rule reflect lessons learned and knowledge gained during previous license renewal environmental reviews. In addition, public comments received on the draft revised GEIS and rule and during previous license renewal environmental reviews were reexamined to validate existing environmental issues and identify new ones.

This SEIS, which discusses the environmental impacts associated with Davis-Besse license renewal, is reviewed against the criteria from the 1996 GEIS. However, new issues identified, or recategorized, in the 2013 GEIS are also included in this SEIS. The new Category 1 issues identified in the 2013 GEIS which are discussed and evaluated in this SEIS are geology and soils, exposure of terrestrial organisms to radionuclides, exposure of aquatic organisms to radionuclides, human health impact from chemicals, and physical occupational hazards. New Category 2 issues that are addressed in this SEIS are radionuclides released to groundwater, effects on terrestrial resources (non-cooling system impacts), minority and low-income populations (i.e., environmental justice), and cumulative impacts.

Table B-1. Generic Summary Findings on NEPA Issues for License Renewal of Nuclear Power Plants

Issue	Type of Issue	Finding
Surface water quality, hydrology, and use		
Impacts of refurbishment on surface water quality	Generic	SMALL. Impacts are expected to be negligible during refurbishment because best management practices are expected to be employed to control soil erosion and spills.
Impacts of refurbishment on surface water use	Generic	SMALL. Water use during refurbishment will not increase appreciably or will be reduced during plant outage.
Altered current patterns at intake and discharge structures	Generic	SMALL. Altered current patterns have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered salinity gradients	Generic	SMALL. Salinity gradients have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Altered thermal stratification of lakes	Generic	SMALL. Generally, lake stratification has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Temperature effects on sediment transport capacity	Generic	SMALL. These effects have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Scouring caused by discharged cooling water	Generic	SMALL. Scouring has not been found to be a problem at most operating nuclear power plants and has caused only localized effects at a few plants. It is not expected to be a problem during the license renewal term.
Eutrophication	Generic	SMALL. Eutrophication has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Discharge of chlorine or other biocides	Generic	SMALL. Effects are not a concern among regulatory and resource agencies, and are not expected to be a problem during the license renewal term.
Discharge of sanitary wastes and minor chemical spills	Generic	SMALL. Effects are readily controlled through National Pollutant Discharge Elimination System (NPDES) permit and periodic modifications, if needed, and are not expected to be a problem during the license renewal term.
Discharge of other metals in wastewater	Generic	SMALL. These discharges have not been found to be a problem at operating nuclear power plants with cooling-tower-based heat dissipation systems and have been satisfactorily mitigated at other plants. They are not expected to be a problem during the license renewal term.
Water use conflicts (plants with once-through cooling systems)	Generic	SMALL. These conflicts have not been found to be a problem at operating nuclear power plants with once-through heat dissipation systems.
Water use conflicts (plants with cooling ponds or cooling towers using makeup water from a small river with low flow)	Site-specific	SMALL OR MODERATE. The issue has been a concern at nuclear power plants with cooling ponds and at plants with cooling towers. Impacts on instream and riparian communities near these plants could be of moderate significance in some situations. See § 51.53(c)(3)(ii)(A).

Issue	Type of Issue	Finding
		Aquatic ecology
Refurbishment	Generic	SMALL. During plant shutdown and refurbishment, there will be negligible effects on aquatic biota because of a reduction of entrainment and impingement of organisms or a reduced release of chemicals.
Accumulation of contaminants in sediments or biota	Generic	SMALL. Accumulation of contaminants has been a concern at a few nuclear power plants but has been satisfactorily mitigated by replacing copper alloy condenser tubes with those of another metal. It is not expected to be a problem during the license renewal term.
Entrainment of phytoplankton and zooplankton	Generic	SMALL. Entrainment of phytoplankton and zooplankton has not been found to be a problem at operating nuclear power plants and is not expected to be a problem during the license renewal term.
Cold shock	Generic	SMALL. Cold shock has been satisfactorily mitigated at operating nuclear plants with once-through cooling systems, has not endangered fish populations, or been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds, and is not expected to be a problem during the license renewal term.
Thermal plume barrier to migrating fish	Generic	SMALL. Thermal plumes have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Distribution of aquatic organisms	Generic	SMALL. Thermal discharge may have localized effects but is not expected to affect the larger geographical distribution of aquatic organisms.
Premature emergence of aquatic insects	Generic	SMALL. Premature emergence has been found to be a localized effect at some operating nuclear power plants but has not been a problem and is not expected to be a problem during the license renewal term.
Gas supersaturation (gas bubble disease)	Generic	SMALL. Gas supersaturation was a concern at a small number of operating nuclear power plants with once-through cooling systems but has been satisfactorily mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Low dissolved oxygen in the discharge	Generic	SMALL. Low dissolved oxygen has been a concern at one nuclear power plant with a once-through cooling system but has been effectively mitigated. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.
Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	Generic	SMALL. These types of losses have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Stimulation of nuisance organisms (e.g., shipworms)	Generic	SMALL. Stimulation of nuisance organisms has been satisfactorily mitigated at the single nuclear power plant with a once-through cooling system where previously it was a problem. It has not been found to be a problem at operating nuclear power plants with cooling towers or cooling ponds and is not expected to be a problem during the license renewal term.

Issue	Type of Issue	Finding
Aquatic ecology (for plants with once-through and cooling-pond heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	Site-specific	SMALL, MODERATE, OR LARGE. The impacts of entrainment are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. Further, ongoing efforts in the vicinity of these plants to restore fish populations may increase the numbers of fish susceptible to intake effects during the license renewal period, such that entrainment studies conducted in support of the original license may no longer be valid. See § 51.53(c)(3)(ii)(B).
Impingement of fish and shellfish	Site-specific	SMALL, MODERATE, OR LARGE. The impacts of impingement are small at many plants but may be moderate or even large at a few plants with once-through and cooling-pond cooling systems. See § 51.53(c)(3)(ii)(B).
Heat shock	Site-specific	SMALL, MODERATE, OR LARGE. Because of continuing concerns about heat shock and the possible need to modify thermal discharges in response to changing environmental conditions, the impacts may be of moderate or large significance at some plants. See § 51.53(c)(3)(ii)(B).
Aquatic ecology (for plants with cooling-tower-based heat dissipation systems)		
Entrainment of fish and shellfish in early life stages	Generic	SMALL. Entrainment of fish has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Impingement of fish and shellfish	Generic	SMALL. The impingement has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Heat shock	Generic	SMALL. Heat shock has not been found to be a problem at operating nuclear power plants with this type of cooling system and is not expected to be a problem during the license renewal term.
Groundwater use and quality		
Impacts of refurbishment on groundwater use and quality	Generic	SMALL. Extensive dewatering during the original construction on some sites will not be repeated during refurbishment on any sites. Any plant wastes produced during refurbishment will be handled in the same manner as in current operating practices and are not expected to be a problem during the license renewal term.
Groundwater use conflicts (potable and service water; plants that use <100 gallons per minute (gpm)	Generic	SMALL. Plants using less than 100 gpm are not expected to cause any groundwater use conflicts.
Groundwater use conflicts (potable and service water, and dewatering plants that use >100 gpm	Site-specific	SMALL, MODERATE, OR LARGE. Plants that use more than 100 gpm may cause groundwater use conflicts with nearby groundwater users. See § 51.53(c)(3)(ii)(C).
Groundwater use conflicts (plants using cooling towers withdrawing makeup water from a small river)	Site-specific	SMALL, MODERATE, OR LARGE. Water use conflicts may result from surface water withdrawals from small water bodies during low flow conditions which may affect aquifer recharge, especially if other groundwater or upstream surface water users come online before the time of license renewal. See § 51.53(c)(3)(ii)(A).

Issue	Type of Issue	Finding
Groundwater use conflicts (Ranney wells)	Site-specific	SMALL, MODERATE, OR LARGE. Ranney wells can result in potential groundwater depression beyond the site boundary. Impacts of large groundwater withdrawal for cooling tower makeup at nuclear power plants using Ranney wells must be evaluated at the time of application for license renewal. See § 51.53(c)(3)(ii)(C).
Groundwater quality degradation (Ranney wells)	Generic	SMALL. Groundwater quality at river sites may be degraded by induced infiltration of poor-quality river water into an aquifer that supplies large quantities of reactor cooling water. However, the lower quality infiltrating water would not preclude the current uses of groundwater and is not expected to be a problem during the license renewal term.
Groundwater quality degradation (saltwater intrusion)	Generic	SMALL. Nuclear power plants do not contribute significantly to saltwater intrusion.
Groundwater quality degradation (cooling ponds in salt marshes)	Generic	SMALL. Sites with closed-cycle cooling ponds may degrade groundwater quality. Because water in salt marshes is brackish, this is not a concern for plants located in salt marshes.
Groundwater quality degradation (cooling ponds at inland sites)	Site-specific	SMALL, MODERATE, OR LARGE. Sites with closed-cycle cooling ponds may degrade groundwater quality. For plants located inland, the quality of the groundwater in the vicinity of the ponds must be shown to be adequate to allow continuation of current uses. See § 51.53(c)(3)(ii)(D).
		Terrestrial ecology
Refurbishment impacts	Site-specific	SMALL, MODERATE, OR LARGE. Refurbishment impacts are insignificant if no loss of important plant and animal habitat occurs. However, it cannot be known whether important plant and animal communities may be affected until the specific proposal is presented with the license renewal application. See § 51.53(c)(3)(ii)(E).
Cooling tower impacts on crops and ornamental vegetation	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling tower impacts on native plants	Generic	SMALL. Impacts from salt drift, icing, fogging, or increased humidity associated with cooling tower operation have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Bird collisions with cooling towers	Generic	SMALL. These collisions have not been found to be a problem at operating nuclear power plants and are not expected to be a problem during the license renewal term.
Cooling pond impacts on terrestrial resources	Generic	SMALL. Impacts of cooling ponds on terrestrial ecological resources are considered to be of small significance at all sites.
Power line right of way (ROW) management (cutting and herbicide application)	Generic	SMALL. The impacts of ROW maintenance on wildlife are expected to be of small significance at all sites.
Bird collisions with power lines	Generic	SMALL. Impacts are expected to be of small significance at all sites.

Issue	Type of Issue	Finding
Impacts of electromagnetic fields on flora and fauna	Generic	SMALL. No significant impacts of electromagnetic fields on terrestrial flora and fauna have been identified. Such effects are not expected to be a problem during the license renewal term.
Floodplains and wetland on power line ROW	Generic	SMALL. Periodic vegetation control is necessary in forested wetlands underneath power lines and can be achieved with minimal damage to the wetland. No significant impact is expected at any nuclear power plant during the license renewal term.
Threatened and endangered species		
Threatened or endangered species	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are not expected to adversely affect threatened or endangered species. However, consultation with appropriate agencies would be needed at the time of license renewal to determine whether or not threatened or endangered species are present and whether or not they would be adversely affected. See § 51.53(c)(3)(ii)(E).
Air quality		
Air quality during refurbishment (non-attainment and maintenance areas)	Site-specific	SMALL, MODERATE, OR LARGE. Air quality impacts from plant refurbishment associated with license renewal are expected to be small. However, vehicle exhaust emissions could be cause for concern at locations in or near nonattainment or maintenance areas. The significance of the potential impact cannot be determined without considering the compliance status of each site and the number of workers expected to be employed during the outage. See § 51.53(c)(3)(ii)(F).
Air quality effects of transmission lines	Generic	SMALL. Production of ozone and oxides of nitrogen is insignificant and does not contribute measurably to ambient levels of these gases.
Land use		
Onsite land use	Generic	SMALL. Projected onsite land use changes required during refurbishment and the renewal period would be a small fraction of any nuclear power plant site and would involve land that is controlled by the applicant.
Power line ROW	Generic	SMALL. Ongoing use of power line ROWs would continue with no change in restrictions. The effects of these restrictions are of small significance.
Human health		
Radiation exposures to the public during refurbishment	Generic	SMALL. During refurbishment, the gaseous effluents would result in doses that are similar to those from current operation. Applicable regulatory dose limits to the public are not expected to be exceeded.
Occupational radiation exposures during refurbishment	Generic	SMALL. Occupational doses from refurbishment are expected to be within the range of annual average collective doses experienced for pressurized-water reactors and boiling-water reactors. Occupational mortality risk from all causes including radiation is in the mid-range for industrial settings.
Microbiological organisms (occupational health)	Generic	SMALL. Occupational health impacts are expected to be controlled by continued application of accepted industrial hygiene practices to minimize exposure to workers.

Issue	Type of Issue	Finding
Microbiological organisms (public health) (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	Site-specific	SMALL, MODERATE, OR LARGE. These organisms are not expected to be a problem at most operating plants except possibly at plants using cooling ponds, lakes, or canals that discharge to small rivers. Without site-specific data, it is not possible to predict the effects generically. See § 51.53(c)(3)(ii)(G).
Noise	Generic	SMALL. Noise has not been found to be a problem at operating plants and is not expected to be a problem at any plant during the license renewal term.
Electromagnetic fields – acute effects (electric shock)	Site-specific	SMALL, MODERATE, OR LARGE. Electrical shock resulting from direct access to energized conductors or from induced charges in metallic structures have not been found to be a problem at most operating plants and generally are not expected to be a problem during the license renewal term. However, site-specific review is required to determine the significance of the electric shock potential at the site. See § 51.53(c)(3)(ii)(H).
Electromagnetic fields – chronic effects	Uncategorized	UNCERTAIN. Biological and physical studies of 60-hertz (Hz) electromagnetic fields have not found consistent evidence linking harmful effects with field exposures. However, research is continuing in this area and a consensus scientific view has not been reached.
Radiation exposures to public (license renewal term)	Generic	SMALL. Radiation doses to the public will continue at current levels associated with normal operations.
Occupational radiation exposures (license renewal term)	Generic	SMALL. Projected maximum occupational doses during the license renewal term are within the range of doses experienced during normal operations and normal maintenance outages, and would be well below regulatory limits.
Socioeconomic impacts		
Housing impacts	Site-specific	SMALL, MODERATE, OR LARGE. Housing impacts are expected to be of small significance at plants located in a medium or high population area and not in an area where growth control measures that limit housing development are in effect. Moderate or large housing impacts of the workforce associated with refurbishment may be associated with plants located in sparsely populated areas or in areas with growth control measures that limit housing development. See § 51.53(c)(3)(ii)(I).
Public services: public safety, social services, and tourism and recreation	Generic	SMALL. Impacts to public safety, social services, and tourism and recreation are expected to be of small significance at all sites.
Public services: public utilities	Site-specific	SMALL OR MODERATE. An increased problem with water shortages at some sites may lead to impacts of moderate significance on public water supply availability. See § 51.53(c)(3)(ii)(I).
Public services: education (refurbishment)	Site-specific	SMALL, MODERATE, OR LARGE. Most sites would experience impacts of small significance but larger impacts are possible depending on site- and project-specific factors. See § 51.53(c)(3)(ii)(I).
Public services: education (license renewal term)	Generic	SMALL. Only impacts of small significance are expected.
Offsite land use (refurbishment)	Site-specific	SMALL OR MODERATE. Impacts may be of moderate significance at plants in low population areas. See § 51.53(c)(3)(ii)(I).

Issue	Type of Issue	Finding
Offsite land use (license renewal term)	Site-specific	SMALL, MODERATE, OR LARGE. Significant changes in land use may be associated with population and tax revenue changes resulting from license renewal. See § 51.53(c)(3)(ii)(I).
Public services: transportation	Site-specific	SMALL, MODERATE, OR LARGE. Transportation impacts (level of service) of highway traffic generated during plant refurbishment and during the term of the renewed license are generally expected to be of small significance. However, the increase in traffic associated with the additional workers and the local road and traffic control conditions may lead to impacts of moderate or large significance at some sites. See § 51.53(c)(3)(ii)(J).
Historic and archaeological resources	Site-specific	SMALL, MODERATE, OR LARGE. Generally, plant refurbishment and continued operation are expected to have no more than small adverse impacts on historic and archaeological resources. However, the National Historic Preservation Act requires the Federal agency to consult with the State Historic Preservation Officer to determine whether or not there are properties present that require protection. See § 51.53(c)(3)(ii)(K).
Aesthetic impacts (refurbishment)	Generic	SMALL. No significant impacts are expected during refurbishment.
Aesthetic impacts (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
Aesthetic impacts of transmission lines (license renewal term)	Generic	SMALL. No significant impacts are expected during the license renewal term.
Postulated accidents		
Design basis accidents	Generic	SMALL. The staff has concluded that the environmental impacts of design-basis accidents are of small significance for all plants.
Severe accidents	Site-specific	SMALL. The probability weighted consequences of atmospheric releases, fallout onto open bodies of water, releases to groundwater, and societal and economic impacts from severe accidents are small for all plants. However, alternatives to mitigate severe accidents must be considered for all plants that have not considered such alternatives. See § 51.53(c)(3)(ii)(L).
Uranium fuel cycle and waste management		
Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high level waste)	Generic	SMALL. Offsite impacts of the uranium fuel cycle have been considered by the Commission in Table S-3 of this part. Based on information in the GEIS, impacts on individuals from radioactive gaseous and liquid releases including radon-222 and technetium-99 are small.
Offsite radiological impacts (collective effects)	Generic	The 100-year environmental dose commitment to the U.S. population from the fuel cycle, high level waste, and spent fuel disposal excepted, is calculated to be about 14,800 person rem, or 12 cancer fatalities, for each additional 20-year power reactor operating term. Much of this, especially the contribution of radon releases from mines and tailing piles, consists of tiny doses summed over large populations. This same dose calculation can theoretically be extended to include many tiny doses over additional thousands of years as well as doses outside the United States. The result of such a calculation would be thousands of cancer fatalities from the fuel cycle, but this result assumes that even tiny doses have some statistical adverse health effect which will not ever be mitigated (for example no cancer cure in the next thousand years), and that these doses projected over thousands of years are meaningful; however, these assumptions are questionable. In particular, science cannot rule out the possibility that there

Issue	Type of Issue	Finding
		will be no cancer fatalities from these tiny doses. For perspective, the doses are very small fractions of regulatory limits, and even smaller fractions of natural background exposure to the same populations. Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the collective effects of the fuel cycle, this issue is considered Category 1 (Generic).
Offsite radiological impacts (spent fuel and high level waste disposal)	Generic	For the high level waste and spent fuel disposal component of the fuel cycle, there are no current regulatory limits for offsite releases of radionuclides for the current candidate repository site. However, if it is assumed that limits are developed along the lines of the 1995 National Academy of Sciences (NAS) report, "Technical Bases for Yucca Mountain Standards," and that in accordance with the Commission's Waste Confidence Decision, 10 CFR 51.23, a repository can and likely will be developed at some site which will comply with such limits, peak doses to virtually all individuals will be 100 millirem per year or less. However, while the Commission has reasonable confidence that these assumptions will prove correct, there is considerable uncertainty since the limits are yet to be developed, no repository application has been completed or reviewed, and uncertainty is inherent in the models used to evaluate possible pathways to the human environment. The NAS report indicated that 100 millirem per year should be considered as a starting point for limits for individual doses, but notes that some measure of consensus exists among national and international bodies that the limits should be a fraction of the 100 millirem per year. The lifetime individual risk from 100 millirem annual dose limit is about 3 x 10-3. Estimating cumulative doses to populations over thousands of years is more problematic. The likelihood and consequences of events that could seriously compromise the integrity of a deep geologic repository were evaluated by the Department of Energy in the "Final Environmental Impact Statement: Management of Commercially Generated Radioactive Waste," October 1980. The evaluation estimated the 70-year whole-body dose commitment to the maximum individual and to the regional population resulting from several modes of breaching a reference repository in the year of closure, after 1,000 years, after 100,000 years, and after 100,000,000 years. Subsequently, the NRC and other federal agencies have expended considerable effort to develop models for the design and for the licensing of a high level waste repository, especially for the candidate repository at Yucca Mountain. More meaningful estimates of doses to population may be possible in the future as more is understood about the performance of the proposed Yucca Mountain repository. Such estimates would involve very great uncertainty, especially with respect to cumulative population doses over thousands of years. The standard proposed by the NAS is a limit on maximum individual dose. The relationship of potential new regulatory requirements, based on the NAS report, and cumulative population impacts has not been determined, although the report articulates the view that protection of individuals will adequately protect the population for a repository at Yucca Mountain. However, the EPA's generic repository standards in 40 CFR Part 191 generally provide an indication of the order of magnitude of cumulative risk to population that could result from the licensing of a Yucca Mountain repository, assuming the ultimate standards will be within the range of standards now under consideration. The standards in 40 CFR Part 191 protect the population by imposing the amount of radioactive material released over 10,000 years. The cumulative release limits are based on the EPA's population impact goal of 1,000 premature

Issue	Type of Issue	Finding
		cancer deaths worldwide for a 100,000 metric ton (MT) repository. Nevertheless, despite all the uncertainty, some judgment as to the regulatory NEPA implications of these matters should be made and it makes no sense to repeat the same judgment in every case. Even taking the uncertainties into account, the Commission concludes that these impacts are acceptable in that these impacts would not be sufficiently large to require the NEPA conclusion, for any plant, that the option of extended operation under 10 CFR Part 54 should be eliminated. Accordingly, while the Commission has not assigned a single level of significance for the impacts of spent fuel and high level waste disposal, this issue is considered in Category 1 (Generic).
Nonradiological impacts of the uranium fuel cycle	Generic	SMALL. The nonradiological impacts of the uranium fuel cycle resulting from the renewal of an operating license for any plant are found to be small.
Low-level waste storage and disposal	Generic	SMALL. The comprehensive regulatory controls that are in place and the low public doses being achieved at reactors ensure that the radiological impacts to the environment will remain small during the term of a renewed license. The maximum additional onsite land that may be required for low-level waste storage during the term of a renewed license and associated impacts will be small. Nonradiological impacts on air and water will be negligible. The radiological and nonradiological environmental impacts of long-term disposal of low-level waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient low-level waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.
Mixed waste storage and disposal	Generic	SMALL. The comprehensive regulatory controls and the facilities and procedures that are in place ensure proper handling and storage, as well as negligible doses and exposure to toxic materials for the public and the environment at all plants. License renewal will not increase the small, continuing risk to human health and the environment posed by mixed waste at all plants. The radiological and nonradiological environmental impacts of long-term disposal of mixed waste from any individual plant at licensed sites are small. In addition, the Commission concludes that there is reasonable assurance that sufficient mixed waste disposal capacity will be made available when needed for facilities to be decommissioned consistent with NRC decommissioning requirements.
Onsite spent fuel	Generic	SMALL. The expected increase in the volume of spent fuel from an additional 20 years of operation can be safely accommodated on site with small environmental effects through dry or pool storage at all plants if a permanent repository or monitored retrievable storage is not available.
Nonradiological waste	Generic	SMALL. No changes to generating systems are anticipated for license renewal. Facilities and procedures are in place to ensure continued proper handling and disposal at all plants.
Transportation	Generic	SMALL. The impacts of transporting spent fuel enriched up to 5 percent uranium-235 with average burnup for the peak rod to current levels approved by NRC up to 62,000 megawatt days per metric-ton uranium Wd/MTU)and the cumulative impacts of transporting high-level waste to a single repository, such as Yucca Mountain, Nevada are found to be consistent with the impact values contained in 10 CFR 51.52(c), Summary Table S–4 – Environmental Impact of Transportation of Fuel and Waste to and from One Light-Water-Cooled Nuclear Power Reactor. If fuel enrichment or burnup conditions are not met, the applicant must submit an assessment of the implications for the environmental impact values reported in § 51.52.

Issue	Type of Issue	Finding
Decommissioning		
Radiation doses	Generic	SMALL. Doses to the public will be well below applicable regulatory standards regardless of which decommissioning method is used. Occupational doses would increase no more than 1 man-rem caused by buildup of long-lived radionuclides during the license renewal term.
Waste management	Generic	SMALL. Decommissioning at the end of a 20-year license renewal period would generate no more solid wastes than at the end of the current license term. No increase in the quantities of Class C or greater than Class C wastes would be expected.
Air quality	Generic	SMALL. Air quality impacts of decommissioning are expected to be negligible either at the end of the current operating term or at the end of the license renewal term.
Water quality	Generic	SMALL. The potential for significant water quality impacts from erosion or spills is no greater whether decommissioning occurs after a 20-year license renewal period or after the original 40-year operation period, and measures are readily available to avoid such impacts.
Ecological resources	Generic	SMALL. Decommissioning after either the initial operating period or after a 20-year license renewal period is not expected to have any direct ecological impacts.
Socioeconomic impacts	Generic	SMALL. Decommissioning would have some short-term socioeconomic impacts. The impacts would not be increased by delaying decommissioning until the end of a 20-year relicense period, but they might be decreased by population and economic growth.
Environmental justice		
Environmental justice	Uncategorized	NONE. The need for and the content of an analysis of environmental justice will be addressed in plant-specific reviews.

Source: Table B-1 in Appendix B, Subpart A, to 10 CFR Part 51 (61 FR 28467, June 5, 1996.)

APPENDIX C
APPLICABLE REGULATIONS, LAWS, AND AGREEMENTS

C APPLICABLE REGULATIONS, LAWS, AND AGREEMENTS

The Atomic Energy Act of 1954 (AEA) authorizes states to establish programs to assume U.S. Nuclear Regulatory Commission (NRC) regulatory authority for certain activities. For example, in accordance with Section 274 of the AEA, as amended, beginning on August 31, 1999, the State of Ohio assumed regulatory responsibility over the following:

- byproduct materials as defined in Section 11e.(1) of the Act,
- byproduct materials as defined in Section 11e.(2) of the Act,
- source materials,
- special nuclear materials in quantities not sufficient to form a critical mass,
- the regulation of the land disposal of byproduct, source, or special nuclear waste materials received from other persons, and
- the evaluation of radiation safety information on sealed sources or devices containing byproduct, source, or special nuclear materials and the registration of the sealed sources or devices for distribution, as provided for in regulations or orders of the NRC.

The Ohio Agreement State Program is administered by the Bureau of Radiation Protection in the Ohio Department of Health.

In addition to implementing some Federal programs, state legislatures develop their own laws. State statutes supplement as well as implement Federal laws for protection of air, water quality, and groundwater. State legislation may address Solid Waste Management Programs, locally rare or endangered species, and historic and cultural resources.

In addition, the Clean Water Act (CWA) allows for primary enforcement and administration through state agencies, provided the state program is at least as stringent as the Federal program and conforms to the CWA and delegation of authority for the Federal National Pollutant Discharge Elimination System (NPDES) Program from the Environmental Protection Agency (EPA) to the state. The primary mechanism to control water pollution is the requirement that direct dischargers to obtain an NPDES permit or in the case of states where the authority has been delegated from the EPA, a State Pollutant Discharge Elimination System (SPDES) permit, pursuant to the CWA.

One important difference between Federal regulations and certain state regulations is the definition of waters regulated by the state. Certain state regulations may include underground waters while the CWA only regulates surface waters.

C.1 Federal &State Environmental Requirements

Certain environmental requirements, including some discussed earlier, may have been delegated to state authorities for implementation, enforcement, or oversight. Table C-1 provides a list of representative state environmental requirements that may affect license renewal applications (LRAs) for nuclear power plants.

Table C-1. Federal and State Environmental Requirements

Davis-Besse Nuclear Power Station, Unit No. 1 (Davis-Besse) is subject to numerous state requirements regarding their environmental program. Those requirements are briefly described below.

Agency	Law/Regulation	Requirements
NRC	Title 10 of the *Code of Federal Regulations* (CFR) Part 51	"Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." This part contains environmental protection regulations applicable to the NRC's domestic licensing and related regulatory functions.
NRC	10 CFR Part 54	"Requirements for Renewal of Operating Licenses for Nuclear Power Plants." This part focuses on managing adverse effects of aging rather than identification of all aging mechanisms. The rule is intended to ensure that important systems, structures, and components (SSCs) will continue to perform their intended function in the period of extended operation.
NRC	10 CFR Part 50	Regulations promulgated by the NRC pursuant to the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242), to provide for the licensing of production and utilization facilities. This part also gives notice to all persons who knowingly provide to any licensee, applicant, contractor, or subcontractor, components, equipment, materials, or other goods or services, that relate to a licensee's or applicant's activities subject to this part, that they may be individually subject to NRC enforcement action for violation of § 50.5.
	Air quality protection	
Ohio EPA, Division of Air Pollution Control	Ambient Air Quality & Emergency Episode Standards Ohio Administrative Code Chapter 3745-25	Primary ambient air quality standards define levels of air quality, which are necessary, with an adequate margin of safety, to protect the public health. Secondary ambient air quality standards define levels of air quality, which are necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
Ohio EPA, Division of Air Pollution Control	Permits to Install New Sources of Pollution Ohio Administrative Code Chapter 3745-31	This chapter provides requirements for installation, modification, and operation of new and existing air contaminant sources at facilities that are not subject to Chapter 3745-77 of the Administrative Code. This chapter also provides requirements for installation and modification of air contaminant sources at facilities that are, or will be, subject to Chapter 3745-77 of the Administrative Code.
EPA	Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.)	The Clean Air Act (CAA) is the law that defines EPA's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The CAA requires EPA to set National ambient air quality standards for six common air pollutants—particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.
	Coastal zone protection	
U.S. Department of Commerce	Coastal Zone Management Act of 1972 (16 U.S.C. § 1451-1464)	The Congress finds and declares that it is the National policy to do the following: • to preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and

Agency	Law/Regulation	Requirements
		succeeding generations and • to encourage and assist the states to effectively exercise their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone, giving full consideration to ecological, cultural, historic, and esthetic values as well as the needs for compatible economic development.
Ohio Department of Natural Resources—Office of Coastal Zone Management	Ohio Coastal Management Program Ohio Administrative Code Chapter 1506	In an effort to balance diverse economic and environmental interests, the Ohio Coastal Management Program sets forth the guidelines for use of Ohio's coastal resources to ensure their continued benefit for this and future generations.
Water resources protection		
EPA	Clean Water Act (CWA) (33 U.S.C. § 1251 et seq.)	The NPDES permit is required for plant industrial, sanitary, and storm water discharges to waters of the state. The NPDES permit requires the compliance of each point source with authorized discharge levels, monitoring requirements, and other appropriate requirements.
EPA	Section 401 of the CWA (33 U.S.C. § 1341)	Section 401 Water Quality Certification of the CWA requires a Section 401 water quality certification and payment of applicable fees before the issuance of a Federal permit or license to conduct any activity that may result in any discharge to waters of the state.
EPA	Section 404 of the CWA (33 U.S.C. § 1344)	Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the U.S., including wetlands. The U.S. Army Corps of Engineers (USACE) and the EPA jointly administer this program. Under the 404 Program, no discharge of dredged or fill material is allowed if a practicable alternative exists that is less damaging to the aquatic environment or if the Nation's waters would be significantly degraded. A Federal permit is required to discharge dredged or fill material into wetlands and waters of the U.S.
EPA	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. § 9601 et seq.)	Section 101 of CERCLA requires a permit to cover consumptive water use over 20,000 gallons per day (over a 30-day average) of surface and ground water.
EPA	Wild and Scenic River Act (16 U.S.C. §1271 et seq.)	This act created the national wild and scenic rivers system, established to protect the environmental values of free flowing streams from degradation by impacting activities including water resources projects.
EPA	Floodplain Executive Order (No. 11988. May 24, 1977, 42 *Federal Register* (FR) 26951) and Wetlands Executive Order (No. 11990. May 24, 1977, 42 FR 26961)	Both Executive Orders require Federal agencies to consider the impacts of their actions on floodplains and wetlands through existing review procedures such as the National Environmental Policy Act of 1969 (NEPA).
Waste Management & Pollution Prevention		
EPA	Resource Conservation and Recovery Act (RCRA) (42 U.S.C. § 6901 et seq.)	Before a material can be classified as a hazardous waste, it must first be a solid waste as defined under the RCRA. Hazardous waste is classified under Subtitle C of the RCRA. All applicable generators of hazardous waste regulations are contained in

Agency	Law/Regulation	Requirements
		40 CFR Parts 261 and 262. Parts 261.5(a) and 261.5(e) contain requirements for conditionally-exempt small-quantity generators (CESQGs). Part 262.34(d) contains requirements for small-quantity generators (SQGs). Parts 262 and 261.5(e) contain requirements for large-quantity generators (LQGs).
EPA	Pollution Prevention Act (42 U.S.C. § 13101 et seq.)	This act formally established a National policy to prevent or reduce pollution at its source whenever feasible. It provides funds for state and local pollution prevention programs through a grant program to promote the use of pollution prevention techniques by business.
Emergency planning & response		
Ohio EPA, Division of Air Pollution Control	Risk Management Program Ohio Administrative Code Chapter 3745-104	The intent of section 112(r) of the CAA is to prevent accidental releases to the air and mitigate the consequences of releases that do occur by focusing on prevention measures on chemicals that pose the greatest risk to the public and the environment. Under these requirements, industry has an obligation to prevent accidents and operate safely.
Ohio EPA, Division of Air Pollution Control	Emergency Planning and Preparedness Ohio Administrative Code Chapter 1301:7-7-04	The Emergency Planning and Community Right-to-Know Act (EPCRA) was passed by Congress in 1986. EPCRA was included as Title III of the Superfund Amendments and Reauthorization Act (SARA) and is sometimes referred to as SARA Title III. EPCRA provides for the collection and availability of information regarding the use, storage, production, and release of hazardous chemicals to the public and emergency responders in your communities. The law promotes a working relationship among Government at all levels, business and community leaders, environmental and other public interest organizations, and individual citizens to improve hazard communications and emergency planning.
Ohio EPA, Division of Air Pollution Control	Toxic Release Inventory Rules Ohio Administrative Code Chapter 3745-100	These rules establish reporting requirements and schedules for each toxic chemical known to be manufactured (including imported), processed, or otherwise used in excess of an applicable threshold quantity. It applies only to facilities of a certain classification.
Biotic resources protection		
U.S. Fish & Wildlife Services (FWS)	Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.)	This act forbids any Government agency, corporation, or citizen from taking (harming or killing) endangered animals without an Endangered Species Permit.
FWS	Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.)	To minimize adverse impacts of proposed actions on fish and wildlife resources and habitat, this act requires that Federal agencies consult Government agencies regarding activities that affect, control, or modify waters of any stream or bodies of water. It also requires that justifiable means and measures be used in modifying plans to protect fish and wildlife in these waters.
Ohio EPA, Division of Surface Water—Isolated Wetland Permitting	General and individual Isolated wetland permits Ohio Administrative Code Chapter 6111.021	A person that proposes to engage in an activity that involves the filling of an isolated wetland shall apply to the director for coverage under a general state-isolated wetland permit or shall apply for an individual state-isolated wetland permit. No person shall engage in the filling of an isolated wetland unless authorized to do so by a general or individual state-isolated wetland permit.
Cultural resources protection		
Advisory Council on Historic Preservation	National Historic Preservation Act (NHPA)	This act directs Federal agencies to consider the impact of their actions on historic properties. The NHPA also encourages state

Agency	Law/Regulation	Requirements
(ACHP)	(16 U.S.C. § 470 et seq.)	and local preservation societies.
Ohio Historic Preservation Office Ohio Historical Society	Historical Society Ohio Administrative Code Chapter 149-1-02	These are guidelines for archaeological investigations on public land, archaeological preserves, and sites listed in the state registry of archaeological landmarks.

C.2 Operating Permits and Other Requirements

Several operating permit applications may be prepared and submitted, and regulatory approval or permits or both would be received prior to license renewal approval by the NRC. Table C-2 lists representative Federal, state, and local permits.

Table C-2. Federal, State, and Local Permits and Other Requirements

Davis-Besse is subject to other requirements regarding various aspects of their environmental program. Those requirements are briefly described below.

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance & Status
License to operate	NRC	AEA (42 U.S.C. 2011, et seq.) 10 CFR 50.10	Operation of Davis-Besse Permit Number: NPF-3 Issued: 04/22/1977 Expires: 04/22/2017
Storage of spent nuclear fuel & high-level radioactive waste	NRC	10 CFR Part 72	Use of Radioactive waste cask Certificate Number: 1004 Issued: 01/23/1995 Expired: 01/31/2015
Air quality protection			
Permit to operate an air containment source	Ohio EPA, Division of Air Pollution Control	CAA, 40 U.S.C. 1857 et seq.; Ohio Air Pollution Control Act (Ohio Administrative Code Chapter 3745-31)	Operation of station auxiliary boiler Permit Application No. 0362000091B001 Issued: Annual Reporting Expires: Indefinite
Water resources protection			
NPDES	Ohio EPA, Division of Surface Water	CWA (33 U.S.C. 1251 et seq.); 40 CFR Part 122 Ohio Water Pollution Control Act (Ohio Revised Code 6111)	Construction of Switchyard project and control-discharge of storm water in Ottawa County, Carrol Township Ohio Permit No. 2GC02563*AG Issued: 12/21/2009 Expires: Upon Project Completion
NPDES	Ohio EPA, Division of Surface Water	CWA (33 U.S.C. 1251 et seq.); 40 CFR Part 122 Ohio Water Pollution Control Act (Ohio Revised Code 6111)	Treatment of wastewater and effluent discharge to surface receiving waters (Toussaint River and Lake Erie) Ohio Permit No. 21B00011*ID

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance & Status
			Issued: 09/01/2006 Expires: 04/30/2011 (every 5 years)
Water withdrawal and use registration and file annual report	Ohio Department of Natural Resources, Division of Water Resources	Ohio Revised Code Section 1521.16	Withdrawal and use of more than 100,000 gallons of water daily from all sources Registration # 00598 Issued: 01/01/1990 Expires: Indefinite
Waste management and pollution prevention			
Notification of regulated waste activity	EPA	RCRA, as amended (42 U.S.C. s/s 321 et seq. (1976)	Generation and accumulation of hazardous waste EPA ID# OHD000720508 Issued: --- Expires: Indefinite
Report of regulated waste activity	Ohio EPA, Division of Hazardous Waste Management	Ohio Administrative Code Chapter 3745-52-41	Generation. Accumulation and offsite disposal of hazardous waste EPA ID# OHD000720508 Issued: Annual Reporting Expires: Indefinite
Emergency planning and response			
Hazardous material registration	U.S. Department of Transportation	Hazardous Materials Transportation Act (HMTA) (49 U.S.C. 1501 et seq.); AEA, as amended (42 U.S.C. 2011 et seq.); 49 CFR Parts 107 Subpart G, 172, 173, 174, 177, and 397	Transportation of hazardous materials Permit Number: 042009 450 002RT Issued: 05/19/2009 Expires: 06/30/2012 (Renewed Triennially)
License to deliver radioactive waste	Tennessee Department of Environment and Conservation	Tennessee Code Annotated 68-202-206	Shipment of radioactive material to a licensed disposal-processing facility within the State of Tennessee Tennessee Delivery License # T-OH003-LO9 Issued: Annually Expires: 12/31/2010
Underground storage tank registration	Ohio Department of Commerce, Division of State Fire Marshal	Ohio Administrative Code 1301: 7-9-04	Registration of underground diesel storage tanks T00001, T00002, and T00003 Certificate # 62000072 Issued: Annually Expires: 06/30/2011

License, Permit, or Other Required Approval	Responsible Agency	Authority	Relevance & Status
		Human health	
X-ray generating equipment registration	Ohio Department of Health	Ohio Administrative Code 3701:1-38-03(C); Ohio Revised Code 3748.06 and 3748.07	Operation of X-ray generation Equipment Registration # 17-M-07181-005 Issued: Biennially Expires: 05/31/2012
		Biotic resource protection	
Scientific Collection Permit	Ohio Department of Natural Resources, Division of Wildlife	Ohio Revised Code Section 1531.08	Collection of wildlife specimens for Radiological Environmental Monitoring Program (REMP) Permit# 10-21 Issued: Annually Expires: 03/15/2011

APPENDIX D
CONSULTATION CORRESPONDENCE

D CONSULTATION CORRESPONDENCE

The Endangered Species Act of 1973, as amended; the Magnuson–Stevens Fisheries Management Act of 1996, as amended; and the National Historic Preservation Act of 1966 require that Federal agencies consult with applicable state and Federal agencies and groups prior to taking action that may affect threatened and endangered species, essential fish habitat, or historic and archaeological resources, respectively. This appendix contains consultation documentation.

Table D–1. Consultation Correspondences

This is a list of the consultation documents sent between the U.S. Nuclear Regulatory Commission (NRC) and other agencies that it is required to consult with based on National Environmental Policy Act (NEPA) requirements.

Author	Recipient	Date of Letter
NRC (David J. Wrona, Chief)	Advisory Council on Historic Preservation (Mr. Reid Nelson, Director)	November 22, 2010
NRC (David J. Wrona, Chief)	Ohio Historic Preservation Office (Mark Epsein)	December 7, 2010
U.S. Fish and Wildlife Service (USFWS) (Mary Knapp, Field Supervisor)	NRC (Cindy Bladey, Chief)	December 16, 2010
NRC (David J. Wrona, Chief)	USFWS (Mary Knapp, Field Supervisor)	June 1, 2011
NRC (David J. Wrona, Chief)	National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) (Patricia Kurkul, Regional Administrator)	December 6, 2010
NRC (David J. Wrona, Chief)	Ohio Department of Natural Resources (David Graham, Chief)	November 22, 2010
NRC (David J. Wrona, Chief)	Ohio Department of Natural Resources (Brian Mitch, Environmental Review Manager)	November 23, 2010
NOAA NMFS (Mary A. Colligan, Assistant Regional Administrator)	NRC (David J. Wrona, Chief)	December 21, 2010
NRC (David J. Wrona, Chief)	Delaware Nation (Edgar L. French)	November 23, 2010
NRC (David J. Wrona, Chief)	Forest County Potawatomi Community (Harold G. Frank)	November 23. 2010
NRC (David J. Wrona, Chief)	Hannahville Indian Community Council (Kenneth Meshiguad)	November 23, 2010
NRC (David J. Wrona, Chief)	Miami Tribe of Oklahoma (Floyd E. Leonard)	November 23, 2010
NRC (David J. Wrona, Chief)	Shawnee Tribe (Ron Sparkman)	November 23, 2010
NRC (David J. Wrona, Chief)	Wyandotte Nation (Leaford Bearskin)	November 23, 2010

Author	Recipient	Date of Letter
NRC (David J. Wrona, Chief)	Peoria Tribe of Indians of Oklahoma (John P. Froman)	November 23, 2010
NRC (David J. Wrona, Chief)	Ottawa Tribe of Oklahoma (Charles Todd)	November 23, 2010
Peoria Tribe of Indians of Oklahoma (John P. Froman)	Chief, Rules and Directives Branch	December 8, 2010

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 22, 2010

Mr. Reid Nelson, Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
1100 Pennsylvania Ave, NW, Suite 803
Washington, DC 20004

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Nelson:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the operating license for Davis Besse Nuclear Power Station, Unit No. 1 (DBNPS). DBNPS is located in Oak Harbor, Ohio. The application for renewal was submitted by FENOC in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54.

The NRC has established that, as part of the staff's review of any nuclear power plant license renewal application, a site-specific Supplemental Environmental Impact Statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969, as amended. The SEIS will include an analysis of pertinent environmental issues, and in accordance with 36 CFR 800.8(c), will include analyses of potential impacts to historic and cultural resources. The staff also plans to contact the Ohio State Historic Preservation Office during its review.

Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is August 2011.

R. Nelson -2-

The DBNPS license renewal application is available at: http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html. If you have any questions concerning the staff's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

Sincerely,

David J. Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

cc: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 7, 2010

Mr. Mark Epstein
Department Head
Resource Protection and Review
Ohio Historic Preservation Office
182 Velma Avenue
Columbus, OH 43211-2497

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Epstein:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the operating license for Davis Besse Nuclear Power Station, Unit No.1 (DBNPS). DBNPS is located in Oak Harbor, OH. The application for renewal was submitted by FENOC in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54. The NRC has established that, as part of the staff's review of any nuclear power plant license renewal application, a site-specific Supplemental Environmental Impact Statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act (NEPA) of 1969, as amended. The NRC plans to coordinate compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended with NEPA in accordance with 36 CFR 800.8(c).

In the context of the NHPA, the staff has determined that the area of potential effect (APE) for a license renewal action is the area at the power plant site and its immediate environs that may be impacted by post-license renewal land-disturbing operations or projected refurbishment activities associated with the proposed action. The APE may extend beyond the immediate environs in those instances where post-license renewal land-disturbing operations or projected refurbishment activities specifically related to license renewal may potentially have an effect on known or proposed historic sites. This determination is made irrespective of ownership or control of the lands of interest. The SEIS will include an analysis of pertinent environmental issues and analyses of potential impacts to historic and cultural resources. The staff also plans to contact the Advisory Council on Historic Preservation Office during its review.

Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is August 2011.

The DBNPS license renewal application is available at:
http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html.

M. Epstein - 2 -

If you have any questions concerning the staff's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

Sincerely,

David J. Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

cc: Distribution via Listserv

RULES AND DIRECTIVES
BRANCH
USNRC

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

2010 DEC 27 PM 2:23

RECEIVED

December 16, 2010

Cindy Bladey, Chief RADB
Division of Administrative Services
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

10/28/10
75 FR 66399
(2)

Subject: Docket ID NRD-2010-0298

Dear Ms. Bladey:

TAILS #: 31420-2011-TA-0097

This is in response to the Nuclear Regulatory Commission's October 28, 2010 Federal Register Notice of Intent to Prepare an Environmental Impact Statement (EIS) and to conduct the scoping process for Davis-Besse Nuclear Power Station, Unit 1. FirstEnergy Nuclear Operating Company (FENOC) has submitted an application for renewal of Facility Operating License No. NPF-003 for an additional 20 years of operation at David-Besse Nuclear Power Station, Unit 1, located in Oak Harbor, Ottawa County, Ohio. The EIS is being prepared as part of this application process.

There are no Federal wilderness areas or designated critical habitat within the vicinity of the proposed site. Davis-Besse consists of 954 acres, of which approximately 733 acres are marshland that is leased to the U.S. government as part of the Ottawa National Wildlife Refuge.

In a letter dated December 16, 2009, we provided comments to FENOC on the proposed 20-year renewal of the operating license for Davis-Besse. At this time we have no additional comments.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Angela Boyer at extension 22 in this office.

Sincerely,

Mary Knapp

Mary M. Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, Ohio

SUNSI Review Complete
Template = ADM-013

E-RIDS = ADM-03
Add = P. Cooper (pec)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 1, 2011

Ms. Mary Knapp
Field Supervisor
U.S. Fish and Wildlife Service
Ohio Ecological Services Field Office
4625 Morse Rd., Suite 104
Columbus, OH 43230

SUBJECT: REQUEST FOR LIST OF FEDERALLY PROTECTED SPECIES AND IMPORTANT HABITATS WITHIN THE AREA UNDER EVALUATION FOR THE DAVIS-BESSE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Knapp:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the operating license for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). DBNPS is located 25 miles east of Toledo, OH. The application for renewal was submitted by FENOC in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the staff's review of any nuclear power plant license renewal application, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants," NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act (NEPA) of 1969, as amended. The SEIS includes an analysis of pertinent environmental issues, impacts to endangered or threatened species, habitats, and impacts to other fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

FENOC stated that it has no plans to alter current operations over the license renewal period. DBNPS, operating under a renewed license, would use existing plant facilities and transmission lines, and would not require additional construction or disturbance of new areas. According to FENOC, any maintenance activities would be limited to previously disturbed areas. The DBNPS site consists of 954 acres, of which approximately 733 acres are marshland currently leased to the U.S. Government as a national wildlife refuge.

As part of the SEIS preparation, the applicable transmission line corridors will be reviewed. The DBNPS 345 kilovolt (kV) switchyard is adjacent to the plant and centrally located on the property. From the switchyard, three 345 kV transmission lines connect DBNPS to the power grid. The transmission lines labeled Bay Shore Line, Lemoyne Line, and Beaver Line are shown on the attached enclosures. Please see the map in Enclosure 4 for further detail.

In response to the *Federal Register* notice, issued on October 18, 2010, "Nuclear Regulatory Commission, FirstEnergy Nuclear Operating Company, Notice of Intent to Prepare an Environmental Impact Statement and Conduct the Scoping Process for Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346," Fish and Wildlife Service's (FWS) submitted a letter

M. Knapp - 2 -

to the NRC, ADAMS Accession Number ML110060289, indicating that there are no Federal wilderness areas or designated critical habitat within the vicinity of the proposed site. In addition, FWS participated in the environmental audit held the week of March 7, 2011. As a result of the audit and FWS involvement, three additional threatened or endangered species were discovered to be known to or likely to occur near the DBNPS site.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests concurrence on the enclosed table of Federally threatened, endangered, proposed, and candidate species that may be in the vicinity of the DBNPS site and its associated transmission line rights-of-way. Please provide any additional information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

If you have any questions concerning the NRC staff's review of this license renewal application, please contact Ms. Paula Cooper, License Renewal Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

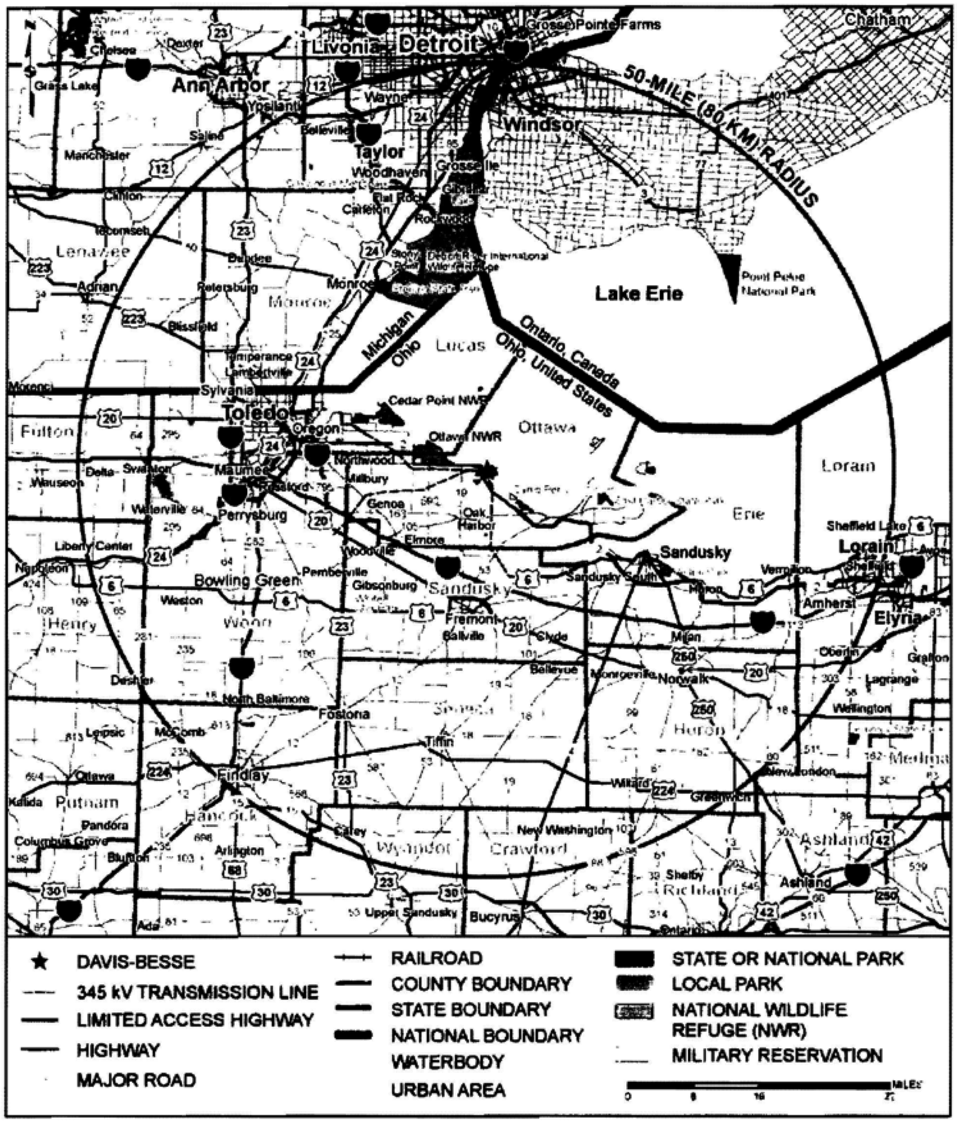
Sincerely,

David J. Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

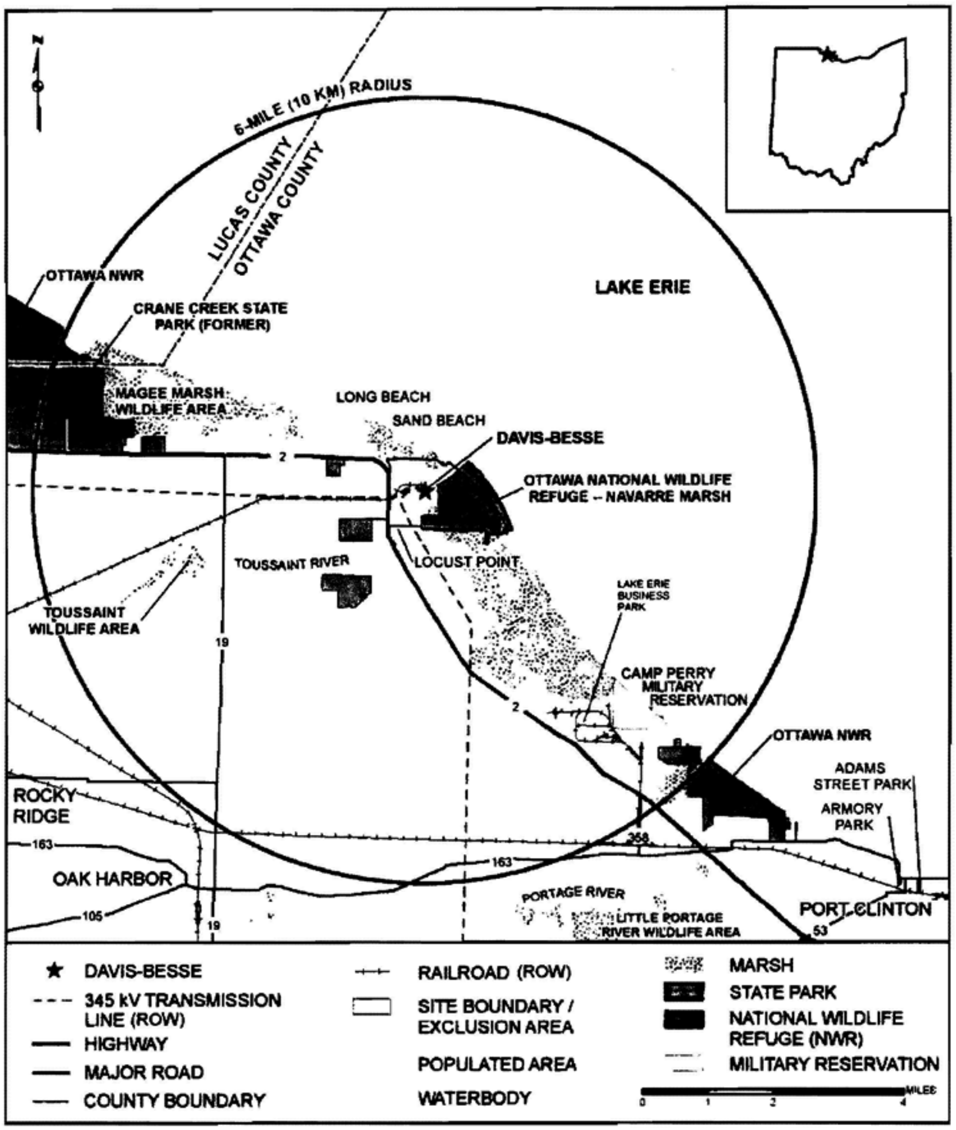
Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map
5. Federal T&E Species Table

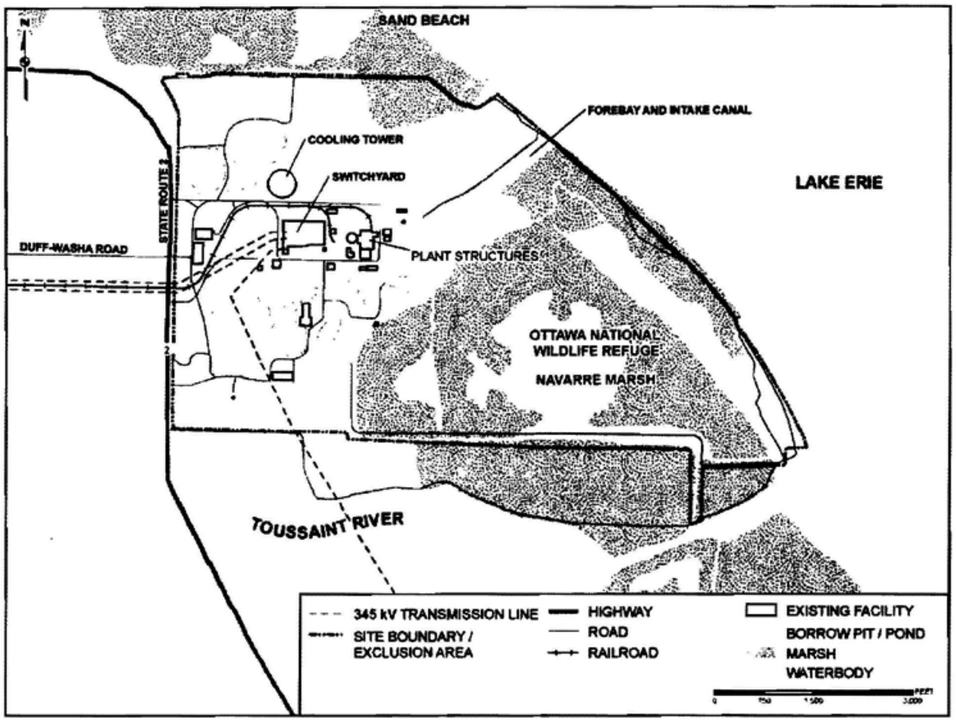
cc w/encls: Listserv


50-MILE (80 KM) RADIUS
Lake Erie
Detroit
Windsor
Toledo
Ann Arbor
Sandusky
Ontario, Canada
Ohio, United States
Michigan
Ohio
DAVIS-BESSE
345 kV TRANSMISSION LINE
LIMITED ACCESS HIGHWAY
HIGHWAY
MAJOR ROAD
RAILROAD
COUNTY BOUNDARY
STATE BOUNDARY
NATIONAL BOUNDARY
WATERBODY
URBAN AREA
STATE OR NATIONAL PARK
LOCAL PARK
NATIONAL WILDLIFE REFUGE (NWR)
MILITARY RESERVATION
MILES

ENCLOSURE 1


6-MILE (10 KM) RADIUS
LUCAS COUNTY
OTTAWA COUNTY
LAKE ERIE
OTTAWA NWR
CRANE CREEK STATE PARK (FORMER)
MAGEE MARSH WILDLIFE AREA
LONG BEACH
SAND BEACH
DAVIS-BESSE
OTTAWA NATIONAL WILDLIFE REFUGE -- NAVARRE MARSH
TOUSSAINT RIVER
LOCUST POINT
TOUSSAINT WILDLIFE AREA
LAKE ERIE BUSINESS PARK
CAMP PERRY MILITARY RESERVATION
OTTAWA NWR
ADAMS STREET PARK
ARMORY PARK
ROCKY RIDGE
OAK HARBOR
PORTAGE RIVER
LITTLE PORTAGE RIVER WILDLIFE AREA
PORT CLINTON
DAVIS-BESSE
345 kV TRANSMISSION LINE (ROW)
HIGHWAY
MAJOR ROAD
COUNTY BOUNDARY
RAILROAD (ROW)
SITE BOUNDARY / EXCLUSION AREA
POPULATED AREA
WATERBODY
MARSH
STATE PARK
NATIONAL WILDLIFE REFUGE (NWR)
MILITARY RESERVATION
MILES

ENCLOSURE 2


SAND BEACH
N
FOREBAY AND INTAKE CANAL
COOLING TOWER
SWITCHYARD
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PLANT STRUCTURES
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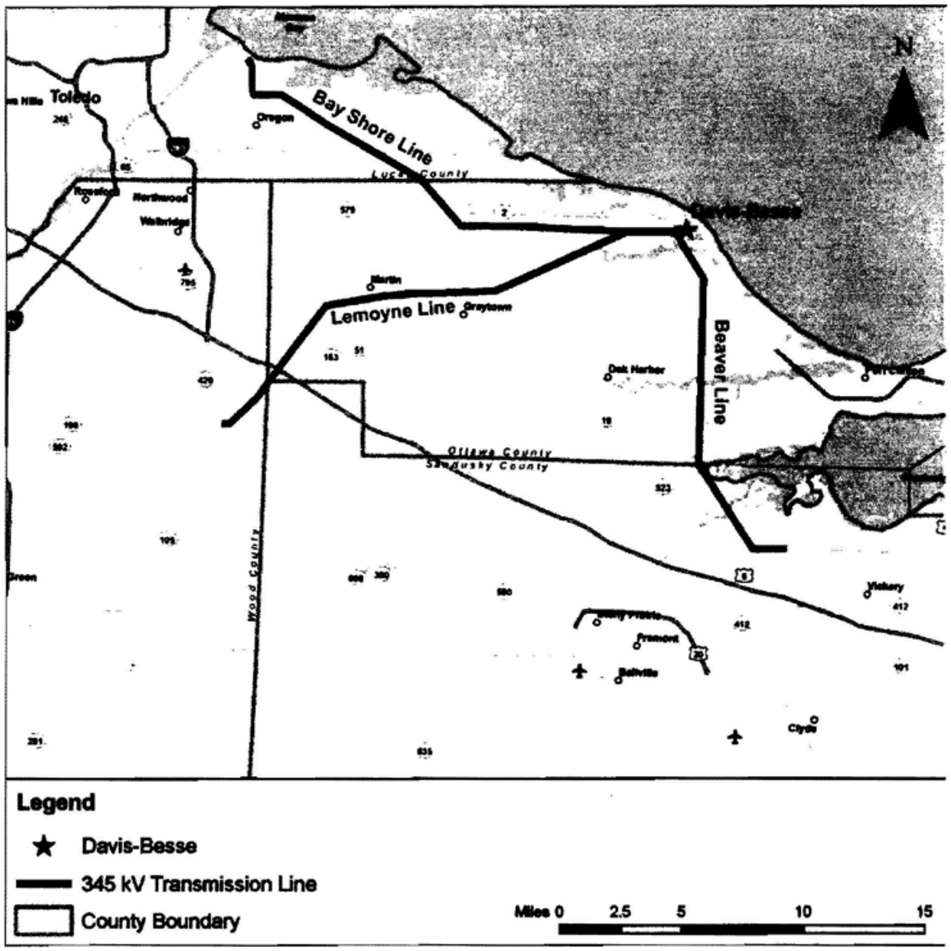
ENCLOSURE 3



N
Toledo
Oregon
Bay Shore Line
Lucas County
Northwood
Walbridge
Davis-Besse
Martin
Lemoyne Line
Graytown
Oak Harbor
Beaver Line
Ottawa County
Sandusky County
Wood County
Fremont
Bellville
Clyde
Legend
Davis-Besse
345 kV Transmission Line
County Boundary
Miles 0 2.5 5 10 15

ENCLOSURE 4

Federally Listed Species Near the Davis-Besse Site and Transmission Line ROWs

Scientific Name	Common Name	Federal Status[a]	State Status[b]	County(ies) of Occurrence[c]			
				Ottawa	Lucas	Sandusky	Wood
Amphibians							
NONE							
Birds							
Charadrius melodus	piping plover	E	E	x	x	x	
Dendroica kirtlandii	Kirtland's warbler	E	E	x	x	x	
Fish							
NONE							
Insects							
Lycaeides melissa samuelis	karner blue butterfly	E	E		x		
Freshwater Mussels							
Epioblasma torulosa rangiana	northern riffleshell	E	E	x			
Villosa fabalis	rayed bean	PE	E				
Mammals							
Myotis sodalis	indiana bat	E	E	x	x	x	x
Plants							
Platanthera leucophaea	eastern prairie fringed orchid	T	T	x	x	x	
Tetraneuris herbacea	lakeside daisy	T	E	x			
Reptiles							
Nerodia sipedon insularum	Lake Erie water snake	T	E	x			
Sistrurus catenatus	eastern massasauga	C	E	x	x	x	

(a) C= Candidate; DL = Delisted; E = Federally endangered; PE = proposed endangered; T = Federally threatened; - = No listing

(b) E = Endangered; T = Threatened; SC = Species of Concern

(c) The Davis-Besse site is located in Ottawa County, Ohio. The transmission lines associated with the Davis-Besse site traverse Ottawa County, as well as Lucas, Sandusky, and Wood Counties.

ENCLOSURE 5

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 6, 2010

Ms. Patricia Kurkul, Regional Administrator
NOAA Fisheries Service
Northeast Regional Office
55 Great Republic Drive
Gloucester, MA 01930-2276

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE DAVIS-BESSE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Ms. Kurkul:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the operating license for Davis-Besse Nuclear Power Station (DBNPS). DBNPS is located 25 miles east of Toledo, OH. The application for renewal was submitted by FENOC in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the staffs review of any nuclear power plant license renewal application, a site-specific Supplemental Environmental Impact Statement (SEIS) to its "Generic Environmental Impact Statement for License Renewal of Nuclear Plants" NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969, as amended. The SEIS includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

FENOC stated that it has no plans to alter current operations over the license renewal period. DBNPS, operating under a renewed license, would use existing plant facilities and transmission lines, and would not require additional construction or disturbance of new areas. According to FENOC, any maintenance activities would be limited to previously disturbed areas. The DBNPS site consists of 954 acres, of which approximately 733 acres are marshland currently leased to the U.S. Government as a national wildlife refuge.

As part of the SEIS preparation, the applicable transmission line corridors will be reviewed. The DBNPS 345 kilovolt (kV) switchyard is adjacent to the plant centrally located on the property. From here, three 345 kV transmission lines connect DBNPS to the power grid. The transmission lines labeled Bay Shore Line, Lemoyne Line, and Beaver Line are shown on the attached enclosure. Please see the map in Enclosure 4 for further detail.

The NRC staff is aware of your letter dated January 15, 2010, to Clifford I. Custer of Davis-Besse Nuclear Power Station, indicating "No species listed by NMFS are known to occur on Lake Erie," as well as, "No essential fish habitat (EFH) as designated by the Magnuson-Steven Fisheries Management and Conservation Act occurs in the vicinity of the facility."

P. Kurkul - 2 -

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests confirmation that further coordination is not necessary. If new information has been found and further coordination is necessary the NRC requests a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of DBNPS and its associated transmission line rights-of-way. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is August 2011.

The DBNPS license renewal application is available at:

http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html.

If you have any questions concerning the staffs review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at (301) 415-2323 or by e-mail at paula.cooper@nrc.gov.

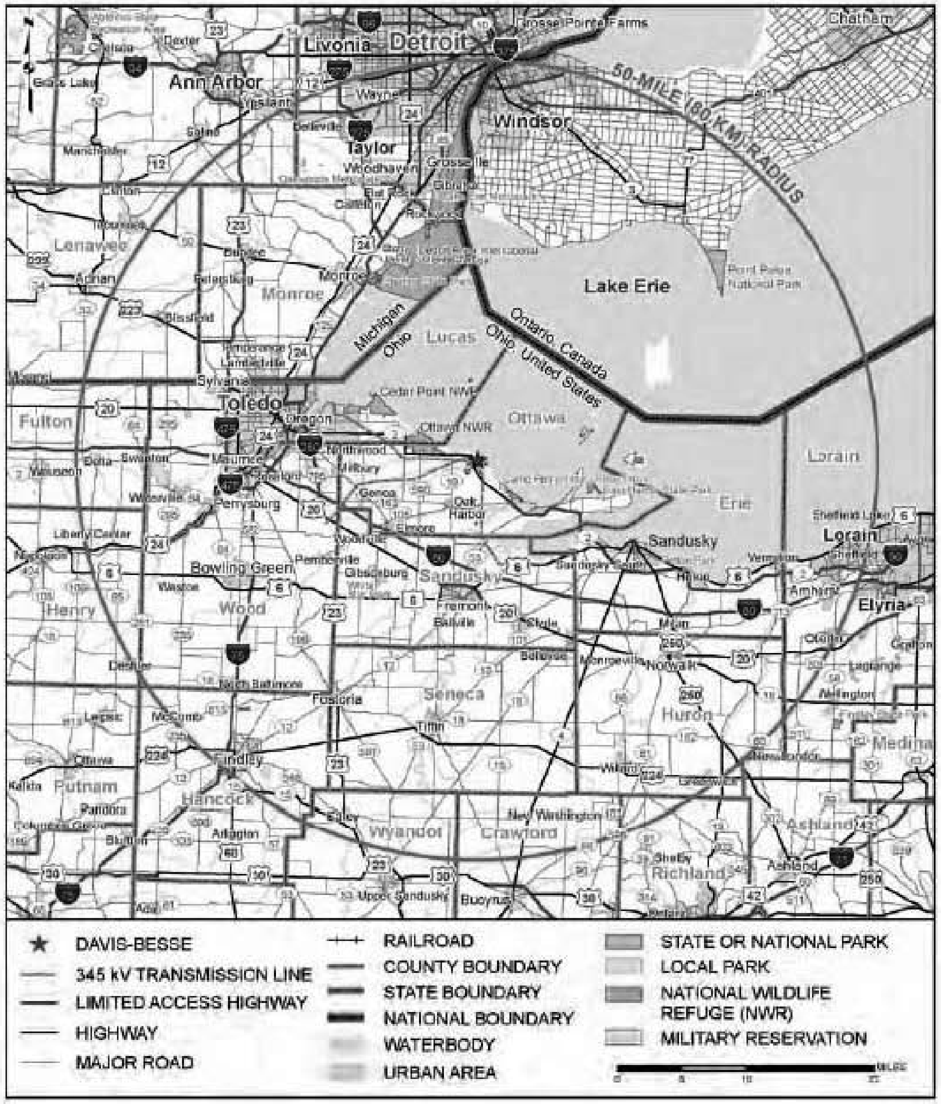
Sincerely,

David J. Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv


Livonia
Detroit
Grosse Pointe Farms
Chatham
Ann Arbor
Windsor
50-MILE (80 KM) RADIUS
Taylor
Lake Erie
Monroe
Lucas
Michigan
Ohio
Ontario, Canada
Ohio, United States
Toledo
Fulton
Ottawa
Lorain
Erie
Sandusky
Bowling Green
Henry
Wood
Seneca
Huron
Medina
Fostoria
Tiffin
Findlay
Putnam
Hancock
Wyandot
Crawford
Ashland
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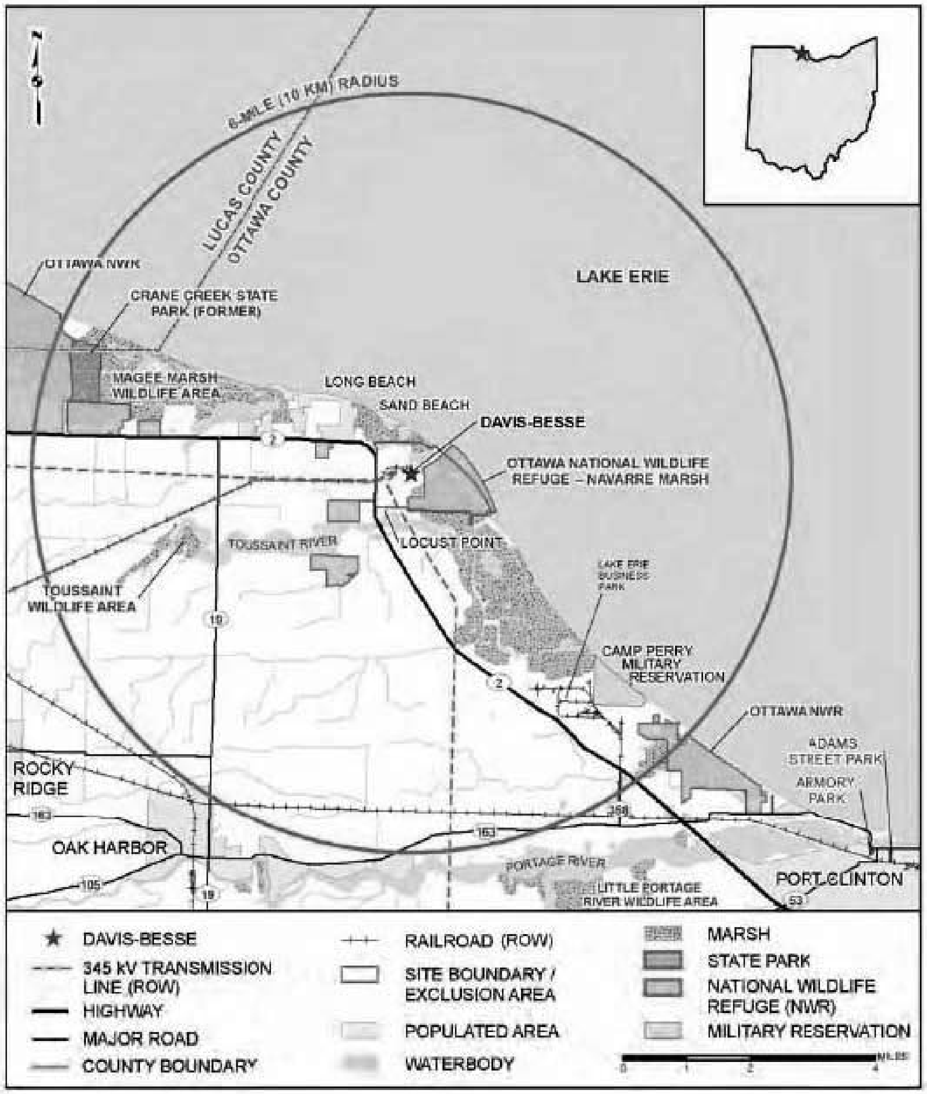
ENCLOSURE 1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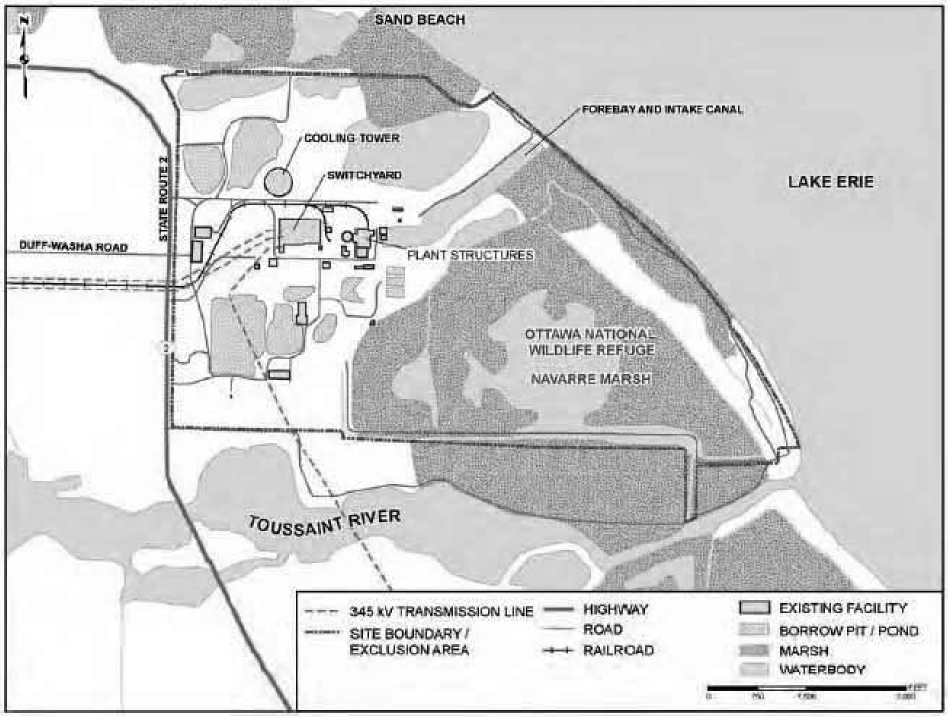
ENCLOSURE 2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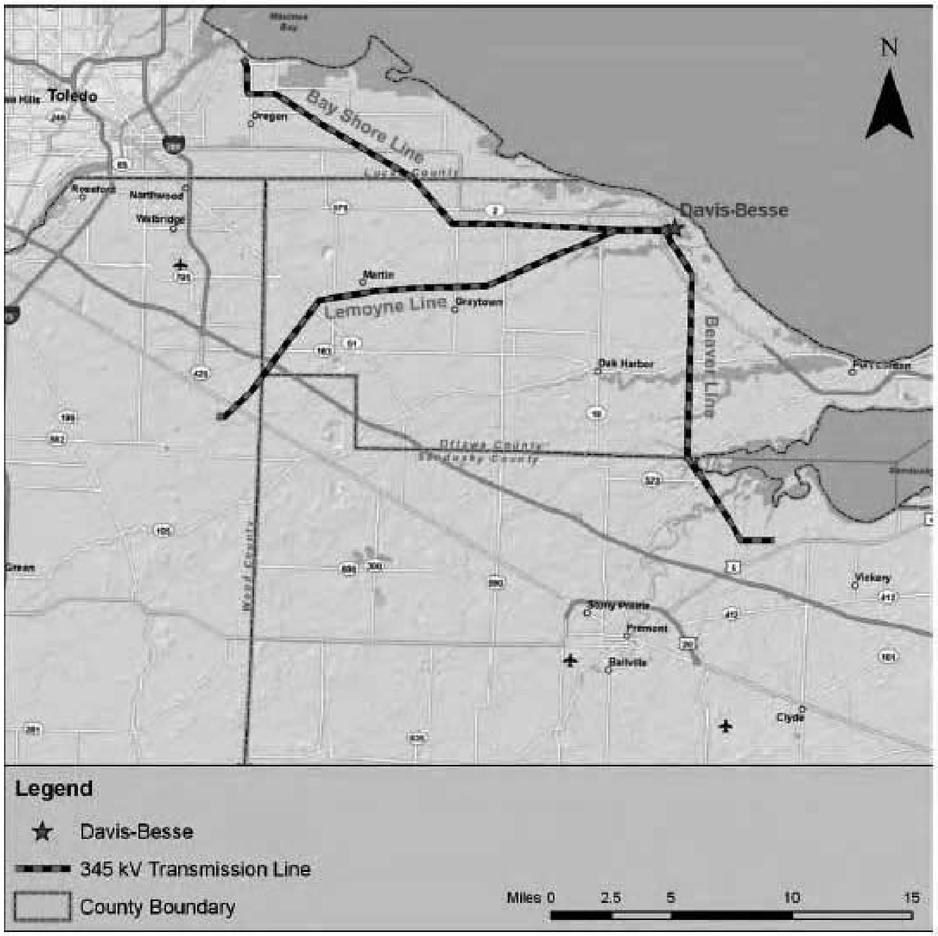
ENCLOSURE 3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County Boundary
Miles 0 2.5 5 10 15

ENCLOSURE 4

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 22, 2010

Mr. David Graham, Chief
Division of Wildlife
Ohio Department of Natural Resources
2045 Morse Rd., Bldg G-3
Columbus, OH 43229-6693

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE DAVIS-BESSE NUCLEAR POWER STATION LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Graham:

The U.S. Nuclear Regulatory Commission (NRC or the staff) is reviewing an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the operating license for Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS). DBNPS is located 25 miles east of Toledo, OH. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC has established that, as part of the staff's review of any nuclear power plant license renewal application, a site-specific Supplemental Environmental Impact Statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environmental Policy Act of 1969, as amended. The SEIS includes an analysis of pertinent environmental issues, including endangered or threatened species and impacts to fish and wildlife. This letter is being submitted under the provisions of the Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act of 1934, as amended.

FENOC stated that it has no plans to alter current operations over the license renewal period. DBNPS, operating under a renewed license, would use existing plant facilities and transmission lines, and would not require additional construction or disturbance of new areas. According to FENOC, any maintenance activities would be limited to previously disturbed areas. The DBNPS site consists of 954 acres, of which approximately 733 acres are marshland currently leased to the U.S. Government as a national wildlife refuge.

As part of the SEIS preparation, the applicable transmission line corridors will be reviewed. The DBNPS 345 kilovolt (kV) switchyard is adjacent to the plant centrally located on the property. From here, three 345 kV transmission lines connect DBNPS to the power grid. The transmission lines labeled Bay Shore Line, Lemoyne Line, and Beaver Line are shown on the attached enclosure. Please see the map in Enclosure 4 for further detail.

To support the SEIS preparation process and to ensure compliance with Section 7 of the Endangered Species Act, the NRC requests a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of DBNPS and its associated transmission line rights-of-way. In addition, please provide any information you consider appropriate under the provisions of the Fish and Wildlife Coordination Act.

D. Graham - 2 -

Your office will receive a copy of the draft EIS along with a request for comments. The anticipated publication date for the draft EIS is August 2011.

The DBNPS license renewal application is available at: http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html.

If you have any questions concerning the staff's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

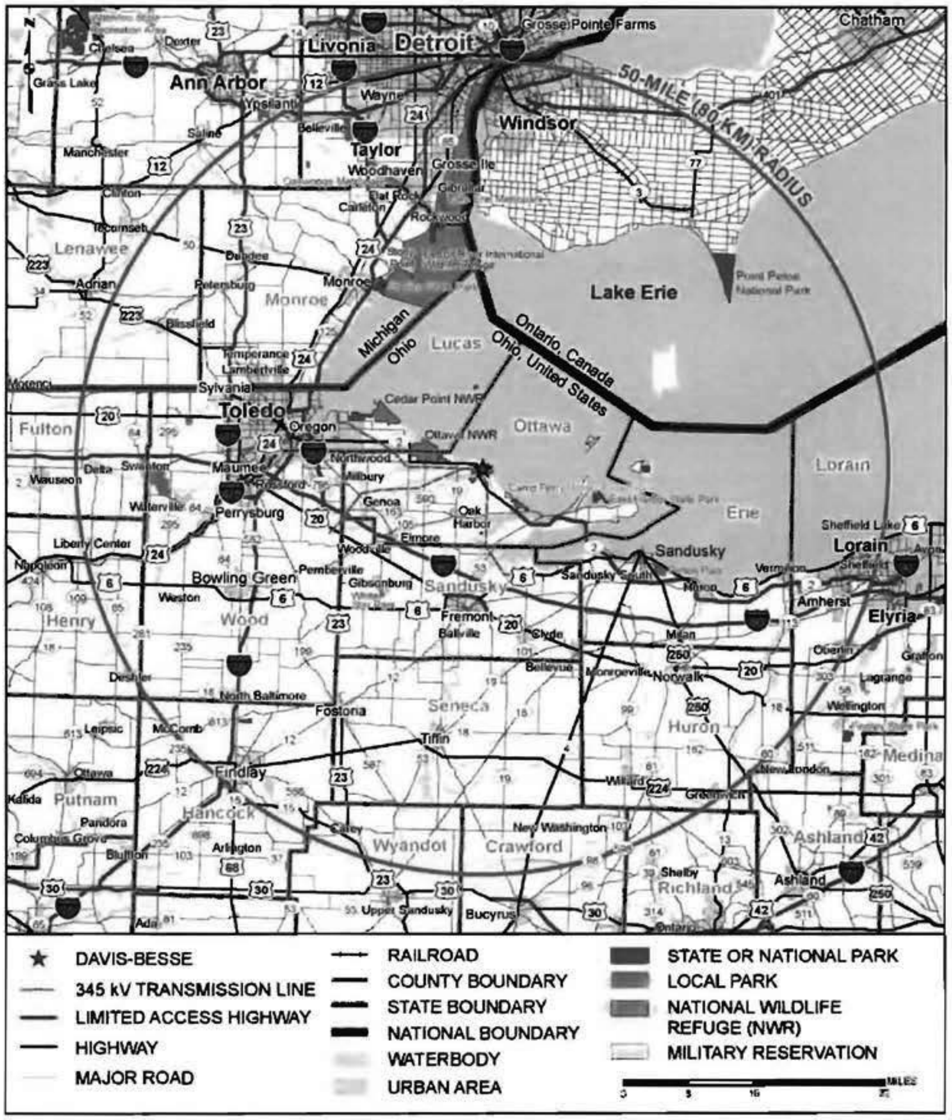
Sincerely,

David J. Wrona
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv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Michigan
Ohio
Detroit
Windsor
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Ann Arbor
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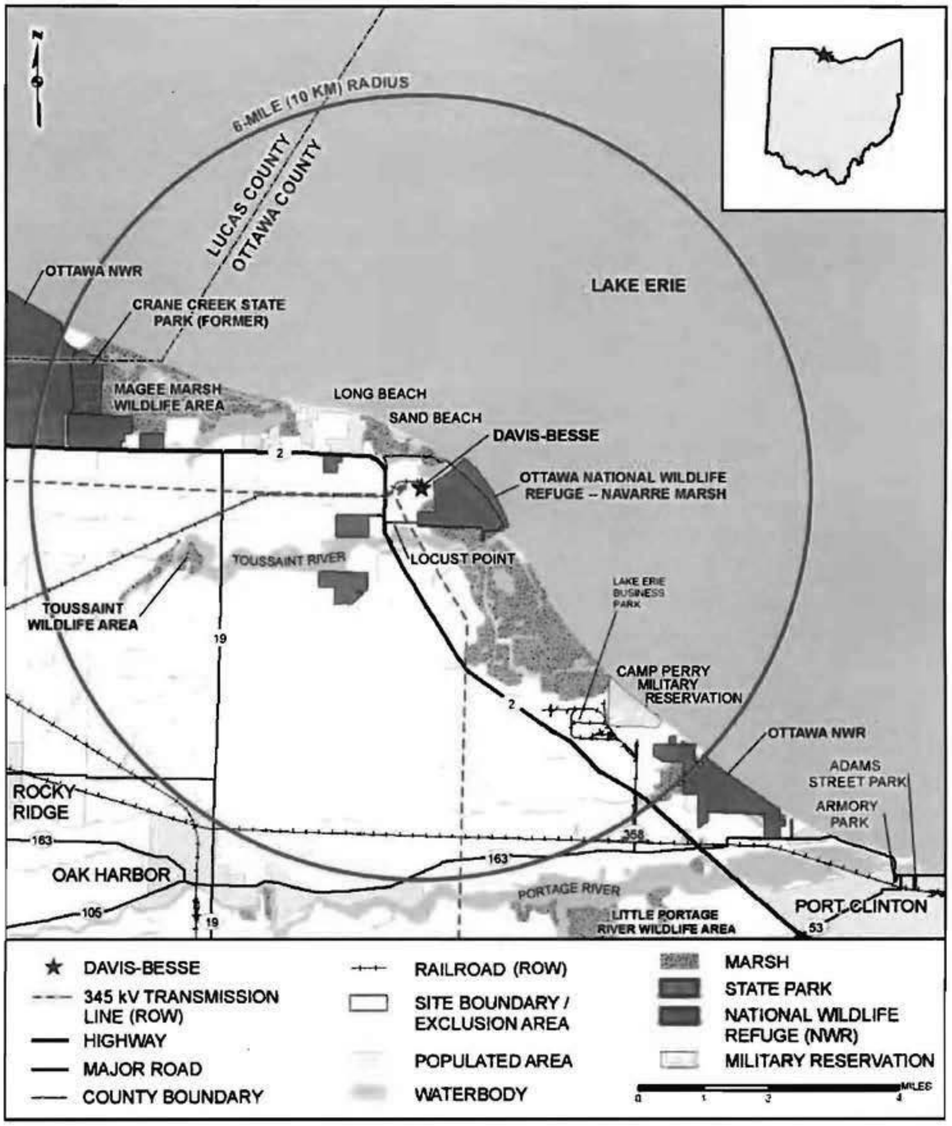
ENCLOSURE 1


6-MILE (10 KM) RADIUS
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ARMORY PARK
ROCKY RIDGE
OAK HARBOR
PORTAGE RIVER
LITTLE PORTAGE RIVER WILDLIFE AREA
PORT CLINTON
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105
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DAVIS-BESSE
345 kV TRANSMISSION LINE (ROW)
HIGHWAY
MAJOR ROAD
COUNTY BOUNDARY
RAILROAD (ROW)
SITE BOUNDARY / EXCLUSION AREA
POPULATED AREA
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NATIONAL WILDLIFE REFUGE (NWR)
MILITARY RESERVATION
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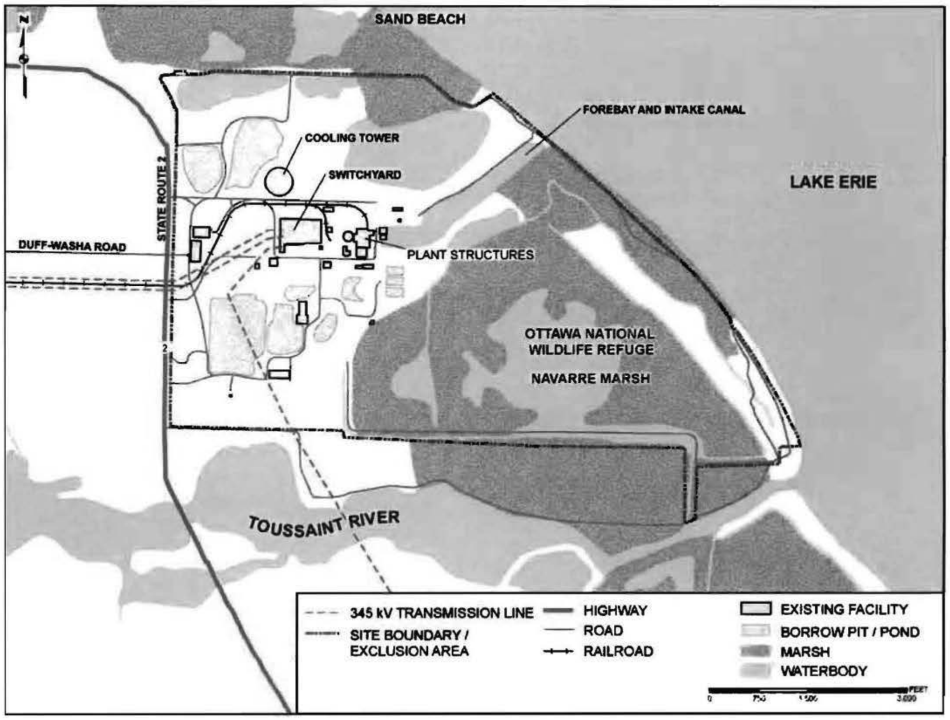
ENCLOSURE 2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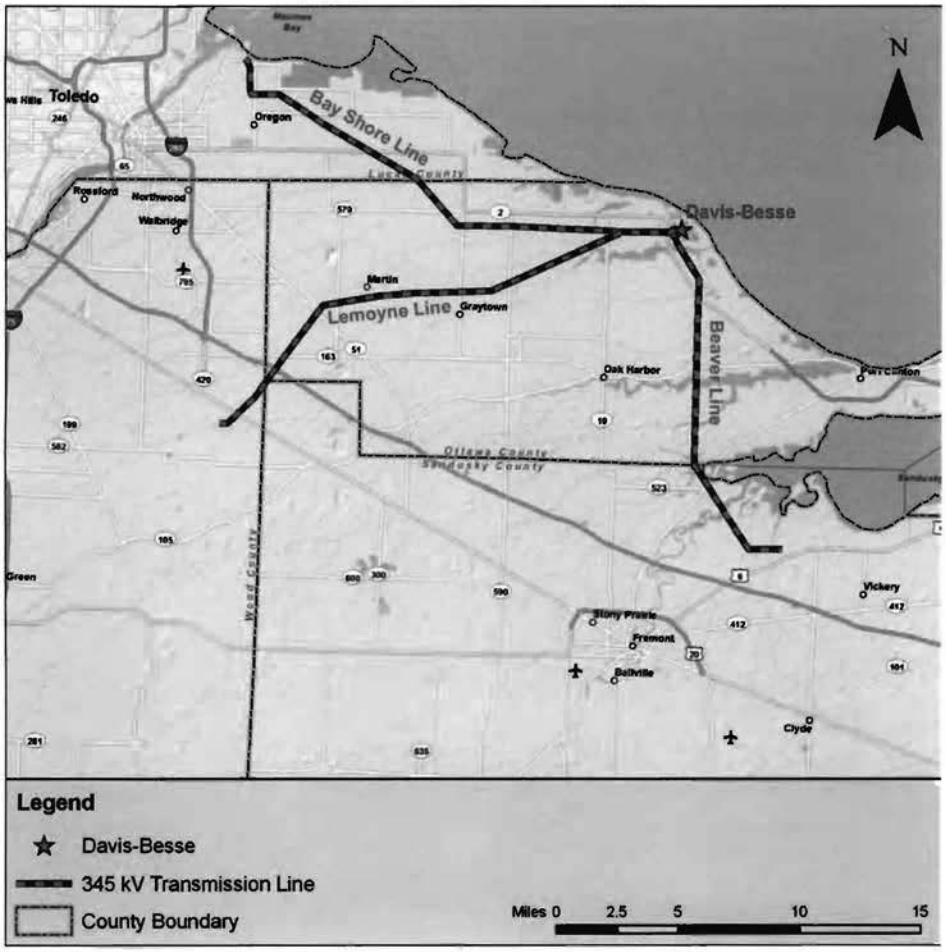
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ENCLOSURE 4

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Brian Mitch, Environmental Review Manager
Ohio Department of Natural Resources
Division of Engineering
Environmental Services Section
2045 Morse Rd., Building F-3
Columbus, OH 43229-6693

SUBJECT: REQUEST FOR LIST OF PROTECTED SPECIES WITHIN THE AREA UNDER EVALUATION FOR THE DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Mitch:

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B. Mitch - 2 -

Your office will receive a copy of the draft SEIS along with a request for comments. The anticipated publication date for the draft SEIS is August 2011.

The DBNPS license renewal application is available at: http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html. If you have any questions concerning the staff's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or Paula.Cooper@nrc.gov.

Sincerely,

David J. Wrona
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

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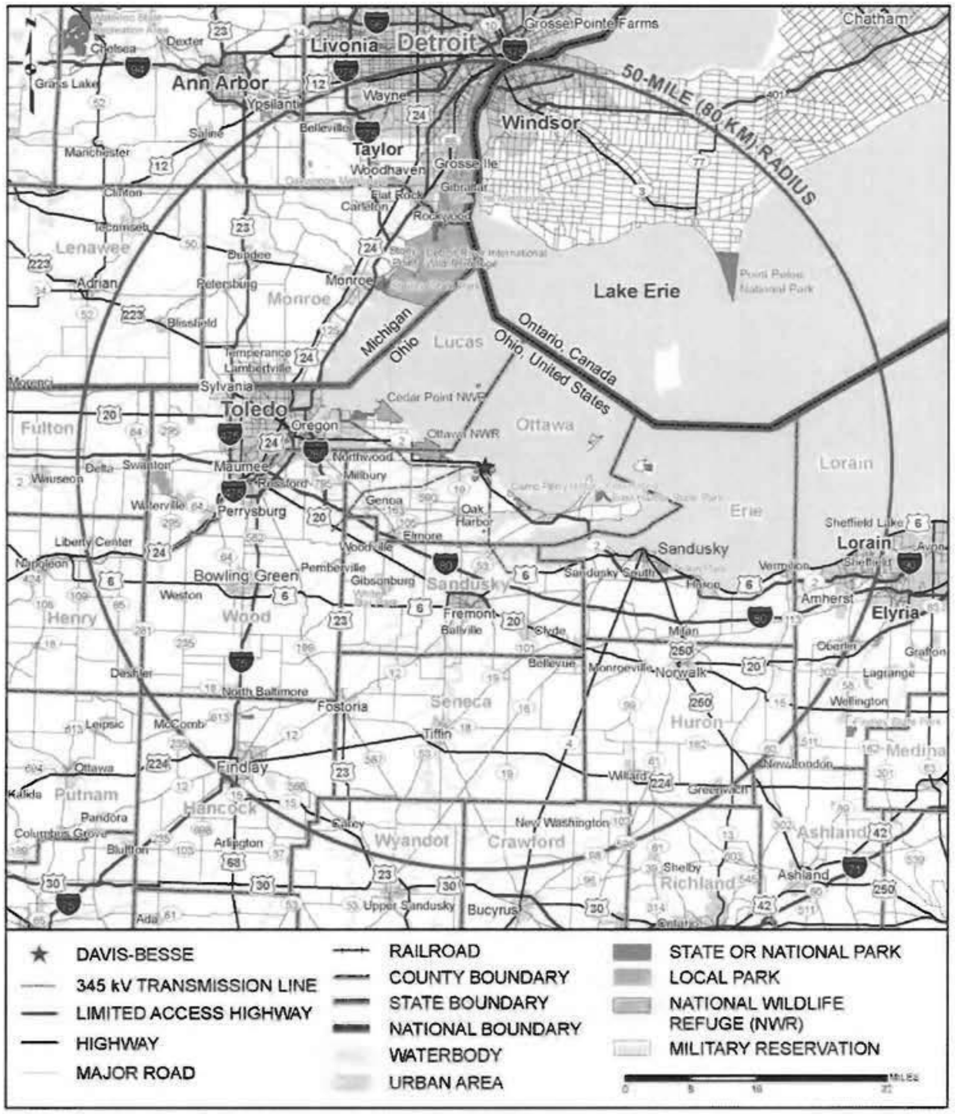
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv


50-MILE (80 KM) RADIUS
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Elyria
Bowling Green
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Fremont
Monroe
Ontario, Canada
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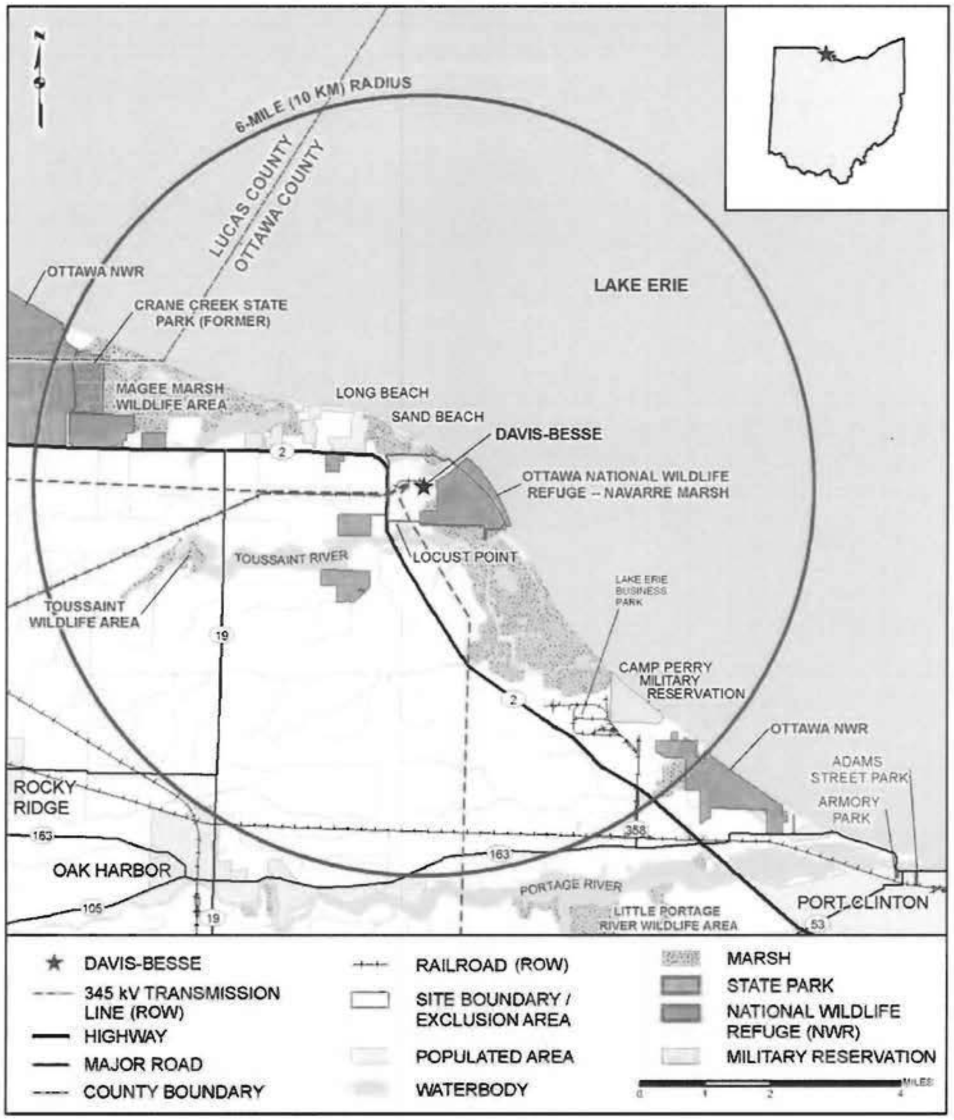

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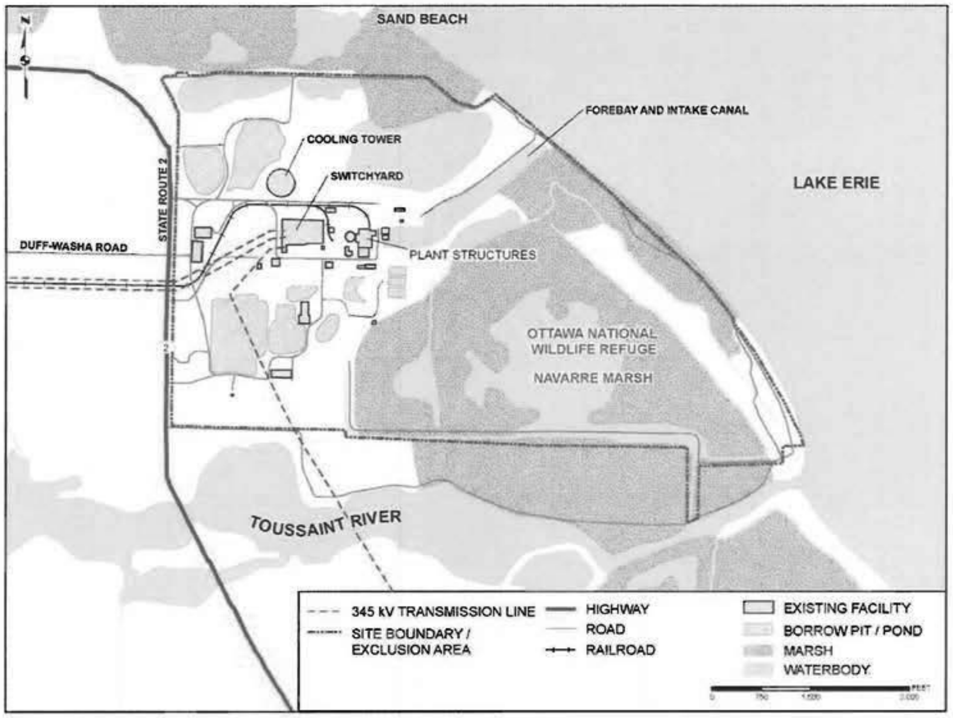
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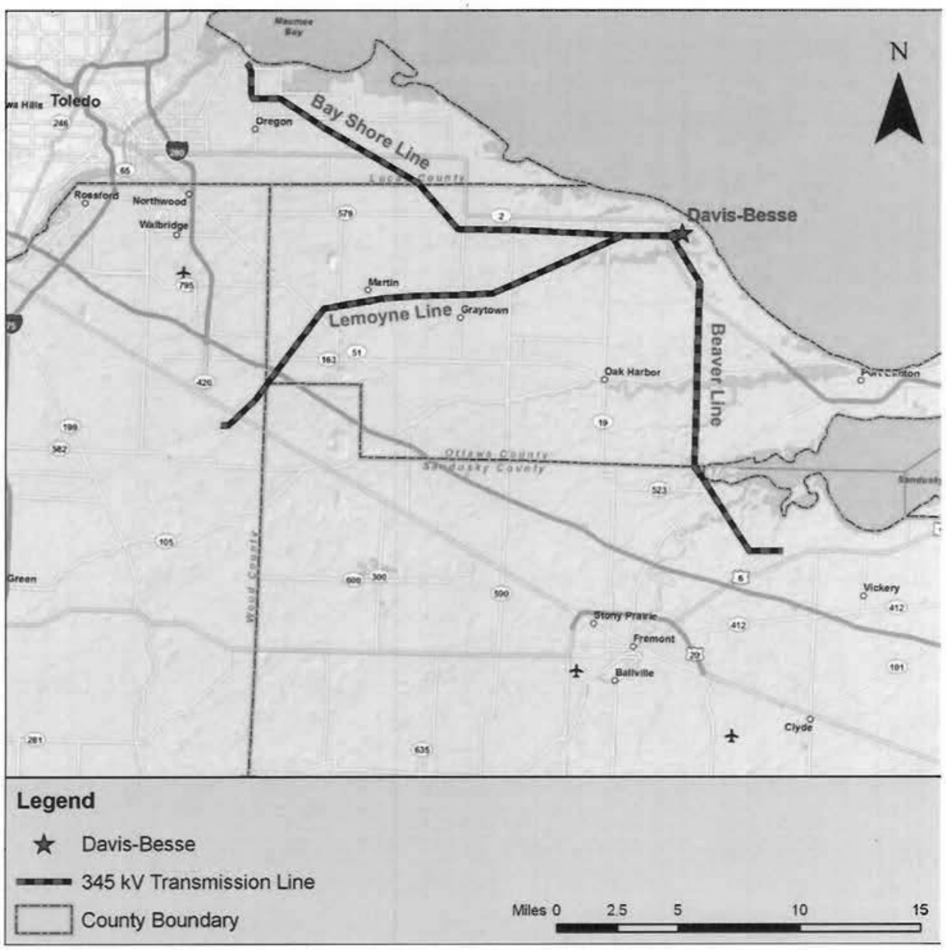
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County Boundary
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ENCLOSURE 4

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
NORTHEAST REGION
55 Great Republic Drive
Gloucester, MA 01930-2276

DEC 21 2010

David J. Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Re: Davis-Besse Nuclear Power Station

Dear Mr. Wrona,

This is in response to your letter dated December 6, 2010 requesting information on the presence of listed species in the vicinity of the Davis-Besse Nuclear Power Station, located 25 miles east of Toledo, Ohio.

No species listed under the jurisdiction of NOAA's National Marine Fisheries Service (NMFS) are known to occur in the vicinity of your proposed project. As such, NMFS Protected Resources Division does not intend to offer additional comments on this proposal. Should project plans change or new information become available that changes the basis for this determination, further coordination should be pursued. If you have any questions regarding these comments, please contact Danielle Palmer at (978) 282-8468.

Sincerely,

Mary A. Colligan
Assistant Regional Administrator
for Protected Resources

File Code: Sec 7 – No Species Present 2010

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Edgar L. French
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. French:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8©, will include analyses of potential impacts to historic and cultural resources.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years, and the license may be renewed for up to 20 years. The current operating license for DBNPS will expire in April 2017. FENOC has no plans to change current operations during the license renewal period. DBNPS would use existing plant facilities and transmission lines and would not construct or disturb undeveloped portions of the site. According to FENOC, any maintenance activities would be limited to previously disturbed areas of the plant site. Please see the enclosed maps and pictures, which show the area under review.

The NRC is also requesting comments on its environmental review from the following contacts, who will receive a copy of this letter: Delaware Nation, Forest County Potawatomi Community, Hannahville Indian Community, Miami Tribe of Oklahoma, Shawnee Tribe, Wyandotte Nation, Peoria Tribe of Indians of Oklahoma and Ottawa Tribe of Oklahoma. Please submit any comments and questions that you may have on the environmental review by December 27, 2010. Written comments should be submitted by mail to:

E. French - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Electronic comments may be submitted to the NRC by e-mail at Paula.Cooper@nrc.gov.

The Davis Besse Nuclear Power Station license renewal application is available at:
http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html.

In addition, the Ida Rupp Public Library, 310 Madison Street, Port Clinton, Ohio 43452 and the Toledo-Lucas County Public Library, 325 North Michigan Street, Toledo, Ohio 43604, has agreed to make the application available for public inspection. Public comments and supporting materials related to this notice can be found at the Federal rulemaking website, http://www.regulations.gov, by searching on Docket ID NRC-2010-0298.

The GEIS, which assesses the scope and impact of environmental effects that would be associated with renewal of any nuclear power plant site, can be found on the NRC's website at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/.

The NRC expects to publish the draft SEIS in August 2011. A copy of the document will be sent to you for your review and comment. After consideration of public comments received, the NRC will prepare a final SEIS, which is scheduled to be issued in April 2012. If you have any questions concerning the NRC's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Harold G. Frank
Forest County Potawatomi Community
Community of Wisconsin
P.O. Box 340
Crandon, WI 54520

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. French:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8©, will include analyses of potential impacts to historic and cultural resources.

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H. Frank - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
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2. Area Map, 6-mile radius
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cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Kenneth Meshiguad
Hannahville Indian Community Council
N14911 Hannahville B1 Road
Wilson, MI 49896

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Meshiguad:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8©, will include analyses of potential impacts to historic and cultural resources.

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K. Meshiguad - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Electronic comments may be submitted to the NRC by e-mail at Paula.Cooper@nrc.gov.

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Floyd E. Leonard
Miami Tribe of Oklahoma
P.O. Box 1326
Miami, OK 74355

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Leonard:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8©, will include analyses of potential impacts to historic and cultural resources.

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F. Leonard - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
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cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Ron Sparkman
Shawnee Tribe
P.O. Box 189
Miami, OK 74355

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Sparkman:

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R. Sparkman - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
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4. Transmission Line Map

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Leaford Bearskin
Wyandotte Nation
P.O. Box 250
Wyandotte, OK 74370

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Bearskin:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8©, will include analyses of potential impacts to historic and cultural resources.

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L. Bearskin - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

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2. Area Map, 6-mile radius
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4. Transmission Line Map

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. John P. Froman
Peoria Tribe of Indians of Oklahoma
P.O. Box 1527
Miami, OK 74355

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Froman:

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J. Froman - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-346

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3. Site Area Map
4. Transmission Line Map

cc w/encls: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 23, 2010

Mr. Charles Todd
Ottawa Tribe of Oklahoma
P.O. Box 110
811 Third Avenue NE
Miami, OK 74355

SUBJECT: REQUEST FOR SCOPING COMMENTS CONCERNING THE DAVIS-BESSE NUCLEAR POWER PLANT, UNIT NO. 1, LICENSE RENEWAL APPLICATION REVIEW

Dear Mr. Todd:

The U.S. Nuclear Regulatory Commission (NRC) is considering an application submitted by FirstEnergy Nuclear Operating Company (FENOC), for the renewal of the Davis-Besse Nuclear Power Station, Unit No. 1 (DBNPS) operating license. DBNPS is located 25 miles east of Toledo, Ohio. The application for renewal was submitted by FENOC, in a letter dated August 27, 2010, pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54). As part of the NRC's review, a site-specific supplemental environmental impact statement (SEIS) to its Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS), NUREG-1437, will be prepared under 10 CFR Part 51, the NRC's regulation that implements the National Environment Policy Act of 1969, as amended. The SEIS will include an analysis of environmental issues, and in accordance with 36 CFR 800.8(c), will include analyses of potential impacts to historic and cultural resources.

Under NRC regulations, the original operating license for a nuclear power plant is issued for up to 40 years, and the license may be renewed for up to 20 years. The current operating license for DBNPS will expire in April 2017. FENOC has no plans to change current operations during the license renewal period. DBNPS would use existing plant facilities and transmission lines and would not construct or disturb undeveloped portions of the site. According to FENOC, any maintenance activities would be limited to previously disturbed areas of the plant site. Please see the enclosed maps and pictures, which show the area under review.

The NRC is also requesting comments on its environmental review from the following contacts, who will receive a copy of this letter: Delaware Nation, Forest County Potawatomi Community, Hannahville Indian Community, Miami Tribe of Oklahoma, Shawnee Tribe, Wyandotte Nation, Peoria Tribe of Indians of Oklahoma and Ottawa Tribe of Oklahoma. Please submit any comments and questions that you may have on the environmental review by December 27, 2010. Written comments should be submitted by mail to:

C. Todd - 2 -

Chief, Rules, Announcements, and Directives Branch
Division of Administrative Services
Office of Administration
Mailstop TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Electronic comments may be submitted to the NRC by e-mail at Paula.Cooper@nrc.gov.

The Davis Besse Nuclear Power Station license renewal application is available at:
http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse.html.

In addition, the Ida Rupp Public Library, 310 Madison Street, Port Clinton, Ohio 43452 and the Toledo-Lucas County Public Library, 325 North Michigan Street, Toledo, Ohio 43604, has agreed to make the application available for public inspection. Public comments and supporting materials related to this notice can be found at the Federal rulemaking website, http://www.regulations.gov, by searching on Docket ID NRC-2010-0298.

The GEIS, which assesses the scope and impact of environmental effects that would be associated with renewal of any nuclear power plant site, can be found on the NRC's website at http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/.

The NRC expects to publish the draft SEIS in August 2011. A copy of the document will be sent to you for your review and comment. After consideration of public comments received, the NRC will prepare a final SEIS, which is scheduled to be issued in April 2012. If you have any questions concerning the NRC's review of this license renewal application, please contact Ms. Paula Cooper, Project Manager, at 301-415-2323 or by e-mail at Paula.Cooper@nrc.gov.

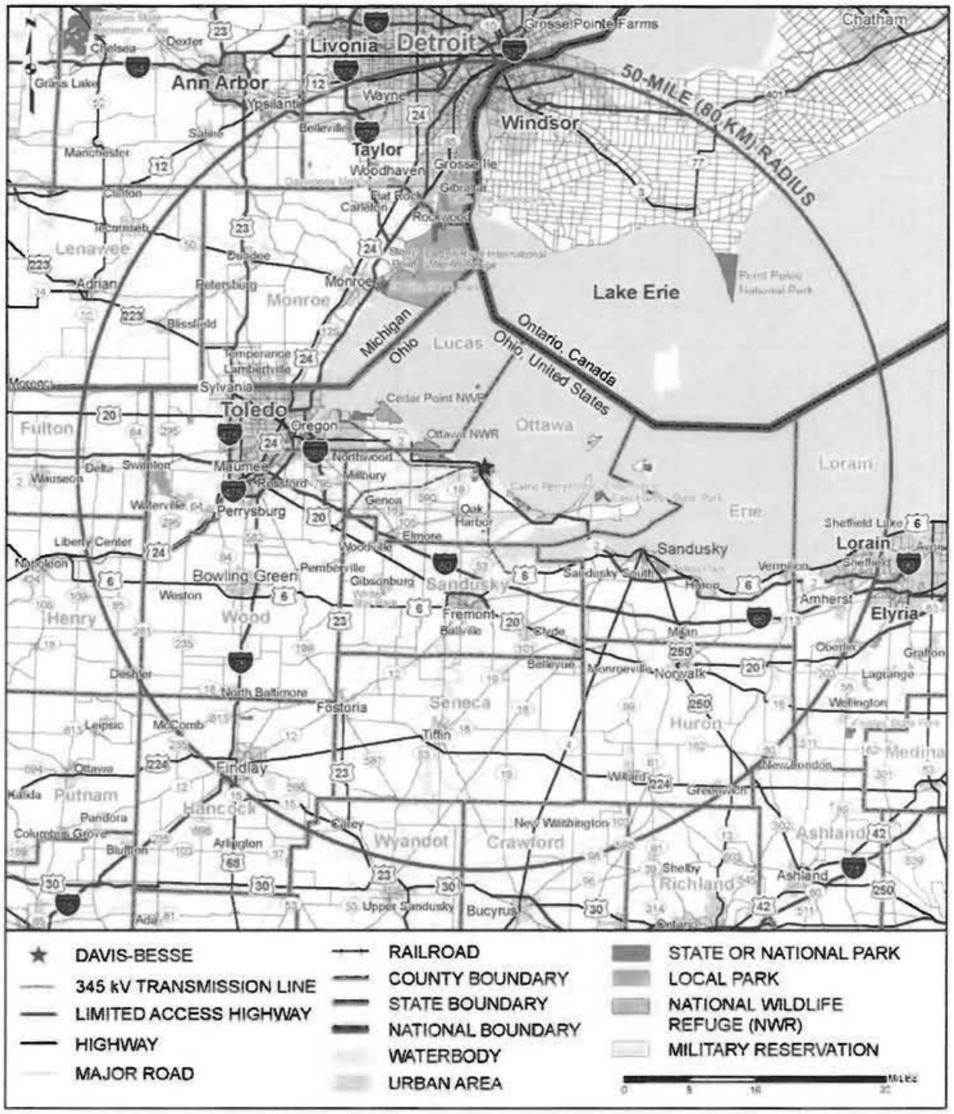
Sincerely,

David J Wrona, Chief
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

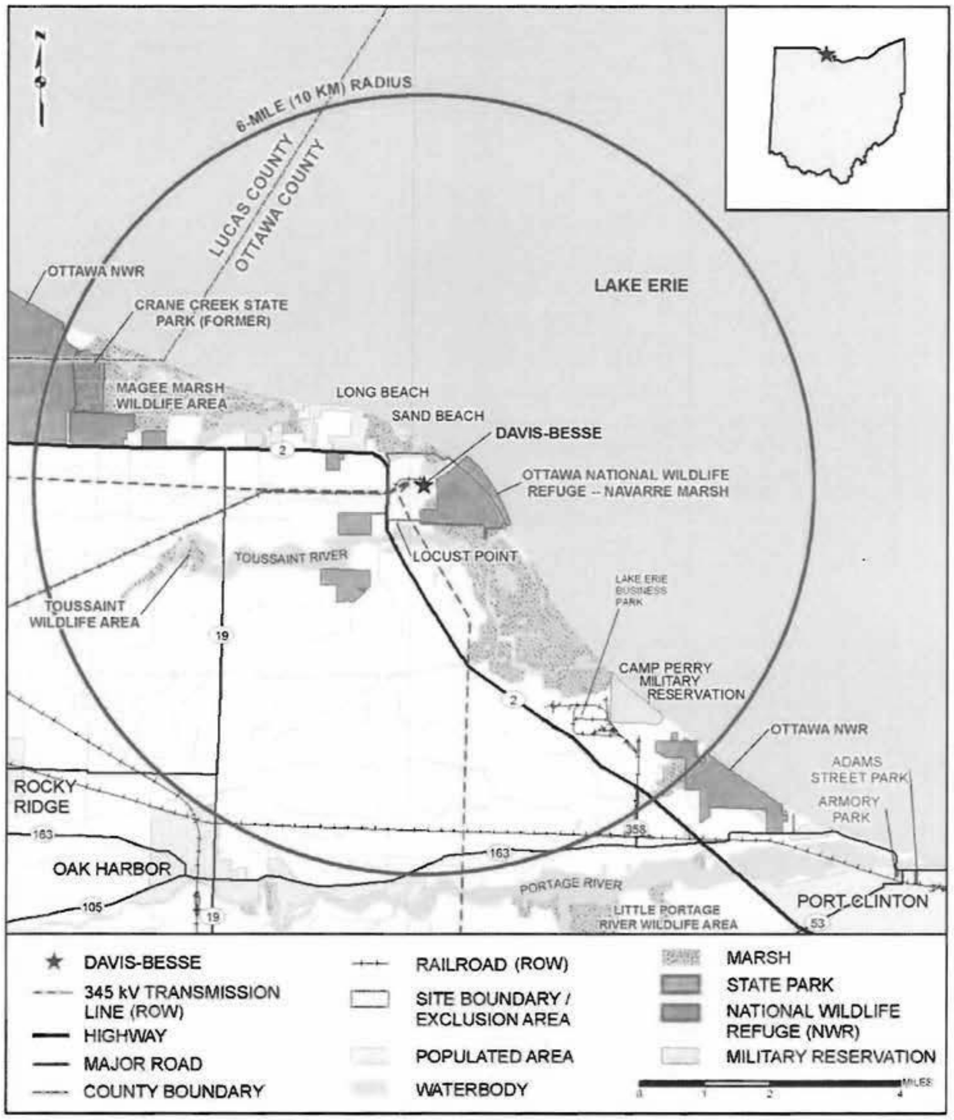
Docket No. 50-346

Enclosures:
1. Area Map, 50-mile radius
2. Area Map, 6-mile radius
3. Site Area Map
4. Transmission Line Map

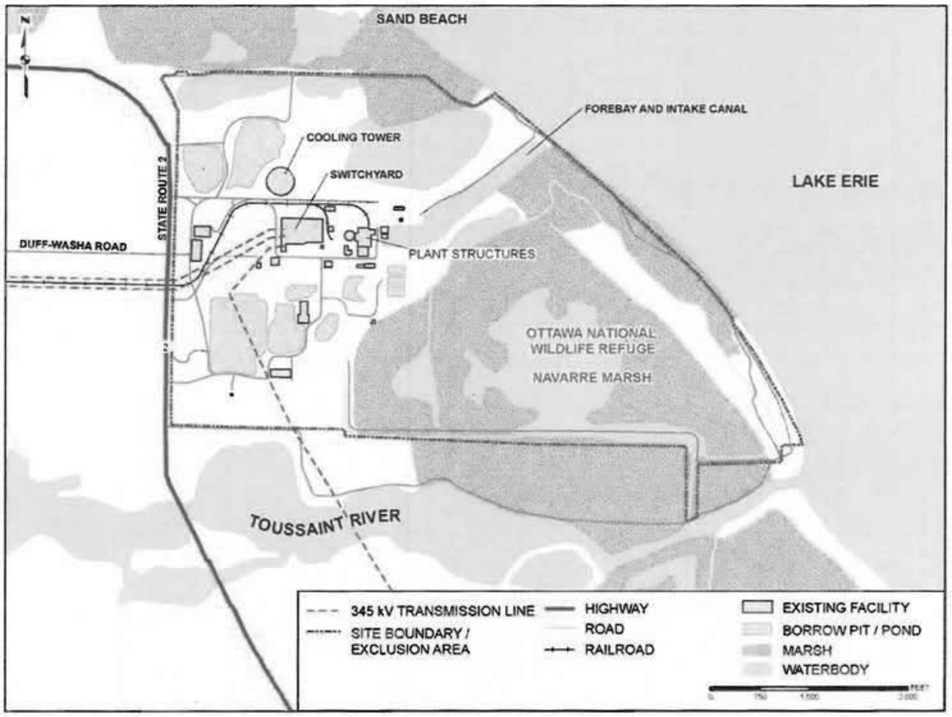
cc w/encls: Distribution via Listserv


50-MILE (80 KM) RADIUS
Lake Erie
Ontario, Canada
Ohio, United States
Michigan
Ohio
Toledo
Detroit
Windsor
Ann Arbor
Sandusky
Lorain
DAVIS-BESSE
345 kV TRANSMISSION LINE
LIMITED ACCESS HIGHWAY
HIGHWAY
MAJOR ROAD
RAILROAD
COUNTY BOUNDARY
STATE BOUNDARY
NATIONAL BOUNDARY
WATERBODY
URBAN AREA
STATE OR NATIONAL PARK
LOCAL PARK
NATIONAL WILDLIFE REFUGE (NWR)
MILITARY RESERVATION

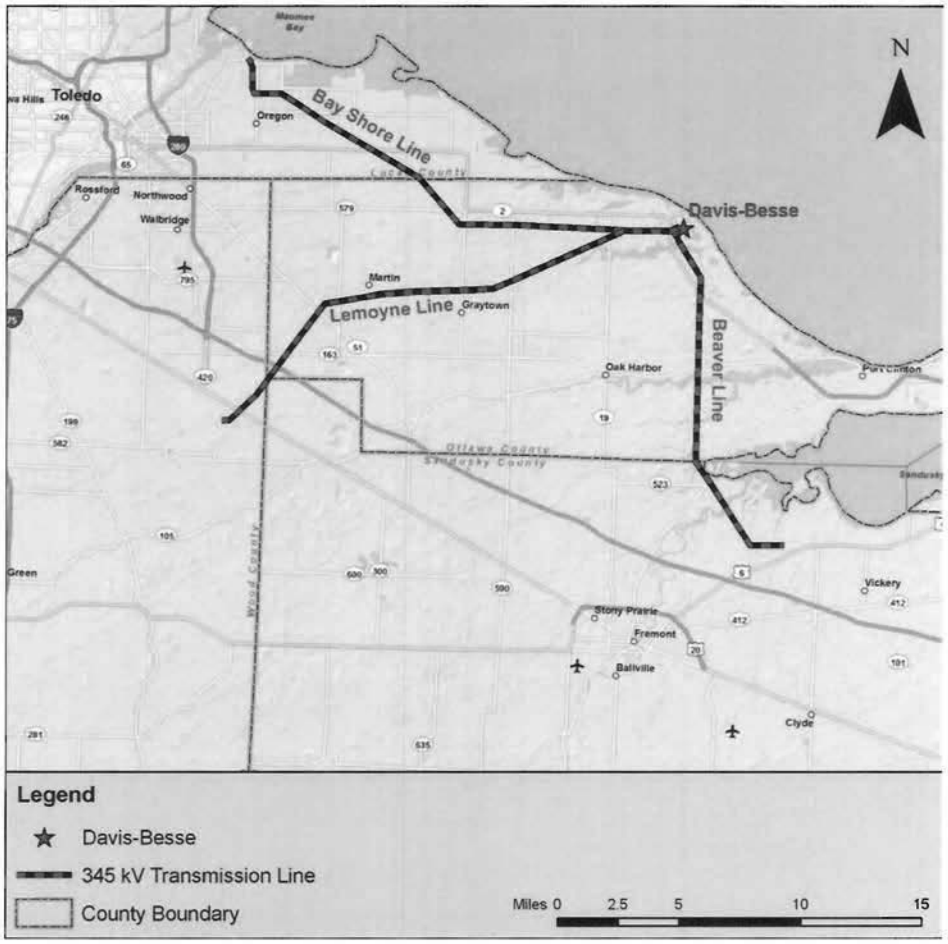
ENCLOSURE 1


6-MILE (10 KM) RADIUS
LUCAS COUNTY
OTTAWA COUNTY
LAKE ERIE
OTTAWA NWR
CRANE CREEK STATE PARK (FORMER)
MAGEE MARSH WILDLIFE AREA
LONG BEACH
SAND BEACH
DAVIS-BESSE
OTTAWA NATIONAL WILDLIFE REFUGE -- NAVARRE MARSH
LOCUST POINT
TOUSSAINT RIVER
TOUSSAINT WILDLIFE AREA
CAMP PERRY MILITARY RESERVATION
OTTAWA NWR
ADAMS STREET PARK
ARMORY PARK
ROCKY RIDGE
OAK HARBOR
PORTAGE RIVER
LITTLE PORTAGE RIVER WILDLIFE AREA
PORT CLINTON
DAVIS-BESSE
345 kV TRANSMISSION LINE (ROW)
HIGHWAY
MAJOR ROAD
COUNTY BOUNDARY
RAILROAD (ROW)
SITE BOUNDARY / EXCLUSION AREA
POPULATED AREA
WATERBODY
MARSH
STATE PARK
NATIONAL WILDLIFE REFUGE (NWR)
MILITARY RESERVATION

ENCLOSURE 2


SAND BEACH
FOREBAY AND INTAKE CANAL
COOLING TOWER
SWITCHYARD
LAKE ERIE
STATE ROUTE 2
DUFF-WASHA ROAD
PLANT STRUCTURES
OTTAWA NATIONAL
WILDLIFE REFUGE
NAVARRE MARSH
TOUSSAINT RIVER
345 kV TRANSMISSION LINE
SITE BOUNDARY /
EXCLUSION AREA
HIGHWAY
ROAD
RAILROAD
EXISTING FACILITY
BORROW PIT / POND
MARSH
WATERBODY

ENCLOSURE 3


N
Toledo
Oregon
Bay Shore Line
Rossford
Northwood
Walbridge
Davis-Besse
Martin
Lemoyne Line
Graytown
Beaver Line
Oak Harbor
Stony Prairie
Fremont
Ballville
Clyde
Vickery
Green
Legend
Davis-Besse
345 kV Transmission Line
County Boundary
Miles 0 2.5 5 10 15

ENCLOSURE 4

APPENDIX E
CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

E CHRONOLOGY OF ENVIRONMENTAL REVIEW CORRESPONDENCE

This appendix contains a chronological listing of correspondence between the U.S. Nuclear Regulatory Commission (NRC) and external parties as part of its environmental review for Davis-Besse Nuclear Power Station, Unit 1. All documents, with the exception of those containing proprietary information are available electronically from the NRC's Public Electronic Reading Room found on the Internet at the following Web address: http://www.nrc.gov/reading-rm.html. From this site, the public can gain access to the NRC's Agencywide Documents Access and Management Systems (ADAMS), which provides text and image files of NRC's public documents. The ADAMS accession number for each document is included below.

August 27, 2010	Letter from Barry S. Allen, "Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, License Renewal Application and Ohio Coastal Management Program Consistency Certification" (ADAMS Accession No. ML1024505650)
September 14, 2010	Letter to Deborah Rossman, Director, Ida Rupp Public Library "Maintenance of Reference Materials at the Ida Rupp Public Library in Regards to the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (ADAMS Accession No. ML1024503420)
September 14, 2010	Letter to Mr. Clyde Scoles, Director, Toledo-Lucas County Public Library, "Maintenance of Reference Materials at the Toledo-Lucas County Public Library in Regards to the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (ADAMS Accession No. ML1024507070)
September 17, 2010	Letter to Barry S. Allen, Receipt and Availability of the License Renewal Application for the Davis-Besse Nuclear Power Station, Unit 1 (ADAMS Accession No. ML1023003250)
September 20, 2010	Press Release: NRC Announces Availability of License Renewal Application for Davis-Besse Nuclear Plant (ADAMS Accession No. ML102630380)
September 24, 2010	E-mail from Megan Seymore, Wildlife Biologist, U.S. Fish and Wildlife Service, to Richard Bulavinetz, NRC, titled Davis-Besse Transmission line corridor (ADAMS Accession No. 103630080)

October 12, 2010	Memorandum to David Wrona, NRC, from Andy Imboden, NRC, Acceptance of License Renewal Application, Davis-Besse Nuclear Power Station, Unit 1 (ADAMS Accession No. ML102850303)
October 18, 2010	Letter to Barry S. Allen, Determination of Acceptability and Sufficiency for Docketing, and Opportunity for a Hearing Regarding the Application from FirstEnergy Nuclear Operating Company, for renewal of the Operating License for the Davis-Besse Nuclear Power Station, Unit 1 (ADAMS Accession No. ML1027105840)
October 20, 2010	Letter to Barry S. Allen, “Notice of Intent to Prepare an Environmental Impact Statement and Conduct Scoping Process for License Renewal for the Davis-Besse Nuclear Power Station, Unit 1” (ADAMS Accession No. ML1027006031)
October 22, 2010	Memorandum to David J. Wrona, NRC, from Paula Cooper, NRC, and Brian Harris, NRC, Forthcoming Meeting to Discuss the License Renewal Process and Environmental Scoping for Davis-Besse Nuclear Power Station License Renewal Application Review (ADAMS Accession No. ML102870261)
October 26, 2010	Press Release: NRC Announces Opportunity for Hearing on Application to Renew Operating License For Davis-Besse Nuclear Power Plant (ADAMS Accession No. ML102990387)
October 28, 2010	Press Release: NRC to Conduct Environmental Scoping Meeting as Part of the License Renewal Application for Davis-Besse: Meeting November 4 (ADAMS Accession No. ML103010069)
November 4, 2010	Transcript Davis-Besse License Renewal Public Meeting—Afternoon Session, pages 1–46 (ADAMS Accession No. 110140231)
November 4, 2010	Transcript Davis-Besse License Renewal Public Meeting—Evening Session, pages 1–37 (ADAMS Accession No. 110140232)
November 22, 2010	Letter from NRC to Reid Nelson, Director, Advisory Council on Historic Preservation (ACHP) Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Review (ADAMS Accession No. ML1029801401)

November 22, 2010	Letter to David Graham, Chief, Division of Wildlife, Ohio Department of Natural Resources (OHDNR), “Request for List of Protected Species Within the Area Under Evaluation for the Davis-Besse Nuclear Power Station License Renewal Application Review” (ADAMS Accession No. ML102980688)
November 23, 2010	Letter to Brian Mitch, Environmental Review Manager, OHDNR, “Request for List of Protected Species Within the Area Under Evaluation for the Davis-Besse Nuclear Power Station License Renewal Application Review” (ADAMS Accession No. ML102980430)
November 23, 2010	Letter to Edgar L, French, Delaware Nation, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Harold G. Frank, Forest County Potawatomi Community, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Kenneth Meshiguad, Hannahville Indian Community Council, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Floyd E. Leonard, Miami Tribe of Oklahoma, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Ron Sparkman, Shawnee Tribe, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Leaford Bearskin, Wyandotte Nation, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)

November 23, 2010	Letter to John P. Froman, Peoria Tribe of Indians of Oklahoma, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
November 23, 2010	Letter to Charles Todd, Ottawa Tribe of Oklahoma, “Request for Scoping Comments Concerning the Davis-Besse Nuclear Power Plant, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1030001644)
December 6, 2010	Letter from NRC to Patricia Kurkul, National Oceanic and Atmospheric Administration Fisheries Service (NOAA), “Request for List of Protected Species Within the Area Under Evaluation for the Davis-Besse Nuclear Power Station License Renewal Application Review” (ADAMS Accession No. ML1029806923)
December 7, 2010	Letter from NRC to Mark Epstein, Ohio State Historic Preservation Officer, “Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Review” (ADAMS Accession No. ML1029806874)
December 11, 2010	Video Recording of Public Comments on the NRC Relicensing of the Davis-Besse Nuclear Plant in Columbus, Ohio (ADAMS Accession No. ML11348A013)
December 16, 2010	Letter from Mary Knapp, United States Department of the Interior, Fish and Wildlife Services, “Docket ID NRD-2010-0298” (ADAMS Accession No. ML1100602894)
December 18, 2010	Transcript and Video Recording of the People’s Hearing on Davis-Besse Relicensing (ADAMS Accession No. ML 11209C0801)
December 21, 2010	Letter from Mary A. Colligan, NOAA, “Re: Davis-Besse Nuclear Power Station” (ADAMS Accession No. ML1101402300)
December 28, 2010	Letter to Barry S. Allen, “Schedule for the Conduct of Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application” (ADAMS Accession No. ML1034305800)
February 2, 2011	E-mail to Laura Bonneau, FWS, “Educational Program” (ADAMS Accession No. ML11236A085)

February 9, 2011	E-mail from Laura Bonneau, FWS, "Educational Program" (ADAMS Accession No. ML11235A564)
February 10, 2011	E-mail to Laura Bonneau, FWS, "Educational Program" (ADAMS Accession No. ML11236A083)
February 10, 2011	E-mail from Laura Bonneau, FWS, "Educational Program" (ADAMS Accession No. ML11235A558)
February 15, 2011	E-mail to Mary Knapp, FWS, for invitation to the license renewal environmental audit (ADAMS Accession No. ML11236A075)
February 15, 2011	E-mail from Mary Knapp, FWS, in response to audit invitation (ADAMS Accession No. ML11235A748)
February 15, 2011	E-mail to Brain Mitch, OHDNR, for invitation to the License renewal environmental audit (ADAMS Accession No. ML11236A077)
February 15, 2011	E-mail to Dave Snyder, OHPO, for invitation to the license renewal environmental audit (ADAMS Accession No. ML11236A079)
February 23, 2011	Letter to Barry S. Allen, "Requests for Additional Information (RAIs) for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application (ADAMS Accession No. ML1101304942)
February 28, 2011	Letter to Barry S. Allen, "Environmental Site Audit Regarding Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (ADAMS Accession No. ML1101901132)
March 4, 2011	E-mail to Mary Knapp, FWS, to provide environmental audit schedule (ADAMS Accession No. ML11236A069)
March 4, 2011	E-mail to Mark Epstein, OHPO, for invitation to the license renewal environmental audit (ADAMS Accession No. ML11236A071)
March 4, 2011	E-mail from Dave Snyder, OHPO, in response to audit invitation (ADAMS Accession No. ML11236A071)

March 4, 2011	E-mail to Dave Snyder, OHPO, for scheduling of Audit telephone conference (ADAMS Accession No. ML11236A073)
March 8, 2011	E-mail from Laura Bonneau, FWS, for confirmation of audit activities (ADAMS Accession No. ML11235A556)
March 8, 2011	E-mail to Dave Snyder, OHPO, to provide audit-related conference call information (ADAMS Accession No. ML11236A067)
March 9, 2011	E-mail to Laura Bonneau, FWS, to provide audit-related conference call information and scheduling (ADAMS Accession No. ML11236A065)
March 14, 2011	E-mail to Megan Seymour, FWS, to provide update on transmission line mapping (ADAMS Accession No. ML 1107303280)
March 23, 2011	Letter from Barry S. Allen, "Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346. License Number NPF-3, Reply to RAI for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (TAC No. ME4640) (ADAMS Accession No. ML1108800582)
May 27, 2011	RAI responses from applicant, "Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, Reply to RAIs for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (TAC No. ME4613) Environmental Report (ADAMS Accession No. ML11193A093)
April 20, 2011	Letter to Barry S. Allen, "RAI for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (ADAMS Accession No. ML1109105664)
April 26, 2011	Letter to Barry S. Allen, "RAI for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application" (ADAMS Accession No. ML11094A0993)
June 1, 2011	Letter to Mary Knapp, FWS, "Request for Lost of Federally Protected Species and Important Habitats within the Area Under Evaluation for the Davis-Besse Nuclear Power Station License Renewal Application Review" (ADAMS Accession No. ML11131A1765)

June 3, 2011	Summary of site audit to support review of LRA of Davis-Besse Nuclear Power Station, Unit 1 (ADAMS Accession No. ML1108202760)
July 11, 2011	Letter from Kendall W. Byrd, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, Ohio Department of Natural Resources Office of Coastal Management Concurrence with Federal Consistency Certification Related to the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Environmental Report (TAC No. ME4613) (ADAMS Accession No. ML11195A1460)
June 24, 2011	Letter from Kendall W. Byrd, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, Reply to RAI for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application (TAC No. ME4613) Environmental Report Severe Accident Mitigation Alternatives Analysis and License Renewal Application Amendment No.1 (ADAMS Accession No. ML11180A233)
July 11, 2011	Letter from Kendall W. Byrd, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, Ohio Department of Natural Resources, Office of Coastal Management Concurrence with Federal Consistency Certification Related to the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Environmental Report (TAC No. ME4613) (ADAMS Accession No. ML11195A146)
August 1, 2011	Summary of scoping meeting held in support of the environmental review for the Davis-Besse Nuclear Power Station, Unit 1, LRA (ADAMS Accession No. ML11173A200)
August 15, 2011	Memorandum from John Parillo, NRC, to Travis L. Tate, Branch Chief, NRC, “RAI Response Clarifications from Davis-Besse Nuclear Power Station in Support of License Renewal Application” (TAC No. ME4613) (ADAMS Accession No. ML112270139)
August 31, 2011	Memorandum from Travis L. Tate, Branch Chief, NRC, to David J. Wrona, Branch Chief, NRC, “Evaluation of Severe Accident Mitigation Alternatives for Davis-Besse Nuclear Power Station” (TAC No. ME4613) (ADAMS Accession No. ML112300844)

September 1, 2011	Letter from Barry S. Allen, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, Reply to Supplemental RAI for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application (TAC No. ME4613) Environmental Report Severe Accident Mitigation Alternatives Analysis (ADAMS Accession No. ML11250A0680)
September 19, 2011	Letter from Kendall W. Byrd, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, License Renewal Application Amendment No. 16, Supplemental Information for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Environmental Report (TAC No. ME4613) (ADAMS Accession No. ML11266A0620)
September 19, 2011	Letter from Kendall W. Byrd, Davis-Besse Nuclear Power Station, Unit 1, Docket No. 50-346, License Number NPF-3, License Renewal Application Amendment No. 17, Supplemental Information for the Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application Environmental Report (TAC No. ME4613) (ADAMS Accession No. ML11266A0090)
October 31, 2011	Letter to Barry S. Allen, “Schedule Revision for the Environmental and Safety Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application” (ADAMS Accession No. ML11256A164)
July 31, 2013	Letter to Barry S. Allen, “Schedule Revision for the Environmental and Safety Review of the Davis-Besse Nuclear Power Station, Unit 1, License Renewal Application” (ADAMS Accession No. ML13205A036)

APPENDIX F
U.S. NUCLEAR REGULATORY COMMISSION STAFF EVALUATION OF SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR DAVIS-BESSE NUCLEAR POWER STATION IN SUPPORT OF LICENSE RENEWAL APPLICATION REVIEW

F U.S. NUCLEAR REGULATORY COMMISSION STAFF EVALUATION OF SEVERE ACCIDENT MITIGATION ALTERNATIVES FOR DAVIS-BESSE NUCLEAR POWER STATION IN SUPPORT OF LICENSE RENEWAL APPLICATION REVIEW

F.1 Introduction

FirstEnergy Nuclear Operating Company (FENOC), on behalf of FirstEnergy Nuclear Generation Corporation, submitted to the U.S. Nuclear Regulatory Commission (NRC) an assessment of severe accident mitigation alternatives (SAMAs) for the Davis-Besse Nuclear Power Station, Unit 1 (Davis-Besse) as part of the Environmental Report (ER) (FENOC 2010). This assessment was based on the most recent Davis-Besse probabilistic risk assessment (PRA) available at that time, a plant-specific offsite consequence analysis performed using the MELCOR Accident Consequence Code System 2 (MACCS2) computer code (NRC 1998a), and insights from the Davis-Besse individual plant examination (IPE) (Centerior Energy 1993) and individual plant examination of external events (IPEEE) (Centerior Energy 1996). In identifying and evaluating potential SAMAs, FENOC considered SAMA candidates that addressed the major contributors to core damage frequency (CDF) and large early release frequency (LERF) at Davis-Besse, as well as SAMA candidates for other operating plants that have submitted license renewal applications (LRAs). FENOC identified 167 potential SAMA candidates. The SAMA candidates were reduced to 15 by eliminating SAMAs that are not applicable for one or more of the following reasons:

- The SAMA has design differences or has already been implemented at Davis-Besse.
- The SAMA is not applicable to Davis-Besse.
- The SAMA has estimated implementation costs that would exceed the dollar value associated with eliminating all severe accident risk at Davis-Besse.
- The SAMA is related to a non-risk significant system and, therefore, has a very low benefit.
- The SAMA is similar in nature and could be combined with another SAMA candidate.

FENOC assessed the costs and benefits associated with each of these 15 potential SAMAs and concluded in the ER that one of the candidate SAMAs evaluated is potentially cost-beneficial.

Based on a review of the SAMA assessment, the NRC issued a request for additional information (RAI) to FENOC by letter dated April 20, 2011 (NRC 2011a). Key questions concerned the following:

- additional details regarding the plant-specific PRA model and changes to CDF and LERF since the IPE,
- additional information on the internal and external reviews of the PRA model performed since the IPE,
- the process used to map Level 1 PRA results into the Level 2 analysis and group containment event tree (CET) end states into release categories,
- justification for the multiplier used for external events,
- population assumptions used in the Level 3 analysis,

- the use of importance analysis in identifying plant-specific SAMA candidates, and
- further information on the cost-benefit analysis of several specific candidate SAMAs and low-cost alternatives.

FENOC submitted additional information to the NRC by letter dated June 24, 2011 (FENOC 2011). FENOC also provided clarifications to the RAI responses via e-mail on July 18 and July 27, 2011 (NRC 2011b). In response to the RAIs, FENOC provided the following information:

- identification of key factors for a significant change in CDF associated with particular version of the Davis-Besse PRA model,
- clarification of the scope of the peer reviews and the status of peer review findings,
- description of the process for mapping Level 1 results into the Level 2 analysis and for assigning CET sequences to release categories,
- a revised SAMA analysis reflecting a higher maximum benefit, higher external events multiplier, and the 95th percentile CDF,
- clarification of the sensitivity analysis,
- an assessment of SAMAs previously found to be potentially cost beneficial for Babcock and Wilcox (B&W) plants,
- additional rationale for not identifying SAMAs for many of the basic events on the risk importance lists,
- additional rationale for considering SAMAs related to improved procedures or training or automated functions that would eliminate high risk operator error,
- an assessment of SAMAs subsumed by other more costly SAMAs, and
- additional information regarding several specific SAMAs.

Subsequent to the RAI responses, FENOC submitted a supplement to the ER that corrected the following five errors in the SAMA assessment (FENOC 2012a):

(1) An inaccurate land area conversion factor for acres to hectares was used.

(2) Dollar values for Ohio farmland and non-farmland were selected from Ohio Department of Taxation ‘tax assessment’ values instead of ‘appraised’ values.

(3) The escalation of decontamination costs was not performed in accordance with approved guidance.

(4) Core inventory isotopic ‘activity’ was used instead of isotopic ‘mass’ in the Modular Accident Analysis Program (MAAP) software code runs in contrast to updated industry guidance.

(5) The wind direction from the Davis-Besse Meteorological Tower was not converted from the ‘blowing from’ direction to the ‘blowing toward’ direction for use in the SAMA Analysis calculations.

Based on a review of this updated SAMA assessment, the NRC held a conference call with FENOC on September 25, 2012, to clarify the decontamination cost escalation factor used in the assessment and the updated release category results (FENOC 2012b).

FENOC's response to the RAIs, as well as FENOC's response to the ER supplement clarification questions, addressed all the concerns raised by the NRC staff.

An assessment of SAMAs for Davis-Besse is presented below.

F.2 Estimate of Risk for Davis-Besse

FENOC's estimates of offsite risk at Davis-Besse are summarized in Section F.2.1. The summary is followed by the NRC staff's review of FENOC's risk estimates in Section F.2.2.

F.2.1 FENOC's Risk Estimates

Two distinct analyses are combined to form the basis for the risk estimates used in the SAMA analysis; the Davis-Besse Level 1 and 2 PRA model, which is an updated version of the IPE (Centerior Energy 1993), and a supplemental analysis of offsite consequences and economic impacts (essentially a Level 3 PRA model) developed specifically for the SAMA analysis. The SAMA analysis is based on the most recent Davis-Besse Level 1 and Level 2 PRA model available at the time of the ER, which is referred to as "SAMA Analysis Model," and is a special update of the Davis-Besse Revision 4 PRA to support the SAMA evaluation. The scope of this Davis-Besse PRA does not include external events.

The Davis-Besse CDF is approximately 9.8×10^{-6} per year for internal events using a truncation value of 5×10^{-13} per year. This CDF includes contributions from internal flooding and high winds (not including tornado-generated missiles). When determined from the sum of the CET sequences, or Level 2 model, the release frequency (from all release categories including intact containment, early and late releases) is approximately 1.0×10^{-5} per year using a truncation value of 5×10^{-13} per year. The latter value was used as the baseline CDF in the SAMA evaluations. The CDF is based on the risk assessment for internally initiated events, which includes internal flooding. FENOC did not explicitly include the contribution from external events in the Davis-Besse PRA risk estimates; however, it did account for the potential risk reduction benefits associated with external events by multiplying the estimated benefits for internal events by a factor of 3.0. As a result of NRC review, FENOC revised the external events multiplier to a factor of 4.6. This is discussed further in Sections F.2.2 and F.6.2.

The breakdown of CDF by initiating event is provided in Table F-1. As shown in this table, loss of offsite power (LOOP), loss of component cooling water (CCW), and reactor or turbine trips are the dominant contributors to the CDF. Anticipated transient without scram (ATWS) sequences are modeled as a failure to trip after an initiating event; ATWS sequences contribute approximately 1 percent to CDF. Station Black Out (SBO) sequences involve a LOOP (as the initiating event or following an initiating event), along with subsequent failure of power to both safety buses, (i.e., a loss of both emergency diesel generators (EDGs) and the SBO diesel generator); SBO sequences contribute approximately 5 percent to CDF and are dominated by sequences initiated by a LOOP.

The Level 2 PRA model that forms the basis for the SAMA evaluation represents a complete revision of the original IPE Level 2 model. The current Level 2 model uses a single CET containing both phenomenological and systemic events. The Level 1 core damage sequences are grouped into core damage bins according to similarities in their impact on containment response. The core damage bins, together with the states of containment systems comprise the plant damage states (PDSs), which provide the interface between the Level 1 analysis and Level 2 CET analysis. The CET probabilistically evaluates the progression of the damaged core with respect to release to the environment. CET nodes are evaluated using supporting fault trees and logic rules. The CET end states are then examined for considerations of timing and magnitude of release and assigned to release categories.

The result of the Level 2 PRA is a set of 34 specific release categories, also referred to as source term categories, with their respective frequency and release characteristics. The results of this analysis for Davis-Besse are provided in Table E.3-13 of Appendix E to the ER (FENOC 2010). The frequency of each release category was obtained by summing the frequency of the individual accident progression CET endpoints assigned to each release category. Source terms were developed for each of the 34 release categories using the results of Modular Accident Analysis Program (MAAP) Version 4.0.6 computer code calculations based on characteristics that determine the timing and magnitude of the release, whether or not the containment remains intact, and isotopic composition of the release material (FENOC 2010).

The offsite consequences and economic impact analyses use the MACCS2 code to determine the offsite risk impacts on the surrounding environment and public. Inputs for these analyses include plant-specific and site-specific input values for core radionuclide inventory, source term and release characteristics, site meteorological data, projected population distribution within a 50-mi (80-km) radius for the year 2040, emergency response evacuation planning, and economic parameters. The core radionuclide inventory corresponds to the end-of-cycle values for Davis-Besse operating at 2,827 megawatt thermal (MWt), which bounds the currently approved power level. The magnitude of the onsite impacts (in terms of cleanup and decontamination costs and occupational dose) is based on information provided in NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook" (NRC 1997a).

Table F-1. Davis-Besse Core Damage Frequency for Internal Events

Initiating Event[(a)]	CDF (per year)(d)	% Contribution to CDF(d)
LOOP	1.9×10^{-6}	19
Loss of CCW pump(s)	1.7×10^{-6}	18
Reactor or turbine trip	1.3×10^{-6}	13
Steam generator tube rupture (SGTR)	6.2×10^{-7}	6
Loss of main feedwater	5.7×10^{-7}	6
Main feedwater flow control[(b)]	5.1×10^{-7}	5
Reactor vessel (RV) rupture	5.0×10^{-7}	5
Small loss-of-coolant accident (LOCA)	4.3×10^{-7}	4
Flooding in CCW pump room	2.0×10^{-7}	2
Medium LOCA	1.5×10^{-7}	2
Loss of service water pump room ventilation	1.3×10^{-7}	1
Loss of direct current (DC) power from Bus d2p	1.1×10^{-7}	1
Flooding in turbine building	8.8×10^{-8}	1
Loss of non-nuclear instrumentation cabinets 1–4 (NNIX) DC power supply	8.2×10^{-8}	1

Initiating Event[a]	CDF (per year)(d)	% Contribution to CDF(d)
Other[c]	1.5×10^{-6}	15
Total CDF (internal events)	9.8×10^{-6}	100

[a] This table is based on model quantification using 5×10^{-13} per year truncation.

[b] In response to an NRC staff RAI, FENOC explains that T2A-1 and T2B-1 are main feedwater flow control valve initiators, and T2A-2 and T2B-2 are the associated flow controller initiators. These four initiators combined form the main feedwater flow control initiator (FENOC 2011).

[c] This is calculated from information in ER Table E.3-1.

[d] Column totals may be different due to round off.

In response to an NRC staff RAI, FENOC estimated the dose to the population within 50 mi (80 km) of the Davis-Besse site to be approximately 0.0212 person-Sievert (Sv) (2.12 person-rem) per year (FENOC 2012a). The breakdown of the total population dose by containment release mode is summarized in Table F-2. SGTR and interfacing system LOCA (ISLOCA), both containment bypass events, dominate the population dose risk at Davis-Besse.

Table F-2. Breakdown of Population Dose by Containment Release Mode

Containment release mode[a,b]	Population Dose (person-rem[c,d] per year)	% Contribution [d]
SGT	1.35	64
ISLOCA	0.35	17
Large containment isolation failure	0.02	1
Small containment isolation failure	0.06	3
Large early release	0.03	1
Sidewall failure (early)	0.03	1
Late containment failure	0.06	3
Basemat failure	0.21	10
No containment failure	0.02	1
Total	**2.12**	**100**

[a] This table is based on model quantification using 5×10^{-13} per year truncation.

[b] Estimated population doses calculated from revised information provided in Table E.3-21 of response to NRC staff RAI 4.b (FENOC 2011).

[c] One person-rem = 0.01 person-Sv.

[d]Column totals may be different due to round off

F.2.2 Review of FENOC's Risk Estimates

FENOC's determination of offsite risk at Davis-Besse is based on the following major elements of analysis:

- the Level 1 and 2 risk models that form the bases for the 1993 IPE submittal (Centerior Energy 1993) and the external event analyses of the 1996 IPEEE submittal (Centerior Energy 1996);

- the major modifications to the IPE model that have been incorporated in the Davis-Besse PRA, including a complete revision of the Level 2 risk model; and
- the MACCS2 analyses performed to translate fission product source terms and release frequencies from the Level 2 PRA model into offsite consequence measures.

Each of these analyses was reviewed to determine the acceptability of the Davis-Besse risk estimates for the SAMA analysis, as summarized below.

The NRC staff's review of the Davis-Besse IPE is described in a safety evaluation report (SER) (NRC 1996). Based on the review of the original IPE submittal and responses to RAIs, the NRC staff concluded that the IPE submittal met the intent of generic letter (GL) 88-20, "Individual Plant Examination for Severe Accident Vulnerabilities" (NRC 1988); that is, the applicant's IPE process is capable of identifying the most likely severe accidents and severe accident vulnerabilities. Although no vulnerabilities were identified in the IPE, 11 improvements to the plant or procedures were identified. These improvements have been either implemented at the site or included in the SAMA evaluation process (FENOC 2010). These improvements are discussed in Section F.3.2.

There have been five revisions to the IPE model between the 1993 IPE submittal and the model used for the SAMA analysis. A listing of the major changes in each revision of the PRA was provided by FENOC in Section E.3.1.1.2 of the ER (FENOC 2010) and in response to an NRC staff RAI (FENOC 2011). The revisions to the IPE are summarized in Table F-3. FENOC clarified that the large decrease in CDF between Revision 0 and Revision 1 is primarily due to reduction in transient frequencies for reactor or turbine trips and loss of main feedwater. Additionally, the sizeable decrease between Revision 3 and Revision 4 was primarily due to update of data and an increase in the time operators have to trip the reactor cooling pumps following loss of seal cooling. A comparison of the internal events CDF between the 1993 IPE and the SAMA analysis model indicates a decrease of approximately 85 percent (from 6.6×10^{-5} per year to 9.8×10^{-6} per year).

The CDF value from the 1993 Davis-Besse IPE (6.6×10^{-5} per year) is near the higher end of the range of the CDF values reported in the IPEs for B&W plants. Figure 11.6 of NUREG-1560 shows that the IPE-based internal events CDF for these plants range from about 1×10^{-5} per year to 7×10^{-5} per year, with an average CDF for the group of 3×10^{-5} per year (NRC 1997b). It is recognized that other plants have updated the values for CDF subsequent to the IPE submittals to reflect modeling and hardware changes. The internal events CDF result for Davis-Besse used for the SAMA analysis (9.8×10^{-6} per year, including internal flooding) is comparable to that for other plants of similar vintage and characteristics.

The NRC staff considered the peer reviews performed for the Davis-Besse PRA and the potential impact of the review findings on the SAMA evaluation. In the ER (FENOC 2010) and in response to an NRC staff RAI (FENOC 2011), FENOC describes a B&W owner's group peer review performed from 1999 through 2000 on internal events and LERF and a "gap self assessment" performed by a team of industry peers and internal staff using the 2005 American Society of Mechanical Engineers (ASME) PRA standard (ASME 2005). The owner's group peer review identified no Level A (important and necessary to address before the next regular PRA update) and 18 Level B (important and necessary to address, but disposition may be deferred until the next PRA update) facts and observations (F&Os). FENOC clarifies that 13 of these open findings were closed prior to implementation of the mitigating systems performance index (MSPI) document, four were closed in the SAMA analysis model, and the remaining F&O is essentially addressed by the SAMA evaluation. This last finding recommended additional sensitivity studies be performed to study the sensitivity of results to modeling PRA assumptions.

The SAMA evaluation includes an importance analysis of basic and initiating events as well as a Level 3 parameter sensitivity analysis, and, in response to an NRC staff RAI, FENOC provided the results of an uncertainty analysis (further discussed in Section F.6.1). Therefore, further insights gained from an additional sensitivity analysis would not be expected to yield significant new insights. FENOC explained in the ER and in an RAI response that the gap self-assessment covered Level 1 and LERF elements excluding internal flooding and high winds, and that it focused on identifying gaps to meeting Capability Category II of the ASME PRA standard (ASME 2005). There were four Level A findings and 23 Level B findings from this gap self-assessment. FENOC summarized these findings, and the model changes made to address the findings in Section E.3.1.1.2 of the ER (FENOC 2010), and stated in the RAI response that all of the Level A and B findings are addressed in the SAMA analysis model.

Table F-3. Davis-Besse Probabilistic Risk Assessment Historical Summary

PRA Version	Summary of Changes From Prior Model	CDF (per year)
1993	IPE Submittal	6.6×10^{-5}
Revision 0 Revision 1 Revision 2 1999	• Performed plant-specific update of failure rates, unavailability, common cause, initiating event frequency, and human reliability analysis (HRA) • Made modifications to reflect plant and procedure changes including adding the SBO diesel generator (DG), removal of a startup feed pump, improvements to CCW and service water system modeling, update of SGTR emergency response modeling, and internal flooding modeling • Improved model documentation to comply with draft PRA standard requirements	$1.4x10^{-5}$ $1.6x10^{-5}$ $1.7x10^{-5}$
Revision 3 5/2001	• Added explicit LERF model • Addressed all Level B peer review findings • Improved model quantification logistics including reducing truncation limit to $2.0x10^{-10}$ • Deleted ISLOCA sequence judged not credible and RV rupture as negligible • Added conditional probability that reactor will trip due to loss of 4160 Volt Bus C or D • Revised logic for loss of start-up feedwater due to circulating water flooding • Revised success criteria for large and medium LOCAs to one of two core flood tanks • Improved model documentation to comply with draft PRA standard requirements	$1.3x10^{-5}$
Revision 4 9/2007	• Updated model for new PRA software • Increased available response time following loss of CCW for manual tripping of Reactor Coolant Pumps (RCPs) from 10 minutes to 1 hour • Added tornado initiating events, excluding consideration of missile generation • Performed module management changes • Reduced truncation limit to $5.0x10^{-13}$	$4.7x10^{-6}$
SAMA analysis	• Reviewed and updated all system fault trees for system dependencies	$9.8x10^{-6}$

PRA Version	Summary of Changes From Prior Model	CDF (per year)
model 7/2009	• Added RV rupture initiating event • Changed success criteria in case of a large LOCA back to two core flood tanks • Made model improvements to CCW and service water models to correct errors • Adjusted system fault trees to and reflect simultaneous alignments using split fraction • Revised common cause failure modeling to use of multiple greek letter approach • Updated HRA using Electric Power Institute (EPRI) HRA calculator • Structured support system initiating event modeling to comply with EPRI guidance (EPRI 2006) • Removed modules from fault trees • Added fire modeling functionality in preparation for performing a National Fire Protection Association (NFPA) 805 analysis • Improved modeling with respect to success gates and mutually exclusive terms • Adapted a two-step quantification approach to facilitate incorporation of recovery events	

In response to an NRC staff RAI (FENOC 2011), FENOC describes the quality control process used at Davis-Besse for the development and maintenance of the PRA. An operating manual related to the PRA Program and a business practice document related to PRA model management both identify requirements for maintaining and updating the PRA models and applications in accordance with regulatory guide (RG) 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities” (NRC 2007) and ensure that the PRA models are current with the changes to the plant. These control documents cover updates; identifying, tracking, and disposition of plant changes; personnel qualification; self-assessment; PRA software and computer control including software quality assurance; and PRA records and documentation. The NRC staff considers FENOC’s quality control process to be of sufficient quality to support the SAMA evaluation.

The NRC staff asked FENOC to identify any changes to the plant, including physical and procedural modifications, since the July 2009 SAMA analysis model that could have a significant impact on the results of the SAMA analysis (NRC 2011a). In response to the RAI, FENOC stated that while there have been some plant changes since the SAMA analysis model, no changes have been identified that would have a significant impact on the SAMA evaluation (FENOC 2011). Furthermore, FENOC states that plant procedures for managing the PRA model specify that plant changes are to be evaluated to determine if they would cause a change of greater than 10 percent CDF, or greater than 20 percent LERF; there have been no changes that meet these criteria.

Given that the Davis-Besse internal events PRA model has been peer-reviewed and the peer review findings were all addressed, and that FENOC has satisfactorily addressed NRC staff questions regarding the PRA, the NRC staff concludes that the internal events Level 1 PRA model is of sufficient quality to support the SAMA evaluation.

As indicated above, the current Davis-Besse PRA does not include external events. In the absence of such an analysis, FENOC used the Davis-Besse IPEEE to identify the highest risk accident sequences and the potential means of reducing the risk posed by those sequences, as discussed below and in Section F.3.2.

FENOC submitted the Davis-Besse IPEEE in February 1996 (Centerior Energy 1996) in response to Supplement 4 of GL 88-20 (NRC 1991). This submittal included a seismic margins analysis, an internal fire PRA, and an evaluation of high winds, external flooding, and other hazards. While no fundamental weaknesses or vulnerabilities to severe accident risk in regard to the external events were identified, a limited set of plant improvements based on an external events finding was identified and is discussed below. In a letter dated February 8, 2001, the NRC staff concluded that the submittal met the intent of Supplement 4 to GL 88-20, and the applicant's IPEEE process is capable of identifying the most likely severe accidents and severe accident vulnerabilities (NRC 2001).

The seismic portion of the IPEEE consisted of a reduced-scope seismic evaluation using the EPRI methodology (EPRI 1991) for seismic margins assessment (SMA), with enhancements specified in NUREG-1407 (NRC 1991), in conjunction with the Seismic Qualification User's Group (SQUG) methodology (SQUG 1992). This method is qualitative and does not provide numerical estimates of the CDF contributions from seismic initiators (EPRI 1991). FENOC indicates in the ER that the SMA has not been updated since the IPEEE. Although the size of an earthquake is usually reported in terms of Richter magnitude, ground-shaking forces are most commonly reported in units of acceleration as a fraction of the force (acceleration) of gravity (g). For the IPEEE seismic assessment, Davis-Besse was categorized as a 0.3 g focused-scope plant per NUREG-1407; however, the applicant performed a 0.15 g reduced scope SMA based on a perceived lower seismic risk at Davis-Besse. The applicant judged seismic risk to be lower at Davis-Besse based on its review of revised Lawrence Livermore National Laboratory (LLNL) seismic hazard curves (NRC 1994a), its review of information notice (IN) 94-32, "Revised Seismic Hazard Estimates" (NRC 1994b), and its commitment to address the outliers identified by the walkdowns for the Unresolved Safety Issue (USI) A-46 Program. The SMA determined that the lowest high confidence in low probability of failure (HCLPF) value for the components evaluated was 0.26 g. In the letter dated February 8, 2001, the NRC staff concluded that the applicant came close to meeting the objectives of a focused scope analysis (NRC 2001).

The NRC staff asked about whether plant improvements had been made to the five structures and components, four masonry walls, and borated water storage tank (BWST) roof determined to have an HCLPF value of less than 0.3 g in the IPEEE (NRC 2011a). In response to the RAI, FENOC stated that plant improvements had been performed for the four components involving masonry walls and that no modifications have been made to the BWST roof. Updated analyses were performed to ensure allowable stresses and design-basis requirements for masonry structures were met (FENOC 2011). In a followup clarification to the RAI responses, FENOC further explained that a SAMA candidate already identified and evaluated in the ER meets the intent of improving the seismic capacity of the BWST roof. This is further discussed in Section F.3.2.

The Davis-Besse IPEEE seismic evaluation identified one unresolved outlier remaining from implementation of the USI A-46 Program. The one unresolved outlier was the identification of two flammable compressed gas bottles with inadequate seismic mounting. This is further discussed in Section F.3.2. The USI A-46 SER for Davis-Besse indicates that the license completed the resolution of all outliers (NRC 2000).

To provide additional insight into the appropriate seismic CDF to use for the SAMA evaluation, the NRC staff used NRC information notice (IN) 2010-18, generic issue 199, "Implications of Updated Probabilistic Seismic Hazard Estimates in Central and Eastern United States on existing Plants," which informs applicants that updated seismic data and models show increased seismic hazard estimates for some plants. The NRC report cited in the IN estimates of the seismic CDF for Davis-Besse to be between 6.7×10^{-7} and 6.7×10^{-6} per year using 2008 U.S. Geological Survey (USGS) seismic hazard curves. Since FENOC did not provide a seismic CDF contribution in the ER, the NRC staff used a seismic CDF of 6.7×10^{-6} per year to assess the appropriateness of the external event multiplier used in the SAMA evaluation. The multiplier is discussed further later in this section.

The Davis-Besse IPEEE fire analysis employed a combination of the EPRI's fire-induced vulnerability evaluation (FIVE) methodology (EPRI 1993) and PRA analysis. Since the FIVE methodology allowed only a few of the Davis-Besse fire compartments to be screened, modification of the FIVE process was employed to include more detailed analysis of affected circuits, improved fire initiation frequency quantification, inclusion of fire effects evaluations, and crediting fire prevention and suppression. These enhancements were primarily based on guidance from the EPRI Fire PRA Implementation Guide (EPRI 1995). In the first phase, initial qualitative and quantitative screening was used to identify potentially risk significant fire compartments. Safe shutdown equipment was identified, and the routing of the associated supporting electrical cables was determined and qualitatively evaluated to determine if there were any plant locations that could be screened out due to the absence of safe shutdown equipment or cables. Fire barriers were evaluated to ensure that any screened out compartments could not cause a fire in an adjacent compartment. The results of the fire compartment interaction analysis were used in the detailed fire analyses of each compartment.

The second phase considered equipment failures beyond those caused by the fire. Using the PRA, plant areas with a fire-induced CDF below 1.0×10^{-6} per year were screened from further evaluation. The third phase involved detailed fire analysis of the unscreened compartments using guidance from the Fire PRA Implementation Guide (EPRI 1995), detailed evaluation of the potential for fire damage due to specific fires within an area, and detailed evaluation of the function of specific safe shutdown equipment cables. In this phase, fire frequencies were adjusted to remove some of the conservatism in the frequencies for specific fire initiation sources. This included applying severity factors for certain fixed sources of ignition and crediting early suppression of welding-related fires based on historical fire events data, crediting early suppression of other transient fires based on the presence of an automatic fire detection system in the fire compartment, crediting restrictions on the quantity of transient combustibles and the use of approved storage containers for transient combustibles, crediting the frequency of inspections to verify compliance with the requirements for control of transient combustibles, and eliminating conduits and cable trays that were determined to not be credibly damaged by a fire based on its distance from the ignition source. Based on these results, the fire-induced equipment failure list was modified and more compartments were screened.

FENOC stated that the fire PRA has not been updated since the IPEEE. In Section 3.1.2.1 of the ER, FENOC provides the fire CDF for the four areas having a CDF greater than the screening criteria of 1.0×10^{-6} per year. In response to an NRC staff RAI, FENOC acknowledges that IPEEE Table 4.2.3.2 (Centerior Energy 1996) provides the CDF for 15 fire compartments that were screened out prior to detailed analysis. The NRC IPEEE SER presents the total CDF of these screened out fire compartments to be 3.8×10^{-6} per year. This CDF, and those for each of the four fire zones have a CDF greater than 1.0×10^{-6} per year, are presented in Table F-4. The total fire CDF, determined from summing the values in Table F-4, is 2.9×10^{-5} per year.

Table F-4. Davis-Besse Fire Zones and their Contribution to Fire Core Damage Frequency

Fire Zone	Fire Zone Description	CDF (per year)
Q.01	High voltage switchgear Room B	8.2×10^{-6}
S.01	High voltage switchgear Room A	6.5×10^{-6}
X.01	Low voltage switchgear room	5.9×10^{-6}
FF.01	Control room cabinets	4.3×10^{-6}
Other[(a)]		3.8×10^{-6}
Total Fire CDF (all fire zones)		$\mathbf{2.9\times10^{-5}}$

[(a)] From the IPEEE SER (NRC 2001).

The NRC staff inquired about additional measures that FENOC had already taken to reduce fire risk since the IPEEE for the four dominant fire areas identified in ER Section E.3.1.2.1 (NRC 2011a). FENOC provided a description of a software tool implemented after issuance of the IPEEE for managing fire risk. This tool tracks inoperable or degraded fire protection features and manages combustible loads and travel paths. This software is maintained by the site fire marshal and controlled by a set of operational procedures. FENOC also provided a SAMA evaluation of these four dominate fire areas, which is discussed further in Section F.3.2.

Considering the above discussion, and the actions taken by FENOC to reduce fire risk since the IPEEE, NRC staff concludes that the fire CDF of 2.9×10^{-5} per year is reasonable for the SAMA analysis.

The Davis-Besse IPEEE analysis of HFO events (high winds, tornadoes, external floods, and other external events) followed the screening and evaluation approaches specified in Supplement 4 to GL 88-20 (NRC 1991) and did not identify any sequences or vulnerabilities that exceeded the 1.0×10^{-6} per year criterion (FENOC 2001). Based on this result, the applicant concluded that these other external hazards would be negligible contributors to overall core damage and did not consider any plant-specific SAMAs for these events. However, the applicant did note that the updated safety analysis report and the control room habitability study did not accurately reflect the current chemicals stored onsite. This is discussed further in Section F.3.2.

Based on the aforementioned results, including the NRC staff assessment of the Davis-Besse seismic CDF, the external events CDF is approximately 3.6 times the internal events CDF (based on a seismic CDF of 6.7×10^{-6} per year, a fire CDF of 2.9×10^{-5} per year, and an internal events CDF of 9.8×10^{-6} per year). The NRC staff requested FENOC increase the internal events benefits from a factor of 3 to 3.6 to account for the seismic hazard and for the CDF associated with screened fire compartments (NRC 2011a). In response to the RAI, FENOC chose to provide a revised SAMA evaluation using an external events multiplier of 4.6 resulting in a total multiplier of 5.6 $((2.9\times10^{-5}+6.7\times10^{-6}+1.0\times10^{-5})/(1.0\times10^{-5})+1))$ to account for external events, which assumes a seismic CDF of 6.7×10^{-6} per year, a fire CDF of 2.9×10^{-5} per year, and an HFO CDF of 1.0×10^{-5} per year (FENOC 2011). This is discussed further in Section F.6.2.

The NRC staff reviewed the general process used by FENOC to translate the results of the Level 1 PRA into containment releases, as well as the results of the Level 2 analysis, as described in the ER and in response to NRC staff RAIs (FENOC 2010, 2011. The Level 2 model is completely revised from the model used in the IPE and reflects the Davis-Besse plant as designed and operated as of September 2009. In response to NRC RAIs, FENOC explains that one of the most significant changes in the Level 2 model was the increase in level detail reflected in the PDSs and the manner in which their frequency is calculated. To better define the status of containment systems to support CET quantification, 14 PDSs were added. Another important change was developing a probability distribution for containment failure as a function of internal pressure. The Level 1 core damage sequences grouped into core damage bins according to similarities in their impact on containment response. The core damage bins, together with the states of containment systems, comprise the nearly 500 PDSs that provide the interface between the Level 1 analysis and Level 2 CET analysis.

Each PDS is analyzed through the Level 2 CET to evaluate the phenomenological progression of the sequence. The current Level 2 model uses a single CET containing both phenomenological and systemic events. In response to an NRC staff RAI, FENOC clarified that the Davis-Besse CET was developed from a B&W owner's group generic CET and refined to address phenomena that could impact reactor cooling system integrity, containment response, and release from containment. The CET end states are assigned to one of nine general and 34 specific release categories based on characteristics that determine the timing and magnitude of the release, whether or not the containment remains intact, and isotopic composition of the release material (FENOC 2010). The frequency of each release category was obtained by summing the frequency of the individual accident progression CET endpoints binned into the release category.

Source term release fractions were developed for each of the 34 release categories based on the results of plant-specific calculations using the MAAP Version 4.0.6. A separate MAAP calculation was performed for each of the 34 release categories. The 2012 SAMA supplement provided updated MAAP results to correct an error in the ER MAAP results (FENOC 2012a). The release categories and their release characteristics and frequencies are presented in Table E.3-13 of the 2012 SAMA supplement (FENOC 2012a) and Table E.3-20 of Appendix E to the ER (FENOC 2010) as corrected in the 2012 SAMA supplement (FENOC 2012a). The updated baseline dose risk and offsite economic risk from the 2012 SAMA supplement were used in the SAMA evaluation (FENOC 2012a).

The total Level 2 release frequency, based on the sum of CET sequences, is 1.0×10^{-5} per year, which is 2 percent higher than the Level 1 internal events CDF of 9.8×10^{-6} per year. This is due to the additional systems included in the Level 2 PRA models and to the presence of minimal cutsets that do not represent viable event sequences. The NRC staff considers that use of the release frequency, rather than the Level 1 CDF, will have a negligible impact as it is very small in comparison to the external events multiplier. The NRC staff asked FENOC to identify the release categories that comprise the LERF and to confirm that these contribute to the LERF importance analysis listing presented in Table E.3-4 (NRC 2011a). In response to the RAI, FENOC identified the release categories comprising LERF and provided a new LERF importance listing based on a re-review and identification of a few minor discrepancies. ER Table E.5-3 was revised to correct the identified discrepancies. This is discussed further in Section F.3.2.

The NRC staff's review of the Level 2 IPE concluded that it addressed the most important severe accident phenomena normally associated with large, dry containments, and it identified no significant problems or errors (NRC 1996). The revisions to the Level 2 model since the IPE, to update the methodology and to address peer review recommendations, are described in Section E.3.2.2 of the ER and in response to NRC staff RAIs (FENOC 2011). The Level 2 PRA model was included in the B&W owner's group peer review mentioned previously. All peer review findings have been addressed and are considered closed. The NRC staff asked FENOC about the implementation status of suggested plant improvements made in the IPE "back-end" analysis and asked FENOC to identify and evaluate SAMA candidates for those that have not been implemented (NRC 2011a). In response to the RAI, FENOC states that each of the suggested improvements has been implemented (FENOC 2011). This is discussed further in Section F.3.2.

Based on the following information, the NRC staff concludes that the Level 2 PRA provides an acceptable basis for evaluating the benefits associated with various SAMAs:

- the NRC staff's review of the Level 2 methodology,
- the fact that FENOC adequately addressed NRC staff RAIs,
- the fact that the Level 2 PRA model was reviewed as part the 1999 owner's group peer review of the LERF analysis, and
- the 2008 gap self-assessment.

In response to NRC staff RAIs, FENOC explains that the reactor core radionuclide inventory used in the consequence analysis corresponds to the end-of-cycle values for Davis-Besse operating at 2,827 MWt, which incorporates a 2 percent uncertainty in core power. In Section 3.1.2 of the ER, it is stated that the operating license and technical specifications were amended in 2008 to allow an increase in rated thermal power from 2,772 MWt to 2,817 MWt.

The reactor core radionuclide inventory assumes a 2 percent uncertainty margin; therefore, it bounds the uprated power level. The core radionuclide inventory is provided in Table E.3-17 of Appendix E of the ER (FENOC 2010). The ER noted that the description of plant facilities and operations and associated impact evaluations in this ER, therefore, assume operation at 2,827 MWt.

The NRC staff reviewed the process used by FENOC to extend the containment performance (Level 2) portion of the PRA to an assessment of offsite consequences (Level 3). This included consideration of the source terms used to characterize fission product releases for the applicable containment release categories and the major input assumptions used in the offsite consequence analyses. Version 1.12 of the MACCS2 code was used to estimate offsite consequences. Plant-specific input to the code includes the source terms for each release category and the reactor core radionuclide inventory (both discussed above), site-specific meteorological data, projected population distribution within a 50-mi (80-km) radius for the year 2040, emergency evacuation planning, and economic parameters including agricultural production. This information is provided in Section 3.0 of Attachment E to the ER (FENOC 2010), as corrected in the 2012 SAMA supplement for four errors in the MACCS2 input data (FENOC 2012a).

Releases were modeled as occurring at four different elevations, specific to each of the MAAP cases. These heights were ground level, 2.13 meters (m), 18.44 m, or 45.42 m. Building wake effects were modeled assuming a building width of 44 m and height of 73 m. The release energy varied from 265 watts (ambient) to 97 megawatts (MW). These are documented in Table E.3-13 of the ER by release category (FENOC 2010). In response to an NRC staff RAI, FENOC identified the heat release for each release category for sensitivity case A1 (FENOC 2012a). A sensitivity study, Case A1, was performed on the methodology used to calculate the release energy, which resulted in a higher release energy for each release category. In the sensitivity study, the energy of release was obtained from MAAP by multiplying the mass flow rate times the enthalpy of the release gas. The results showed a decrease in population dose risk of 3.3 percent and in offsite economic cost risk of 5.3 percent (FENOC 2012a). This result is expected since a higher energy release will both increase the radioactive decay period of the plume and increase the extent of dispersion of the plume. Since a higher energy release results in decreased population dose and offsite economic cost risk, the NRC staff concludes that the release parameters used are acceptable for the purposes of the SAMA evaluation.

FENOC used site-specific meteorological data for the year 2006 as input to the MACCS2 code. Meteorological data included wind speed, wind direction, delta-temperature, and precipitation for each hour of the year. Wind speed and direction are collected from various levels at a 100-m primary tower and a nearby 10-m backup tower. The 100-m tower also measures differential temperatures at several levels to determine atmospheric stability. The development of the meteorological data is discussed in Sections 2.10 and E.3.4 of the ER (FENOC 2010). Data from 2006 through 2008 was considered, but the 2006 data was chosen because it was the most complete data set. Data from year 2008 was considered unusable as it contained too many missing long data sequences of unusable data. A sensitivity study, Case M1, was performed using year 2007 data. The results showed a decrease in population dose risk of 0.5 percent and an increase in offsite economic cost risk of 1.1 percent (FENOC 2012a). The NRC staff notes that these results are consistent with previous SAMA analyses that have shown little sensitivity to year-to-year differences in meteorological data.

Missing data were estimated using data substitution methods (FENOC 2011). The 100-m tower measures differential temperatures at several levels to determine atmospheric stability. Mixing heights, which are presented in Table E.3-12 of the ER, were specified for a.m. and p.m. hours and are based on Environmental Protection Agency (EPA) data (EPA 1972). A sensitivity study, Case A2, was performed assuming more extreme values of the meteorological boundary parameters (e.g., stability class, rainfall, wind speed). This resulted in no change in the population dose risk or offsite economic cost risk (FENOC 2012a). The NRC staff concludes that the use of the 2006 meteorological data in the SAMA analysis is reasonable.

The population distribution the applicant used as input to the MACCS2 analysis was estimated for the year 2040 using year 2000 census data as accessed by SECPOP2000 (NRC 2003). In response to an NRC staff RAI, FENOC identified that known code errors in SECPOP2000 did not apply as only the SECPOP2000 population data were used (FENOC 2011). All other site file parameters were developed independently. The year 2040 is 3 years beyond the renewed license year 2037. The baseline population was determined for each of 160 sectors, consisting of the 16 directions for each of 10 concentric distance rings with outer radii at 1, 2, 3, 4, 5, 10, 20, 30, 40 and 50 mi surrounding the site. County population growth estimates were applied to year 2000 census data to develop year 2040 population distribution.

In response to an NRC staff RAI, FENOC revised the Level 3 PRA to include the Canadian population (FENOC 2011). SECPOP2000 contains only United States population data, and the Canadian population was not included in the Level 3 assessment. The year 2000 population from SECPOP2000 and Table 2.6-1 of the ER, which contains the population for Ontario, Canada from the 2001 Canadian census, were used to revise the total population within the 50-mi radius of Davis-Besse. The revised population was escalated to year 2040, resulting in a total population of 2,903,790.

In a clarification to a response to an NRC staff RAI, FENOC confirmed that transient population was included in the revised population (between 0 and 30 mi) (NRC 2011b). The transient population segment includes seasonal residents, transient population, and boating population. The seasonal population group comprises those people who reside in the area during warmer months, principally May through October. The transient population group comprises those people who enter the area for a specific purpose (e.g., recreation) and who leave on the same day or stay overnight at motels and hotels. The distribution of the population is given for the 10-mi radius from the Davis-Besse plant site and for the 50-mi radius from the Davis-Besse site in the revised Table E.3-11 of the RAI responses (FENOC 2011). The SAMA analysis was revised to use the revised population estimate, and relevant revised sections of the ER were provided in the RAI response. The revisions included the addition of the Canadian population, revised cost-benefit results, and revised base case and sensitivity case comparisons discussed in this section and in Section F.6. The population dose reported in Table F-2 also incorporates the results of the revised population estimate. A sensitivity case, Case S1, was performed using a population escalation to year 2060 and a second sensitivity case, Case S2, for a less conservative population escalation to year 2040 (1.5 percent per decade). A base population escalation of 4.7 percent per decade was used in the SAMA analysis, which is the rate of increase in the population of Ohio between 1990 and 2000 based on census records. The escalation to year 2060 showed an increase in population dose risk of 9.4 percent and in offsite economic cost risk of 9.2 percent (FENOC 2012a). The 1.5 percent escalation showed a decrease in population dose risk of 11.3 percent and in offsite economic cost risk of 10.9 percent (FENOC 2012a). The NRC staff considers the methods and assumptions for estimating population reasonable and acceptable for purposes of the SAMA evaluation.

FENOC performed sensitivity analyses to determine the impact on population dose risk and offsite economic cost risk for changes to release energy, meteorology, warning delay time, evacuation speed, sheltering, population and water shed assumptions as shown in Table F-5.

Table F-5. Impact on Population Dose Risk and Offsite Economic Cost Risk for Selected Sensitivity Cases

Sensitivity Case	Population Dose Risk (person-rem/year)			Offsite economic Cost Risk (dollars/year x 1000)		
	Baseline Result	Sensitivity Result	% Difference	Baseline Result	Sensitivity Result	% Difference
Case A1—Simpler release energy methodology	2.12	2.05	-3.3	3.59	2.40	-5.3
Case A2—More extreme values of meteorological boundary parameters	2.12	2.12	0	3.59	3.59	0
Case A3—Increase warning delay time to 20 minutes	2.12	2.12	0	3.59	3.59	0
Case E1—Increase evacuation speed to 1.0 mps	2.12	2.11	-0.5	3.59	3.59	0
Case E2—Change sheltering shielding to brick housing	2.12	1.62	-23.6	3.59	2.16	-39.8

Sensitivity Case	Population Dose Risk (person-rem/year)			Offsite economic Cost Risk (dollars/year x 1000)		
	Baseline Result	**Sensitivity Result**	**% Difference**	**Baseline Result**	**Sensitivity Result**	**% Difference**
Case E3—4.7% per decade escalation in population and proportional decrease in evacuation speed	2.12	2.12	0	3.59	3.59	0
Case M1—Use year 2007 meteorological data	2.12	2.11	-0.5	3.59	3.63	+1.1
Case S1—Population escalation to year 2060	2.12	2.32	+9.4	3.59	3.92	+9.2
Case S2—Population escalation of 1.5% per decade	2.12	1.88	-11.3	3.59	3.20	-10.9
Case S3—Watershed index of 1.0 for all sectors	2.12	2.18	+2.8	3.59	3.59	0

The emergency evacuation model was modeled as a single evacuation zone extending out 10 mi (16 km) from the plant. FENOC assumed that 95 percent of the population would evacuate. This assumption is conservative relative to the NUREG-1150 study (NRC 1990), which assumed evacuation of 99.5 percent of the population within the emergency planning zone (EPZ). The evacuated population was assumed to move at an average speed of approximately 0.58 meters per second (mps) (1.3 miles per hour (mph)) with a delayed start time of 4 hours and 55 minutes after declaration of a general emergency. The evacuation speed was derived from the projected time to evacuate the entire EPZ under the most conservative (long-time) conditions for “Summer, Midday, Weekend” (FENOC 2010). In response to an NRC staff RAI, FENOC identified that the evacuation analysis did not clearly identify a reference year for the EPZ population, and it was assumed to be year 2000 (FENOC 2011). No correction of the EPZ evacuation speed was made for the year 2040 population. In further response to the RAI, FENOC performed a sensitivity study, Case E3, using a 4.7 percent per decade escalation of the year 2000 EPZ population to year 2040 and assumed the evacuation speed decreased proportional to the population increase, or to 0.52 mps (1.2 mph). This resulted in no change in population dose risk and no change in offsite economic cost risk (FENOC 2011). A sensitivity study, Case E1, was performed in which the evacuation speed was increased to 1.0 mps (2.2 mph). This resulted in a 0.9 percent decrease in the total offsite population dose risk and no change in the offsite economic cost risk (FENOC 2011). An additional sensitivity study, Case A3, was performed for the warning delay time. The base case assumed about 300 seconds (5 minutes). The sensitivity case increased the warning time to 20 minutes. This resulted in no change in population dose risk and no change in offsite economic cost risk (FENOC 2012a). One additional sensitivity case was performed for shielding factors. The base case assumed wood housing, and the sensitivity case, Case E2, assumed brick. The sensitivity results showed a decrease in population dose risk of 23.6 percent and in offsite economic cost risk of 39.8 percent (FENOC 2012a). The NRC staff concludes that the evacuation assumptions and analysis are reasonable and acceptable for the purposes of the SAMA evaluation.

Site-specific agriculture and economic data were provided from 2007 National Census of Agriculture (USDA 2009a, 2009b) data for each of the 10 counties surrounding Davis-Besse to a distance of 50 mi (80 km). This included the fraction of land devoted to farming, annual farm sales, the fraction of farm sales resulting from dairy production, and the value of both farmland and non-farmland. Non-farm wealth was derived from 2005 and 2006 property tax valuations (MDT 2007; ODT 2008). A sensitivity case, Case S3, was performed using a water shed index of 1.0 (maximum runoff consequences) for all sectors. The results showed an increase in population dose risk of 2.8 percent and no change to offsite economic cost risk (FENOC 2011).

Area-wide farm wealth was determined from 2005 and 2006 property tax valuations (MDT 2007; ODT 2008) and county statistics for farmland, buildings, and machinery, with only the fraction of each county within 50 mi of Davis-Besse considered. The daily cost of compensation for evacuees and short-term relocatees used the year 2000 census economic data for each state (USCB 2000; USGSA 2000). In addition, parameters describing the cost of population and business relocation, farm and non-farmland decontamination, and decontamination labor used MACCS2 default values (NRC 1998a). An escalation factor of 1.95 based on the consumer price index was applied to these parameters to account for cost escalation from 1986 (the year the input was first specified) to 2009 (FENOC 2012b).

The NRC staff concludes that the methodology used by FENOC to estimate the offsite consequences for Davis-Besse provides an acceptable basis from which to proceed with an assessment of risk reduction potential for candidate SAMAs. Accordingly, the NRC staff based its assessment of offsite risk on the CDF and offsite doses reported by FENOC.

F.3 Potential Plant Improvements

The process for identifying potential plant improvements, an evaluation of that process, and the improvements evaluated in detail by FENOC are discussed in this section.

F.3.1 Process for Identifying Potential Plant Improvements

FENOC's process for identifying potential plant improvements (SAMAs) consisted of the following elements:

- review of the dominant cutsets and most significant basic events from the current, plant-specific PRA,
- review of potential plant improvements identified in the Davis-Besse IPE and IPEEE,
- review of SAMA candidates identified for LRAs for selected pressurized-water reactor (PWR) plants, and
- review of other industry documentation discussing potential plant improvements.

Based on this process, an initial set of 167 candidate SAMAs, referred to as Phase I SAMAs, was identified. In Phase I of the evaluation, FENOC performed a qualitative screening of the initial list of SAMAs and eliminated SAMAs from further consideration using the following criteria:

- The SAMA has design difference or has already been implemented at Davis-Besse.
- The SAMA is not applicable to Davis-Besse.

- The SAMA has estimated implementation costs that would exceed the dollar value associated with eliminating all severe accident risk at Davis-Besse.
- The SAMA is related to a non-risk significant system and, therefore, has a very low benefit.
- The SAMA Is similar in nature and could be combined with another SAMA candidate.

Based on this screening, 152 SAMAs were eliminated, leaving 15 for further evaluation. The remaining SAMAs, referred to as Phase II SAMAs, are listed in Table E.7-1 of the ER (FENOC 2010). In Phase II, a detailed evaluation was performed for each of the 15 remaining SAMA candidates, as discussed in Sections F.4 and F.6 below. To account for the potential impact of external events, the estimated benefits based on internal events were multiplied by a factor of 5.6, as previously discussed.

In response to NRC staff RAIs, FENOC re-evaluated all SAMAs screened in Phase I as "Very Low Benefit" using a recalculated maximum benefit based on an increased multiplier of 5.6 to account for the impact of external events. Based on this reevaluation, no additional SAMAs screened in Phase I were retained for the detailed Phase II evaluation.

F.3.2 Review of FENOC's Process

FENOC's efforts to identify potential SAMAs focused primarily on areas associated with internal initiating events but also included explicit consideration of potential SAMAs for fire and seismic events. The initial list of SAMAs generally addressed the accident sequences considered to be important to CDF from functional, initiating event, and risk reduction worth (RRW) perspectives at Davis-Besse.

FENOC's SAMA identification process began with a review of the list of potential PWR enhancements in Table 14 of Nuclear Energy Institute (NEI) 05-01 (NEI 2005). Review of this generic SAMA list resulted in all of the SAMAs from this table being identified as Phase I SAMAs, for a total of 154 Phase I SAMAs.

FENOC provided a tabular listing of the Level 1 PRA basic events sorted according to their RRW and the top 100 cutsets (FENOC 2010). SAMAs impacting these cutsets and basic events would have the greatest potential for reducing risk. For the basic events listing, FENOC used an RRW cutoff of 1.005, which corresponds to about a 0.5 percent change in CDF given 100-percent reliability of the SAMA. The NRC staff requested FENOC to identify the SAMA candidates that address each of the basic events having an RRW equating to a benefit greater than the minimum cost of a procedure change (NRC 2011a). In response to the RAI, FENOC provided a review of all Level 1 basic events having an RRW greater than or equal to 1.03, which corresponds to about a 3 percent change in CDF given 100-percent reliability of the SAMA (FENOC 2011). This equates to a benefit of approximately \$10,000 for internal events, which is the estimated minimum cost of a procedure change. Based on the review of evaluations from other plants, the \$10,000 estimated minimum cost for a procedure change is conservative.

Of the over 40 basic events reviewed, SAMA candidates were identified for all but 12 of the basic events. These remaining basic events were found to be: (1) events that had no physical meaning (such as a flag event or a plant configuration probability event); (2) events for which no feasible SAMA was identified; (3) events that could only be addressed by a hardware modification and had a maximum benefit less than the minimum cost of \$100,000 for a hardware change; or, (4) events that are being addressed by the installation of new steam generators in 2013.

In addition, as a result of the reevaluation of the Level 1 basic importance list in the RAI response, FENOC identified new SAMA candidate OT-09R, "present the highest worth PRA human actions to the Davis-Besse operator training." This SAMA candidate was, however, subsequently found by FENOC to already be implemented at Davis-Besse. Davis-Besse provides PRA information such as risk significant initiating events, high worth operator actions and high worth equipment. This information is provided to various departments and is presented on posters throughout the plant. In response to other NRC staff RAIs, FENOC explained that the following eight SAMA candidates were identified from plant-specific risk insights during the review of the cutsets and Level 1 basic events importance list: CB-20, install relief valves in the CCW system; CB-21, install pressure measurements between the two DHR suction valves in the line from the RCS hot leg; CC-19, provide automatic switchover of HPI and LPI suction from the BWST to containment sump for LOCAs; CC-21, reduce the BWST level at which switchover to containment recirculation is initiated; CP-19, install a redundant containment fan system; CW-24, replace the standby CCW pump with a pump diverse from the other two CCW pumps; CW-25, provide the ability to cool makeup pumps using fire water in the event of loss of CCW; and FW-16, perform surveillances on manual valves used for backup AFW pump suction. (FENOC 2011).

The NRC staff asked FENOC to specifically address the potential for SAMAs for the following basic events in the importance listing: WHAF3ISE, failure to isolate flood in room 328 before CCW pumps are affected; SHAF2ISE, failure to isolate flood before service water pumps are affected; F3AM, maximum flood in CCW pump room from service water (initiating event) and F7L, large circulating water flood in turbine building (initiating event) (NRC 2011a). In response to the RAI, FENOC explained that no SAMAs were identified for the first three events because they did not have an RRW benefit value equal to or greater than the cost of a procedural change (FENOC 2011). However, Phase I SAMA candidate FL-01, "improve inspection of rubber expansion joints on the main condenser," was identified to address basic event F7L. FENOC determined, after further evaluation of this SAMA, that it was already implemented at Davis-Besse and, as a result, the screening disposition for FL-01 was reclassified in the Phase I screening from having a very low benefit to already implemented.

The NRC staff asked FENOC to evaluate a SAMA for basic events QMBAFP11 and QMBAFP12, which involve maintenance outages of the auxiliary feedwater (AFW) trains, which would make improvements to AFW maintenance practices or hardware (NRC 2011a). In response to the RAI, FENOC explained that AFW maintenance unavailability data used in the PRA is based on Maintenance Rule data and is consistent with the generic industry unavailability data reported in NUREG/CR-6928 (FENOC 2011). FENOC further explained that improvements to maintenance practices at Davis-Besse are proposed and evaluated as an element of normal business practices to maintain the AFW train unavailability at its lowest achievable value. Based on the unavailability of the AFW being consistent with the industry unavailability data, and because of the high cost of making improvements to safety-related hardware, FENOC concluded that a SAMA to improve the availability of the AFW pumps is not expected to be cost-beneficial. Based on this information, the NRC staff agrees that a SAMA to improve the availability of the AFW pumps is unlikely to be cost-beneficial.

The NRC staff noted that there are a significant number of operator errors and non-recovery actions that appear in the CDF and LERF importance listings and top 100 cutsets listing, yet no weakness in training or procedures was identified. In light of this, the NRC staff asked FENOC to explain the process used to make the determination that no opportunities exist to improve training or procedures and to discuss whether opportunities exist for reducing risk by providing automatic functions to risk significant operator actions (NRC 2011a). In response to the RAI, FENOC explains that, based on its analysis of human failure events using the EPRI HRA calculator, no specific vulnerabilities in procedures, training, staff, assumptions, performance shaping factors, or timing were found (FENOC 2011). FENOC further explains, however, that two additional SAMA candidates were evaluated to address risk-significant operations—AC/DC-28R, “automatically start and load the SBO DG on Bus D2 upon loss of power to the bus,” and OT-08R, “automatically start and load the SBO DG on Bus D2 upon loss of power to the bus in combination with automatically starting the motor-driven feedwater pump (MDFP).” These are discussed further in Section F.6.2. In a clarification to the RAI response, FENOC concludes that the opportunities to automate operator actions has been fully considered because, in addition to these two additional SAMA candidates, three new SAMA candidates related to automating operator actions were evaluated in response to other NRC staff RAIs (SAMAs CC-22R, CW-26R, and FW-17R defined in Table F-6 and discussed in Section F.6.2). Five SAMA candidates were identified and evaluated in the ER to evaluate automating operator actions (SAMAs AC/DC-14, AC/DC-25, AC/DC-26, AC/DC-17, and CC-19), and other additional Phase I SAMA candidates to automate operator actions were identified but screened from the Phase II evaluation. Additionally, all basic events having an RRW equal to or greater than the cost of a procedure change were reviewed for SAMA candidates (NRC 2011b). The NRC staff concludes that the opportunity for SAMA candidates to automate operator actions has been adequately explored, and it is unlikely that there are additional cost-beneficial SAMA candidates to automate operator actions.

FENOC also provided and reviewed the LERF-based RRW events down to a RRW of 1.005 (FENOC 2010). In response to an NRC staff RAI, FENOC provided a review of all Level 2 basic events having an RRW greater than or equal to 1.03 as was done for the Level 1 basic events (FENOC 2011). FENOC explained that the RRW for the Level 2 basic events was calculated based on LERF rather than CDF and that the estimated benefit for each basic event was derived by taking the RRW for LERF and applying the maximum benefit used for the CDF event, which is conservative. Of the over 20 basic events reviewed, SAMA candidates were identified for about half of the basic events. The remaining basic events were found to be: (1) events that had no physical meaning (such as a flag event or a plant configuration probability event); (2) events for which no feasible SAMA was identified; (3) events that could only be addressed by a hardware modification and had a maximum benefit less than the minimum cost of $100,000 for a hardware change; or, (4) that are being addressed by the installation of new steam generators in 2013. No new SAMA candidates were identified from this review.

FENOC reviewed the SAMA candidates from prior SAMA analyses for nine PWR sites. FENOC’s review did not identify any additional SAMA candidates applicable to Davis-Besse that were not already identified from the importance analysis review described above.

For some of the SAMAs listed in the ER, the information provided did not sufficiently describe the proposed modification. Therefore, the NRC staff asked the applicant to provide more detailed descriptions of the modifications for several of the SAMA candidates (NRC 2011a). In response to the RAI, FENOC provided the requested information on the modifications for SAMAs: AC/DC-01, provide additional DC battery capacity; CC-19, install a redundant containment fan system; AC/DC-25, provide a dedicated DC power system (battery/battery charger) for TDAFW control; and CW-24, replace the standby CCW pump with a pump diverse from the other two CCW pumps (FENOC 2011).

FENOC considered both the potential plant improvements and risk insights described in the IPE and IPEEE in the identification of plant-specific candidate SAMAs for internal and external events. Although the IPE did not identify any vulnerabilities, seven "front-end" (Level I PRA) and four "back-end" (Level II PRA) plant improvements were identified in Part 6, Sections 3.1 and 3.2, respectively, of the IPE report. FENOC identified five additional SAMA candidates to address the five "front-end" plant improvements from the IPE—AC/DC-25, AC/DC-26, AC/DC-27, HV-06 (Provide procedural guidance for establishing an alternate means of room ventilation to the service water pump room), and CC-20 (Modify hardware and procedures to allow using the makeup pumps for high pressure recirculation from the containment sump).

The NRC staff requested information regarding the status of the four suggested "back-end" improvements from the IPE (NRC 2011a). In response to the RAI, FENOC clarified that the four suggested improvements (i.e., reduce the BWST level during switchover to sump recirculation, improve operator actions for inadequate core cooling, re-examine the emergency plan evacuation criteria, and monitor carbon monoxide levels in containment) have been implemented.

The NRC staff requested information regarding lower cost alternatives to some of the SAMAs evaluated (NRC 2011a), including those listed below:

(a) automate RCP trip on high motor bearing cooling temperature,

(b) use the decay heat removal (DHR) system as an alternate suction source for high-pressure injection (HPI)

(c) automate HPI injection on low pressurizer level (in loss of secondary side heat removal cases where the reactor coolant system (RCS) pressure remains high while the RCS level drops),

(d) automate refill of the BWST,

(e) automate start of AFW pump in the event the automated emergency feedwater (EFW) system is unavailable, and

(f) purchase or manufacture of a "gagging device" that could be used to close a stuck-open steam generator safety valve for an SGTR event prior to core damage.

In response to the RAIs, FENOC addressed the suggested lower cost alternatives and determined that they were either already implemented at Davis-Besse (b), not feasible (c), or not cost-beneficial (a, d, e, and f)(FENOC 2011). This is discussed further in Section F.6.2.

Based on this information, the NRC staff concludes that the set of SAMAs evaluated in the ER, together with those identified in response to NRC staff RAIs, addresses the major contributors to internal event CDF.

The Davis-Besse IPEEE seismic evaluation identified one unresolved outlier remaining from implementation of the USI A-46 Program. The one unresolved outlier was the identification of two flammable compressed gas bottles in the auxiliary building with inadequate seismic mounting. An action to address the seismic-fire interaction issues associated with these flammable compressed gas bottles was identified and implemented by the applicant (NRC 2001). The USI A-46 SER for Davis-Besse indicates that the license had completed the resolution of all outliers (NRC 2000).

As discussed in Section F.2.2, the NRC staff requested information regarding any plant improvements for identified structures and components with an HCLPF value of less than 0.3 g (i.e., BWST roof, Masonry Wall No. 2367, Masonry Wall No. 3407, Masonry Wall No. 4786, and Masonry Wall No. 6107). The NRC staff asked the applicant to identify and evaluate SAMAs to improve the seismic capacity of these components and structures (NRC 2011a). In response to the RAI, FENOC explains that seismic improvements have been made to two of the masonry walls and that the Davis-Besse masonry wall analysis has been updated to ensure that the other two masonry walls met allowable stresses and design basis requirements (FENOC 2011). In a clarification to the RAI response, FENOC further explains that SAMA CC-10, which considers providing an in-containment reactor water storage tank, meets the intent of improving the seismic capacity of the BWST by providing a tank independent of the BWST (NRC 2011b).

The IPEEE did not identify opportunities for improvements related to fire events (FENOC 1996). FENOC also did not identify any other plant vulnerabilities in the IPEEE that would impact the PRA CDF (FENOC 2010).

The NRC staff asked FENOC to review each of the four dominant fire areas discussed in Section F.2.2 to identify potential SAMA candidates to reduce fire risk and to provide an assessment of identified SAMA candidates (NRC 2011a). FENOC responded that the main contributors to fire risk in all four areas are the MDFP, AFW system, and pilot-operated relief valve (PORV) (FENOC 2011). Loss of all feedwater or the inability to perform feed and bleed cooling are the primary contributors to CDF. FENOC's search for SAMA candidates, therefore, focused on these two fire-induced failure scenarios and determined that existing Phase I SAMAs (CC-16, FW-02, FW-08, FW-09, FW-10, and FW-11) already adequately address these contributors to CDF.

The NRC staff identified three SAMA candidates (CB-02, CP-21, and OT-07) that were screened on very low benefit based on low contribution to LERF. In light of the fact that the release categories comprising LERF were not identified in the ER, the NRC staff asked FENOC to justify screening out these SAMA candidates (NRC 2011a). In response to the RAI, FENOC explains two of these SAMAs (CB-02 and CP-21) do not contribute to LERF and, therefore, are appropriately screened (FENOC 2011). FENOC also clarified that the screening basis in the ER for SAMA OT-07 was incorrect and that this SAMA was screened on the basis of its contribution to both CDF and LERF.

The NRC staff noted that several Phase I SAMAs were screened by being subsumed into other SAMAs and asked FENOC to either confirm that cost to implement these SAMAs is lower than those into which the SAMA was subsumed or provide a revised basis for the Phase I screening (NRC 2011a). In response to the RAI, FENOC explained that four such SAMAs (i.e., AC/DC-06, AC/DC-09, AC/DC-20, and CC-08) have an equivalent or higher implementation cost than the SAMAs into which they were subsumed (FENOC 2011). FENOC also provided a cost-benefit evaluation of these SAMAs. This is discussed further in Section F.6.2. FENOC further explained that the fifth subsumed SAMA (i.e., CB-07) was subsumed into SAMA CB-08, which was screened as already implemented at Davis-Besse. FENOC also determined that SAMA CB-08 was already implemented and rescreened this SAMA on that basis.

The NRC staff noted that Phase I SAMA CB-18, "direct steam generator flooding after an SGTR, prior to core damage," was screened because it could impact efforts to mitigate SGTR, but it points out that this SAMA has been shown to be cost-beneficial in other SAMA analyses and asked FENOC to evaluate this SAMA (NRC 2011a). FENOC explained that in the

Davis-Besse PRA model the SGTR sequences are grouped into core damage bins in which either feedwater is unavailable to the steam generators and, therefore, flooding the steam generators is not possible or feedwater is available and scrubbing is already expected to occur so that flooding the steam generators provides no additional scrubbing benefit (FENOC 2011). Based on this, FENOC concludes that further evaluation of SAMA CB-18 is not warranted. Based on the once-through steam generator design used at Davis-Besse, the NRC staff agrees with this conclusion.

FENOC did not identify any additional SAMA candidates in the 2012 SAMA supplement (FENOC 2012a)

The NRC staff notes that the set of SAMAs submitted is not all-inclusive, since additional, possibly even less expensive, design alternatives can always be postulated. However, the NRC staff concludes that the benefits of any additional modifications are unlikely to exceed the benefits of the modifications evaluated and that the alternative improvements would not likely cost less than the least expensive alternatives evaluated, when the subsidiary costs associated with maintenance, procedures, and training are considered.

The NRC staff concludes that FENOC used a systematic and comprehensive process for identifying potential plant improvements for Davis-Besse, and the set of SAMAs evaluated in the ER, together with those evaluated in response to NRC staff inquiries, is reasonably comprehensive and, therefore, acceptable. This search included reviewing insights from the plant-specific risk studies and reviewing plant improvements considered in previous SAMA analyses. While explicit treatment of external events in the SAMA identification process was limited, it is recognized that the prior implementation of plant modifications for fire risks, the absence of external event vulnerabilities (as documented in the IPEEE), and the use of an external events multiplier reasonably justifies examining primarily the internal events risk results for this purpose.

F.4 Risk Reduction Potential of Plant Improvements

FENOC evaluated the risk-reduction potential of the 15 SAMAs retained for the Phase II evaluation in the ER. The SAMA evaluations were generally performed in a bounding fashion in that the SAMA was assumed to eliminate all of the risk associated with the proposed enhancement. FENOC also provided the risk-reduction potential of six additional SAMAs (i.e., AC/DC-28R, OT-08R, CW-26R, CC-22R, FW-17R, and CB-22R) identified in response to RAIs using the same bounding approach. This bounding approach overestimates the benefit and is conservative.

FENOC used model re-quantification to determine the potential benefits. The CDF, population dose, and offsite economic cost reductions were estimated using the Davis-Besse SAMA analysis model. The changes made to the model to quantify the impact of SAMAs are detailed in Table E.7-1 of Attachment E to the ER (FENOC 2010). The changes made to the model to determine the risk reduction for the six SAMAs identified in response to NRC staff RAIs are provided in a clarification to the RAI responses (NRC 2011b). Table F-6 lists the assumptions considered to estimate the risk reduction for each of the evaluated SAMAs, the estimated risk reduction in terms of percent reduction in CDF and population dose, and the estimated total benefit (present value) of the averted risk. The estimated benefits reported in Table F-6 reflect the combined benefit in both internal and external events. The determination of the benefits for the various SAMAs is further discussed in Section F.6.

The NRC staff requested FENOC to clarify why the population dose risk reduction in Table E.7-2 of the ER is either 10 percent or 0 percent and to explain how population dose risk was calculated (NRC 2011a). In response to the RAI, FENOC clarified that binary appearance of the reported population dose risk reduction is due to the round-off used in spreadsheet calculations (FENOC 2011). It was further explained that the population dose for each SAMA candidate is determined using the population dose determined by MACCS2 for each release category, the release category frequency from the PRA, and the sum of the population dose risk times the frequency for all release categories. The percent change is determined by comparison of the population dose risk for each SAMA candidate compared with the base case. In addition, FENOC regenerated the population dose risk reduction for all SAMAs evaluated, including the new SAMAs evaluated in response to NRC RAIs, to a higher number of significant digits to illustrate the distinction between the population dose risk values for each SAMA candidate. The regenerated population dose risk reduction for each SAMA candidate includes the revised Level 3 PRA analysis to include the Canadian population, as discussed in Section F.2.2. The revised population dose risk values having more significant figures are provided in Table F-6.

The NRC staff noted that the risk reduction reported for SAMA AC/DC-14, "install a gas turbine generator," which assumes failure of the SBO DG is eliminated, does not appear to credit the situation where all emergency diesel generators (EDGs) are unavailable, and it asked FENOC to provide an assessment of this apparent omission (NRC 2011a). FENOC responded that, in the PRA model, the SBO DG is modeled as a backup to either EDG 1 or EDG 2 or both when they are unavailable (FENOC 2011). FENOC also explained that the analysis of this SAMA conservatively eliminated failure of the SBO DG ensuring that one train of emergency power was always available.

The NRC staff has reviewed FENOC's bases for calculating the risk reduction for the various plant improvements and concludes that the rationale and assumptions for estimating risk reduction are reasonable and generally conservative (i.e., the estimated risk reduction is higher than what would actually be realized). Accordingly, the NRC staff based its estimates of averted risk for the various SAMAs on FENOC's risk reduction estimates.

Table F-6. SAMA Cost-Benefit Screening Analysis for Davis-Besse[(a)]

SAMA	Modeling Assumptions	% Risk Reduction		Total benefit ($)[(c)]		Cost ($)
		CDF	Population Dose[(c)]	Using 7% Discount Rate	Using 3% Discount Rate	
AC/DC-01—Provide additional DC battery capacity	Reduce the offsite power non-recovery probabilities to reflect an increase in battery life to 7 hours from 1 hour	6	2	100K	150K	1.75M
AC/DC-03—Add a portable, diesel-driven battery charger to existing DC system	Eliminate loss of DC power from station batteries due to loss of DC battery chargers	22	12	400K	600K	330K
AC/DC-14—Install a gas turbine generator	Eliminate failure of the SBO DG and associated operator actions	10	16	240K	360K	2.0M

SAMA	Modeling Assumptions	% Risk Reduction		Total benefit ($)[c]		Cost ($)
		CDF	Population Dose[c]	Using 7% Discount Rate	Using 3% Discount Rate	
AC/DC-19—Use fire water system as a backup source for diesel cooling	Eliminate failure of the EDGs due to loss of CCW system	2	2	39K	60K	700K
AC/DC-21—Develop procedures to repair or replace failed 4 kV breakers	Eliminate failure of the 4 kV breakers	3	<1	48K	72K	100K
AC/DC-25—Provide a dedicated DC power system (battery/battery charger) for turbine-driven auxiliary feedwater (TDAFW) control	Eliminate failure of the TDAFW system due to loss of DC power	15	3	240K	370K	2.0M
AC/DC-26—Provide an alternator/generator that would be driven by each TDAFW pump to provide DC control power	Eliminate failure of the TDAFW system due to loss of DC power	15	3	240K	370K	2.0M
AC/DC-27—Increase the size of the SBO fuel oil tank	Eliminate failure of the operators to refuel the oil tank	0	0	0	0	550K
CB-21—Install pressure measurements between the two DHR suction valves in the line from the RCS hot leg	Eliminate latent failure of the upstream DHR suction valve (i.e., eliminate failures of the inboard isolation valve DH12 prior to demand)[d]	0	6	30K	46K	550K
CC-01—Install an independent active or passive HPI system	Eliminate failure of one HPI train	0	1	3.4K	5.3K	6.5M
CC-04—Add a diverse low-pressure injection (LPI) system	Eliminate failure of one LPI train	0	0	0	0	5.5M
CC-05—Provide capability for alternate LPI via diesel-driven fire pump	Eliminate failure of one LPI train and eliminate failure of LPI due to loss of AC/DC power	0	0	0	0	6.5M
CC-19—Provide automatic switchover of HPI and LPI suction from the BWST to containment sump for LOCAs	Eliminate operator failures to switchover HPI and LPI suction to the containment sump	1	0	15K	23K	1.5M

SAMA	Modeling Assumptions	% Risk Reduction		Total benefit ($)[c]		Cost ($)
		CDF	Population Dose[c]	Using 7% Discount Rate	Using 3% Discount Rate	
HV-01—Provide a redundant train or means of ventilation	Eliminate failure of the low voltage switchgear room ventilation	0	<1	1.4K	2.1K	50K
HV-03—Stage backup fans in switchgear rooms	Eliminate failure of the low voltage switchgear room ventilation	0	<1	1.4K	2.1K	400K
AC/DC-28R[b]—Automatic start and load SBO DG on Bus D2 on loss of power to that bus	Eliminate operator failure to start the SBO DG	17	4	280K	420K	1.6M
CB-22R[b]—Purchase or manufacture of a "gagging device" that could be used to close a stuck-open steam generator safety valve for an SGTR event prior to core damage	Eliminate failure of main steam safety valve to close	3	12	110K	170K	4.6M
CC-22R[b]—Automatic refill of the BWST	Eliminate operator failure to refill the BWST	0	0	0	0	2.2M
CW-26R[b]—Automatic RCP trip on high motor bearing cooling temperature	Eliminate operator failure to trip the RCPs on loss of seal cooling and injection	23	3	365K	550K	1.5M
FW-17R[b]—Automatic start of AFW pump in the event the automated emergency system is unavailable	Eliminate operator failure to start the MDFP	25	6	410K	620K	2.8M
OT-08R[b]—Automatic start and load SBO DG on Bus D2 on loss of power to that bus in combination with automatically starting the MDFP	Eliminate operator failure to start the MDFP and SBO DG	43	9	700K	1.1M	4.4M

[a] SAMAs in bold are potentially cost-beneficial.

[b] SAMA description and evaluation provided in response to NRC staff RAIs 5.d and 7a–f (FENOC 2011). SAMA modeling assumptions provided in a clarification to the RAI responses (NRC 2011b).

[c] Estimated population doses and benefits reflect revised values provided in response to NRC staff RAIs 3.c, 4.b, and 6.e and to correct five errors identified in the 2012 SAMA supplement (FENOC 2011, 2012a).

[d] Modeling assumption clarified in response to NRC staff RAI 6.h (FENOC 2011).

F.5 Cost Impacts of Candidate Plant Improvements

FENOC developed plant-specific costs of implementing the original 15 Phase II candidate SAMAs as well as 6 additional SAMAs identified in response to NRC staff RAIs. The NRC staff asked FENOC to describe the level of detail used to develop the cost estimates and to clarify whether the cost estimates accounted for inflation, contingency costs associated with unforeseen implementation obstacles, replacement power during extended outages, and maintenance and surveillance costs during plant operation (NRC 2011a). In response to the RAI, FENOC clarified that the cost estimates conservatively did not include inflation, contingency costs associated with unforeseen implementation obstacles, or the cost of replacement power during extended outages required to implement the modifications (FENOC 2011). FENOC also clarified that the cost estimates considered the cost of equipment, fuel, space requirements, and the extent of the modifications and were developed by an expert panel that was composed of experienced staff drawn from engineering, operations, procurement, and project management. It was further explained that some implementation costs were assigned standard values based on plant experience or estimated man-hour requirements and that the following is true:

- minimal procedure changes would be between $10,000 and $50,000,
- procedural changes with engineering support would be between $50,000 and $200,000,
- procedural changes with engineering support and testing or training would be between $200,000 and $300,000, and
- minimal physical plant changes would start at $100,000.

Support activities included costs associated with procurement, installation, long-term maintenance, surveillance, calibration, and initial and on-going training.

The NRC staff reviewed the bases for the applicant's cost estimates (presented in Section E.7.2 of Attachment E to the ER). For certain improvements, the NRC staff also compared the cost estimates to estimates developed elsewhere for similar improvements, including estimates developed as part of other applicant's analyses of SAMAs for operating reactors. Specifically, the NRC staff requested justification for the estimated cost of $1.5 million for implementation of SAMA CC-19, "provide automatic switch over of HPI and LPI suction from the BWST to containment sump for LOCAs." This amount seems high for what is described as a capability that already exists at Davis-Besse but has been deactivated and is also higher than that estimated by other applicants (NRC 2011a). FENOC explained that the expert panel made the following assumptions in developing the cost estimate for this SAMA candidate (FENOC 2011):

- reconnection and reactivation of automatic switchover equipment that is already in place,
- re-performing the Appendix R analyses since the associated valves were de-powered to meet Appendix R criteria (approximately $500,000),
- modifications to safety-related equipment and the associated calculation support (approximately $500,000),
- procedure changes and initial testing and training (approximately $300,000), and
- ongoing testing, surveillances, maintenance, and training (approximately $200,000).

Based on the need for the Appendix R analysis, the NRC staff finds FENOC's justification for the cost estimate for SAMA CC-19 reasonable.

The NRC staff requested justification for the estimated cost of $2 million for implementation of SAMA AC/DC-25, "provide a dedicated DC power system (battery/battery charger) for the TDAFW control valve and NNI-X for steam generator level indication." This amount seems high for a system dedicated to just the TDAFW control valves and in light of the lower estimated costs for similar SAMA candidates AC/DC-01 and AC/DC-03 (NRC 2011a). In response to the RAI, FENOC explained that the expert panel made the following assumptions in developing the cost estimate for this SAMA candidate (FENOC 2011):

- a dedicated set of batteries and battery charger with a longer battery lifetime than the existing safety-related DC system and automatic steam generator level control,
- safety-related space for the batteries (approximately $400,000),
- modifications to safety-related equipment with seismic evaluation and associated calculation support (approximately $500,000),
- procedure changes and initial testing and training (approximately $300,000), and
- procurement and installation of batteries and other components and equipment (approximately $700,000).

Based on the estimated cost for additional safety-related space for the batteries, the NRC staff finds FENOC's justification for the cost estimate for SAMA AC/DC-25 reasonable.

The NRC staff requested justification for the estimated cost of $7.5 million for implementation of SAMA CW-24, "replace the standby CCW pump with a pump diverse from the other two CCW pumps." This amount seems high for a pump replacement (NRC 2011a). FENOC explained that the expert panel made the following assumptions in developing the cost for this SAMA candidate (FENOC 2011):

- additional safety-related space is needed to provide separation from the existing CCW pumps (approximately $2 million),
- design, procurement, and installation of the pump and associated components and equipment (approximately $4 million),
- modifications to safety-related equipment with seismic evaluation and associated calculation support (approximately $1 million), and
- procedure changes and initial testing and training (approximately $500,000).

Based on the estimated cost for additional safety-related space for the pump, the NRC staff finds FENOC's justification for the cost estimate for SAMA CW-24 reasonable.

The NRC staff requested justification for the estimated cost of $1.75 million for SAMA AC/DC-01, "provide additional DC battery capacity" (NRC 2011a). In response to the RAI, FENOC explained that the expert panel made the following assumptions in developing the cost for this SAMA candidate (FENOC 2011):

- safety-related space for the batteries (approximately $500,000),
- major modifications to equipment (approximately $200,000),

- procedure changes and initial testing and training (approximately $300,000), and
- procurement and installation of batteries and other components and equipment (approximately $600,000).

Based on the estimated cost for additional safety-related space for the batteries, the NRC staff finds FENOC's justification for the cost estimate for SAMA AC/DC-01 reasonable.

The NRC staff reviewed the costs provided in the ER, and in response to NRC staff RAIs, and found them to be reasonable and generally consistent with estimates provided in support of other plants' analyses. The NRC staff concludes that the cost estimates provided by FENOC are sufficient and appropriate for use in the SAMA evaluation.

F.6 Cost-Benefit Comparison

FENOC's cost-benefit analysis and the NRC staff's review are described in the following sections.

F.6.1 FENOC's Evaluation

The methodology used by FENOC was based primarily on NRC's guidance for performing cost-benefit analysis (i.e., NUREG/BR-0184, *Regulatory Analysis Technical Evaluation Handbook* (NRC 1997a)). The guidance involves determining the net value for each SAMA according to the following formula:

Net Value = (APE + AOC + AOE + AOSC) – COE where the following is true:
APE = present value of averted public exposure ($)
AOC = present value of averted offsite property damage costs ($)
AOE = present value of averted occupational exposure costs ($)
AOSC = present value of averted onsite costs ($)
COE = cost of enhancement ($)

If the net value of a SAMA is negative, the cost of implementing the SAMA is larger than the benefit associated with the SAMA and it is not considered cost-beneficial. FENOC's derivation of each of the associated costs is summarized below.

NUREG/BR-0058 has been revised to reflect the agency's policy on discount rates. Revision 4 of NUREG/BR-0058 states that two sets of estimates should be developed, one at 3 percent and one at 7 percent (NRC 2004). FENOC provided a base set of results using the 7 percent discount rate and a sensitivity study using the 3 percent discount rate (FENOC 2010, 2012a).

<u>Averted Public Exposure Costs</u>. The APE costs were calculated using the following formula:

APE = Annual reduction in public exposure (Δperson-rem/year)
x monetary equivalent of unit dose ($2,000 per person-rem)
x present value conversion factor (12.27 based on a 28-year period with a 7-percent discount rate)

As stated in NUREG/BR-0184 (NRC 1997a), the monetary value of the public health risk after discounting does not represent the expected reduction in public health risk due to a single accident. Rather, it is the present value of a stream of potential losses extending over the remaining lifetime (in this case, the renewal period) of the facility. FENOC based its calculations on a 28-year period, which is the summation of the 20-year license renewal period and the 8-year period remaining in the current plant license, which is conservative. For the purposes of initial screening, which assumes elimination of all severe accidents caused by internal events, FENOC calculated, in response to an NRC staff RAI, an APE of approximately $52,000 for the 20-year license renewal period and the 8 years of remaining life in the current plant license (FENOC 2012a).

Averted Offsite Property Damage Costs. The AOCs were calculated using the following formula:

AOC = Annual CDF reduction

x offsite economic costs associated with a severe accident (on a per-event basis)
x present value conversion factor

This term represents the sum of the frequency-weighted offsite economic costs for each release category, as obtained for the Level 3 risk analysis. For the purposes of initial screening, which assumes elimination of all severe accidents caused by internal events, FENOC calculated, in response to an NRC staff RAI, an annual offsite economic cost of about $3,590 based on the Level 3 risk analysis (FENOC 2012a). This results in a discounted value of approximately $44,000 for the 20-year license renewal period and the 8 years of remaining life in the current plant license (FENOC 2012a).

Averted Occupational Exposure Costs. The AOE costs were calculated using the following formula:

AOE = Annual CDF reduction
x occupational exposure per core damage event
x monetary equivalent of unit dose
x present value conversion factor

FENOC derived the values for AOE from information provided in Section 5.7.3 of the *Regulatory Analysis Handbook* (NRC 1997a). Best estimate values provided for immediate occupational dose (3,300 person-rem) and long-term occupational dose (20,000 person-rem over a 10-year cleanup period) were used. The present value of these doses was calculated using the equations provided in the handbook in conjunction with a monetary equivalent of unit dose of $2,000 per person-rem, a real discount rate of 7 percent, and a time period of 28 years to represent the license renewal period and the remaining plant life in the current license. For the purposes of initial screening, which assumes elimination of all severe accidents caused by internal events, FENOC calculated an AOE of approximately $4,300 for the 20-year license renewal period and the 8 years of remaining life in the current plant license (FENOC 2010).

Averted Onsite Costs. AOSCs include averted cleanup and decontamination costs (ACCs) and averted power replacement costs. Repair and refurbishment costs are considered for recoverable accidents only and not for severe accidents. FENOC derived the values for AOSC based on information provided in Section 5.7.6 of NUREG/BR-0184, the *Regulatory Analysis Handbook* (NRC 1997a).

FENOC divided this cost element into two parts—the onsite cleanup and decontamination cost, also commonly referred to as ACCs, and the replacement power cost (RPC).

ACCs were calculated using the following formula:

ACC = Annual CDF reduction
x present value of cleanup costs per core damage event
x present value conversion factor

The total cost of cleanup and decontamination subsequent to a severe accident is estimated in NUREG/BR-0184 to be $\$1.5 \times 10^9$ (undiscounted). This value was converted to present costs over a 10-year cleanup period and integrated over the term of the proposed license extension and remaining plant life. For the purposes of initial screening, which assumes elimination of all severe accidents caused by internal events, FENOC calculated an ACC of approximately $132,400 for the 20-year license renewal period and the 8 years of remaining life in the current plant license.

Long-term RPCs were calculated using the following formula:

RPC = Annual CDF reduction
x present value of replacement power for a single event
x factor to account for remaining service years for which replacement power is required
x reactor power scaling factor

FENOC based its calculations on the 910 megawatt-electric (MWe) reference plant in NUREG/BR-0184 (NRC 1997a) and did not scale down to the 908 MWe rating for Davis-Besse. Therefore, FENOC did not apply a power scaling factor to determine the RPCs, which are conservative. For the purposes of initial screening, which assumes elimination of all severe accidents caused by internal events, FENOC calculated an RPC of approximately $133,900 and an AOSC of approximately $266,300 for the 20-year license renewal period and the 8 years of remaining life in the current plant license.

Using the above equations, FENOC estimated the total present dollar value equivalent associated with eliminating severe accidents from internal events at Davis-Besse to be about $367,000 (FENOC 2012a). As discussed in Section F.2.2, in response to an NRC staff RAI, FENOC used a multiplier of 5.6 to account for external events, which increases the value to $2.05 million and represents the dollar value associated with eliminating all internal and external event severe accident risk at Davis-Besse, also referred to as the modified maximum averted cost risk (MMACR).

<u>FENOC's Results</u>. If the implementation costs for a candidate SAMA exceeded the calculated benefit, the SAMA was considered not to be cost-beneficial. In the revised baseline analysis contained in the responses to an NRC staff RAI (FENOC 2011) and in the 2012 SAMA supplement (FENOC 2012a), using a 7 percent discount rate, FENOC identified one potentially cost-beneficial SAMA. Based on the results of the revised sensitivity analysis using a 3 percent discount rate, FENOC did not identify any additional potentially cost-beneficial SAMAs. FENOC also provided a revised uncertainty analysis using the multiplier of 7.0 to account for external events benefits, which resulted in no additional potentially cost-beneficial SAMAs.

The potentially cost-beneficial SAMA for Davis-Besse is SAMA AC/DC-03, "add a portable, diesel-driven battery charger to existing DC system." This potentially cost-beneficial SAMA, and FENOC's plans for further evaluation of this SAMA, is discussed in more detail in Section F.6.2.

F.6.2 Review of FENOC's Cost-Benefit Evaluation

The cost-benefit analysis performed by FENOC was based primarily on NUREG/BR-0184 (NRC 1997a) and discount rate guidelines in NUREG/BR-0058 (NRC 2004), and it was executed consistent with this guidance.

SAMAs identified primarily on the basis of the internal events analysis could also provide benefits in certain external events. FENOC accounted for the potential risk reduction benefits associated with external events by applying a multiplier to the estimated benefits for internal events. In the analysis reported in the ER, FENOC multiplied the estimated benefits for internal events by a factor of 4.0 incorporating an external events multiplier of 3.0 to account for external events (based on the assumption that fire, seismic and other external events each contribute a benefit equivalent to that from internal events). As discussed in Section F.2.2, the NRC staff noted in an RAI that the external events multiplier should be 3.6 (based on a fire CDF of 2.9×10^{-5} per year, a seismic CDF of 6.7×10^{-6} per year, a negligible contribution from HFO events, and an internal events CDF of 9.8×10^{-6} per year). The NRC staff asked FENOC to assess the impact on the SAMA evaluation of using the higher multiplier (NRC 2011a). In response to the RAI, FENOC provided a revised baseline evaluation by applying an external events multiplier of 4.6 resulting in a total multiplier of 5.6 (based on a fire CDF of 2.9×10^{-5} per year, a seismic CDF of 6.7×10^{-6} per year, an HFO CDF of 1.0×10^{-5} per year, and an internal events CDF of 1.0×10^{-5} per year) to the estimated SAMA benefits in internal events to account for potential SAMA benefits in both internal and external events (FENOC 2011). The results of this revised evaluation, incorporating the revised SAMA analysis provided in the 2012 SAMA supplement, are provided in Table F-6 (FENOC 2012a). As a result of the revised baseline analysis (using a multiplier of 5.6 and a 7 percent discount rate), FENOC found one SAMA (SAMA AC/DC-03) to be potentially cost-beneficial.

The NRC staff asked FENOC to provide an assessment of the uncertainty distribution for CDF and an assessment of the impact on the SAMA analysis of using the 95th percentile CDF (NRC 2011a). In response to the RAI, FENOC presented the results of an uncertainty analysis of the internal events CDF for Davis-Besse, which indicates that the 95th percentile value is a factor of 1.45 greater than the mean CDF for Davis-Besse (FENOC 2011). FENOC reexamined both the Phase I and Phase II SAMAs to determine if any would be potentially cost-beneficial if the revised baseline benefits were increased by an additional factor of 1.45 (in addition to the multiplier of 5.6 to account for external events). No additional SAMAs became cost-beneficial as a result of this analysis or the revised analysis provided in the 2012 SAMA supplement (FENOC 2012a).

FENOC provided the cost-benefit results of additional sensitivity analyses in the ER, including the following:

- assuming the cost of repair and refurbishment of damaged plant equipment is 20 percent of the baseline RPC (FENOC 2011),
- using 3 percent and 10 percent discount rates,
- using 14,000 person-rem for short term dose and 30,000 person-rem for long term doses,
- using an onsite cleanup and decontamination cost of $2.0 billion,
- escalating the annual RPC to 2009 dollars by an average annual inflation rate of 2.3 percent (FENOC 2011),

- using a multiplier of 8.0 to account for external events,
- using a higher population evacuation speed of 1.0 mps (NRC 2011b), and
- In addition, FENOC provided in the ER the results of sensitivity analyses of variations in MACCS2 input parameters (as discussed in Section F.2.2).

Revised results for all of these sensitivity cases are provided in Table E.8-1 of the 2012 SAMA supplement to account for the revised external events multiplier discussed above, to account for the correction to the population estimate discussed in Section F.2.2, and to correct the five errors in the ER SAMA analysis discussed in Section F.2.2 (FENOC 2012a). No additional SAMAs became cost-beneficial as a result of these analyses. It is noted that the sensitivity case using a 3 percent discount rate results in the most bounding cost-benefit results for all SAMAs, all sensitivity analyses, and the uncertainty analysis. The results for the 3 percent discount rate sensitivity case are provided in Table F-6.

The NRC staff noted that the higher evacuation speed sensitivity case resulted in a lower population dose, as would be expected, but the net benefit increased by about $2,000 for each SAMA, which would be expected to decrease. The NRC staff asked FENOC to explain this anomalous result (NRC 2011a). In response to an NRC staff RAI, FENOC clarified that this anomalous behavior was due to the difference in the number of significant digits used in the Level 3 PRA analysis and in the cost-benefit evaluation (FENOC 2011). Revised results were provided for this sensitivity case in which a consistent use of significant figures was applied between the Level 3 PRA and cost-benefit analyses, the revised external events multiplier was used, the revised population estimates discussed in Section F.2.2 were used, the scenario was changed to be a reduction in the baseline evacuation speed of 9.6 percent, and the five errors in the ER SAMA analysis discussed in Section F.2.2 were corrected. The revised results for this sensitivity case are provided in Table E.8-1 of the 2012 SAMA supplement (FENOC 2012a). No additional SAMAs became cost-beneficial as a result of this analysis. In addition, the results for this sensitivity case continued to be bounded by the 3 percent discount rate sensitivity case.

As indicated in Section F.3.2, the NRC staff asked the applicant to discuss opportunities for reducing risk by providing automatic functions to risk significant operator actions (NRC 2011a). In response to the RAI, FENOC identified and evaluated the following additional SAMA candidates that address risk-significant operations (FENOC 2011):

- AC/DC-28R, “automatically start and load the SBO diesel generator (DG) on Bus D2 upon loss of power to the bus”—The cost-benefit evaluation of this SAMA candidate is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.
- OT-08R, “automatically start and load the SBO DG on Bus D2 upon loss of power to the bus in combination with automatically starting the motor-driven feedwater pump (MDFP)”—The cost-benefit evaluation of this SAMA candidate is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.

As indicated in Section F.3.2, the NRC staff asked the applicant to evaluate potentially lower cost alternatives to the SAMAs considered in the ER (NRC 2011a), as summarized below:

- Automate RCP trip on high motor bearing cooling temperature—In response to the RAI, FENOC provided a cost-benefit evaluation of this SAMA candidate, referred to as SAMA CW-26R (FENOC 2012a). The evaluation of this SAMA is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.

- Use the DHR system as an alternate suction source for HPI—In response to the RAI, FENOC explained that the Davis-Besse PRA already credits use of the DHR system as a suction source for HPI and that this is effectively already implemented (FENOC 2011). The NRC staff concludes that this alternative has been adequately addressed.

- Automate HPI injection on low pressurizer level (in loss of secondary side heat removal cases where the RCS pressure remains high while the RCS level drops)—In response to the RAI, FENOC explained that this proposed alternative is not viable for implementation at Davis-Besse because of design and system configuration differences between the Davis-Besse plant and other B&W plants (FENOC 2011). Specifically, this proposed improvement is applicable to B&W plants in which the HPI system is also the makeup system, and HPI cooling must be established earlier enough to prevent uncovering of the core due to RCS inventory depletion. For the Davis-Besse design, the HPI system is separate from the makeup system, and the HPI system is not capable of injecting water into the RCS until a specific pressure threshold is reached. In addition, makeup and HPI cooling can be delayed at Davis-Besse because Davis-Besse has two makeup pumps. The NRC staff concludes that this alternative has been adequately addressed.

- Automate refill of the BWST—In response to the RAI, FENOC provided a cost-benefit evaluation of this SAMA candidate, referred to as SAMA CC-22R (FENOC 2012a). The evaluation of this SAMA is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.

- Automate start of AFW pump in the event the automated EFW system is unavailable—In response to the RAI, FENOC provided a cost-benefit evaluation of this SAMA candidate, referred to as SAMA FW-17R (FENOC 2012a). The evaluation of this SAMA is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.

- Purchase or manufacture of a “gagging device” that could be used to close a stuck-open steam generator safety valve for an SGTR event prior to core damage. In response to the RAI, FENOC provided a cost-benefit evaluation of this SAMA candidate, referred to as SAMA CB-22R (FENOC 2012a). The evaluation of this SAMA is provided in Table F-6 and was determined to not be cost-beneficial in either the revised baseline evaluation or the revised uncertainty and sensitivity analyses.

As indicated in Section F.3.2, in response to an NRC staff RAI, FENOC provided a revised baseline evaluation for four Phase I SAMAs that were screened by being subsumed into other SAMAs (FENOC 2012a). The four subsumed SAMAs are AC/DC-06, AC/DC-09, AC/DC-20, and CC-08, which FENOC estimated to have implementation costs of $1.75 million, $2.8 million, $700,000, and $1.5 million, respectively. FENOC estimated the baseline benefit of these SAMAs to be the same as the SAMAs into which they were subsumed, namely SAMAs AC/DC-01, AC/DC-14, AC/DC-19, and CC-19, respectively. The revised benefits for these SAMAs are provided in Table F-6, and, in each case, the implementation cost of the subsumed SAMA is much greater than the estimated benefit. FENOC consequently determined the subsumed SAMAs to not be cost-beneficial.

FENOC states in Section E.9 of the ER that the one SAMA (SAMA AC/DC-03) determined to be potentially cost-beneficial in both the baseline analysis and the sensitivity analysis will be considered for implementation through the normal processes for evaluating possible plant modifications.

The NRC staff concludes that, with the exception of the potentially cost-beneficial SAMA discussed above, the costs of the other SAMAs evaluated would be higher than the associated benefits.

F.7 Conclusions

FENOC initially compiled a list of 167 SAMAs based on a review of the dominant cutsets and most significant basic events from the plant-specific PRA, insights from the plant-specific IPE and IPEEE, Phase II SAMAs from LRAs for other plants, and review of other industry documentation. An initial qualitative screening removed the SAMA candidates:

- The SAMA has design differences or has already been implemented at Davis-Besse.
- The SAMA is not applicable to Davis-Besse.
- The SAMA has estimated implementation costs that would exceed the dollar value associated with eliminating severe accident risk at Davis-Besse.
- The SAMA is related to a non-risk significant system and, therefore, has a very low benefit.
- The SAMA is similar in nature and could be combined with another SAMA candidate.

Based on this screening, 152 SAMAs were eliminated, leaving 15 candidate SAMAs for evaluation as well as 6 additional SAMAs identified in response to NRC staff RAIs.

For the remaining 21 SAMA candidates, more detailed design and cost estimates were developed, as shown in Table F-6. In response to NRC staff RAIs, and in the 2012 SAMA supplement, FENOC provided revised cost-benefit analyses that showed that one of the SAMA candidates was potentially cost-beneficial in the revised baseline analysis (SAMA AC/DC-03). FENOC also performed additional analyses to evaluate the impact of parameter choices and uncertainties on the results of the SAMA assessment. As a result, no additional SAMAs were determined to be potentially cost-beneficial.

The NRC staff reviewed the FENOC analysis and concludes that the methods used and the implementation of those methods were sound. The treatment of SAMA benefits and costs support the general conclusion that the SAMA evaluations performed by FENOC are reasonable and sufficient for the license renewal submittal. Although the treatment of SAMAs for external events was somewhat limited, the likelihood of there being cost-beneficial enhancements in this area was minimized by improvements that have been realized as a result of the IPEEE process and inclusion of a multiplier to account for external events.

The NRC staff concurs with FENOC's identification of areas in which risk can be further reduced in a cost-beneficial manner through the implementation of the identified, potentially cost-beneficial SAMA. Given the potential for cost-beneficial risk reduction, the NRC staff agrees that further evaluation of this SAMA by FENOC is warranted. However, this SAMA does not relate to adequately managing the effects of aging during the period of extended operation. Therefore, it is not required to be implemented as part of license renewal pursuant to Title 10 of the *Code of Federal Regulations*, Part 54 (10 CFR Part 54).

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NRC FORM 335 (12-2010) NRCMD 3.7 — U.S. NUCLEAR REGULATORY COMMISSION **BIBLIOGRAPHIC DATA SHEET** *(See instructions on the reverse)*	1. REPORT NUMBER (Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, if any.) NUREG-1437, Supplement 52, DRAFT
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10. SUPPLEMENTARY NOTES

Docket No. 50-346

11. ABSTRACT (200 words or less)

This draft supplemental environmental impact statement has been prepared in response to an application submitted by FirstEnergy Nuclear Operating Company (FENOC) to renew the operating license for the Davis-Besse Nuclear Power Station, Unit No. 1, for an additional 20 years.

This draft supplemental environmental impact statement includes the preliminary analysis that evaluates the environmental impacts of the proposed action and alternatives to the proposed action. Alternatives considered include natural gas combined-cycle (NGCC); combination alternative (wind, solar, NGCC and compressed air energy storage; coal-fired power; and not renewing the license (the no action alternative).

The U.S. Nuclear Regulatory Commission's preliminary recommendation is that the adverse environmental impacts of license renewal for Davis-Besse are not great enough to deny the option of license renewal for energy planning decision makers. This recommendation is based on the following: the analysis and findings in NUREG 1437, Volumes 1 and 2, Generic Environmental Impact Statement for License Renewal of Nuclear Plants; the environmental report submitted by FENOC; consultation with Federal, state, and local agencies; the NRC's environmental review; and consideration of public comments received during the scoping process.

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