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The Detroit Edison Company
One Energy Plaza, Detroit, MI 48226-1279



10 CFR 51.45
10 CFR 52.77
10 CFR 52.79
10 CFR 2.390

October 29, 2010
NRC3-10-0048

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

- References:
- 1) Fermi 3
Docket No. 52-033
 - 2) Letter from Stephen Lemont (USNRC) to Peter W. Smith (Detroit Edison),
"Requests for Additional Information Related to the Environmental Review for
the Combined License Application for Fermi Nuclear Power Plant, Unit 3,"
dated May 12, 2009
 - 3) Letter from Bruce Olson (USNRC) to Peter W. Smith (Detroit Edison),
"Requests for Additional Information Letter No. 2 Related to the
Environmental Review for the Combined License Application for Fermi
Nuclear Power Plant, Unit 3," dated November 6, 2009
 - 4) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison
Company Response to NRC Requests for Additional Information Related to
the Environmental Review," NRC3-09-0010 dated June 19, 2009
 - 5) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison
Company Response to NRC Requests for Additional Information Related to
the Environmental Review," NRC3-09-0012 dated July 31, 2009
 - 6) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison
Company Response to NRC Requests for Additional Information Related to
the Environmental Review," NRC3-09-0013 dated August 25, 2009
 - 7) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison
Company Response to NRC Requests for Additional Information Related to
the Environmental Review," NRC3-09-0014 dated September 30, 2009

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- 8) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Related to the Environmental Review," NRC3-09-0015 dated October 30, 2009
- 9) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Related to the Environmental Review," NRC3-09-0016 dated November 23, 2009
- 10) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Related to the Environmental Review," NRC3-09-0017 dated December 23, 2009
- 11) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 2 Related to the Environmental Review," NRC3-10-0004 dated January 29, 2010
- 12) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to NRC Requests for Additional Information Letter No. 2 Related to the Environmental Review," NRC3-10-0005 dated February 15, 2010
- 13) Letter from Peter W. Smith (Detroit Edison) to USNRC, "Detroit Edison Company Response to Fermi 3 COLA Review Schedule Milestone Changes," NRC3-10-0031 dated September 21, 2010

Subject: Detroit Edison Company Response to NRC Requests for Additional Information Letter Related to the Environmental Review

In References 2 and 3, the NRC requested additional information to support the review of Part 3 (Environmental Report) of the Fermi 3 Combined License Application (COLA). Since June 2009, Detroit Edison has submitted responses to all of the Requests for Additional Information (RAIs) identified in Reference 2 and 3 in a series of monthly letters (References 4 through 12). This letter is providing revised responses to eleven RAIs previously submitted in References 4 through 12. Detroit Edison is revising ten of these RAI responses as a result of telephone discussions with NRC staff. The remaining attached responses are discussed below.

In a telephone call on September 20, 2010, the NRC indicated that air-emission values presented in ER Section 9.2.3.1 for a future coal-fired power plant appeared to be higher than expected assuming the use of current air-emission control technology. The air-emission estimates were modified accordingly and the proposed ER markups are contained in Attachment 7.

The "Submerged Site Sensitivity Study Report" submitted in Reference 3 in response to ER RAI CR4.1.3-8 was revised to correct an error identified subsequent to submission. The revised report is contained in Attachment 8. Note that Figure 5 of the revised study, provided separately in Attachment 9, contains information identifying the location of a sensitive historic resource. ~~As such, Detroit Edison requests that Figure 5 in Attachment 9 be withheld from public disclosure, in accordance with Section 304 of the National Historic and Preservation Act (NHIPA).~~

Enclosed with this letter is a disk containing updated LADTAP input and output files requested in ER RAI HH5.4.2-1. The file format and names on the enclosed disk do not comply with the requirements for electronic submission in NRC guidance document, "Guidance for Electronic Submissions to the NRC," dated May 17, 2010; the files are not ".pdf" formatted. The NRC staff requested the files be submitted in their native formats required by the software in which they are utilized to support the Environmental Report development.

In Reference 13, Detroit Edison indicated that written comments were expected shortly from the United States Army Corps of Engineers (USACE) regarding responses to two USACE RAIs provided on December 23, 2009. With that feedback, Detroit Edison planned to provide a schedule for resolution of USACE feedback in this letter. A schedule is not included because written comments from USACE have not been received.

If you have any questions, or need additional information, please contact me at (313) 235-3341.

I state under penalty of perjury that the foregoing is true and correct. Executed on the 29th day of October 2010.

Sincerely,



Peter W. Smith, Director
Nuclear Development – Licensing and Engineering
Detroit Edison Company

- Attachments:
- 1) Response to ER RAI Question AQ2.7-1
Response to ER RAI Question AQ4.4.1-1
 - 2) Response to ER RAI Question GE3.1-1
Response to ER RAI Question TE4.3.1-1
 - 3) Response to ER RAI Question HH5.4.2-1
 - 4) Response to ER RAI Question NO4.4.1-1
Response to ER RAI Question NO4.4.1-2
 - 5) Response to ER RAI Question SE2.5.2-1
Response to ER RAI Question SE2.5.2-2
 - 6) Response to ER RAI Question TE4.3.1-9
 - 7) Markups Related to ER Section 9.2.3.1
 - 8) Response to ER RAI Question CR4.1.3-8
 - 9) Figure 5, "Fermi 3 Project Area Previously Recorded Archaeological Sites," of the Revised "Submerged Site Sensitivity Study Report," Section 304 of the National Historic and Preservation Act – Withhold from Public Disclosure under 10 CFR 2.390

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cc: Adrian Muniz, NRC Fermi 3 Project Manager
Jerry Hale, NRC Fermi 3 Project Manager
Bruce Olson, NRC Fermi 3 Environmental Project Manager
Fermi 2 Resident Inspector (w/o attachments)
NRC Region III Regional Administrator (w/o attachments)
NRC Region II Regional Administrator (w/o attachments)
Supervisor, Electric Operators, Michigan Public Service Commission
(w/o attachments)
Michigan Department of Natural Resources and Environment
Radiological Protection Section (w/o attachments)

Attachment 1
NRC3-10-0048

Supplemental Response to RAI letter related to Fermi 3 ER

RAI Question AQ2.7-1
RAI Question AQ4.4.1-1

NRC RAIs

The following RAIs are related to offsite emissions. Detroit Edison has elected to address these RAIs with a single response.

RAI AQ2.7-1

Provide a general conformity analysis for construction and operation activities of the proposed Fermi 3 project due to nonattainment status of the area for 8- hour ozone and PM_{2.5}.

Supporting Information

Section 2.7.2.1 of the ER states that “Monroe County and the counties that include the Detroit metropolitan area are ruled as non-attainment areas for the USEPA’s PM_{2.5} and 8-hour ozone standard.” Accordingly, the site is subject to a general conformity analysis under 40 CFR 51, Subpart W. Provide a conformity analysis for ozone and PM_{2.5} associated with construction and operation of Fermi 3, along with quantifying direct and indirect emission rates.

RAI AQ4.4.1-1

Provide expected CO₂ emission rates during the worst year of construction. Emission sources considered should include engine exhaust emissions from heavy equipment and worker/delivery/support vehicles, and other fossil fuel combustion emissions.

Supporting Information

CO₂ emissions during construction are needed for the climate change analysis to be presented in the EIS. Emissions from the worst year (i.e., the year when CO₂ emissions are expected to be highest) will provide a conservative estimate of climate change impacts.

Supplemental Response

The original combined response to RAIs AQ2.7-1 and AQ4.4.1-1 was submitted to the NRC in Detroit Edison letter NRC3-09-0017 (ML093650121), dated December 23, 2009. In a telephone conversation on April 16, 2010, the NRC requested that Detroit Edison revise the construction and operation emission estimates to include related emissions occurring beyond the site, but within the non-attainment or maintenance zone. A revised emissions estimate was provided in Detroit Edison letter NRC3-10-0025 (ML102000562), dated July 9, 2010. At that time, the revised calculation package was also made available for the NRC’s review. During a telephone discussion on September 20, 2010, the NRC stated that after reviewing the revised calculation package, they needed clarification of the number of construction worker vehicle trips used as the basis for the analysis of offsite emissions. The requested clarification is provided below. During the preparation of the requested information, a more conservative assumption regarding the

usage of employee vehicles was used. The method of calculating the emissions from construction employee vehicles was revised to eliminate the 0.75 usage factor which is applied to all other construction related vehicles. With this adjustment, there is still no exceedance of the threshold for either construction or operations. The revised calculation package has also been made available for the NRC and their contractors' review.

Bases of Values for Number of Trips per Day Traveled by Construction Workers

The number of trips per day traveled by construction worker vehicles during construction of Fermi 3 is based on the estimated number of construction workers explained below. The estimate was developed by using best available data in order to obtain a reasonable estimate for construction workers during the period of construction. Table 1 displays the average annual construction worker vehicles, carpool adjustment factor, and resulting average annual construction worker vehicles after applying the carpool adjustment factor used in the conformity analysis. The peak number of average annual construction worker vehicles is during the third year of construction, assumed to be 2013, which produces the maximum emissions from worker vehicles for each non-attainment and maintenance area pollutant or their precursors listed in the combustion source summary table on page A.1-1 of the Technical Memorandum available to NRC staff. This emissions analysis assumes construction begins during the year 2011 and continues for 62 months. Although Environmental Report (ER) Subsection 4.4.2 indicates that the start of construction is assumed to be 2013 and peaks in the year 2017, the start year of construction for this analysis was chosen as 2011 since emission factors for most off-road construction equipment and on-road vehicles are higher in earlier years versus later years (Reference 3). Therefore, the emission analysis is bounding of emission estimates beginning at a later year.

Table 1			
Year	Average Annual Construction Worker Vehicles per Day ⁽¹⁾	Carpool Adjustment Factor ⁽²⁾ (Vehicles per Worker)	Average Annual Construction Worker Vehicles per Day After Carpool Adjustment
2011	100.0	0.72	72.0
2012	262.5	0.72	189.0
2013	1853.25	0.72	1334.34
2014	1379.5	0.72	993.24
2015	504.75	0.72	363.42
2016 ⁽³⁾	504.75	0.72	363.42
<p>1) Average annual construction worker vehicles derived from the general distribution pattern of construction workers for nuclear facilities in Reference 1.</p> <p>2) Carpool adjustment factor is the average of the morning and afternoon peak values observed during a Fermi 2 outage presented in Reference 2.</p> <p>3) Since two months of construction will occur in 2016, it is assumed that the average annual value for 2015 will apply for 2016.</p>			

The average number of construction worker vehicle trips per day to the Fermi site was calculated through multiple steps. The following provides an explanation of how the average annual construction worker vehicles per day values were derived.

- The starting point was the peak personnel average for a single plant and general distribution pattern of construction workers for nuclear facilities contained in the Department of Energy (DOE) document *DOE2010 Nuclear Power Plant Construction Infrastructure Assessment* (Reference 1).
- Table 3-3 in Reference 1 states that the personnel average for a single plant in the peak year of construction is 2,400. Using this number and modifying it by the size of the project resulted in a value of 2,900, representing the peak number of workers for a single month in the peak year of construction.
- Figure 3-2 of Reference 1 contains the general ramp-up and ramp-down construction pattern initially assumed for ESBWRs.
- The monthly peak of 2,900 workers was applied to the general construction worker pattern and adjusted for the Fermi 3 project based on the project specific constraints and information available for the project such that the pattern conformed to key assumptions used for development of the COLA.
- Based on the monthly peak of 2,900 workers, the general pattern from the DOE report, and the information and constraints for Fermi 3, average employment values in 6-month increments of the project construction time frame were developed. The average worker

employment values are based on calculations developed for determining the peak construction workforce value and resulting social and economic impacts from construction, presented in ER Subsection 4.4.2.

Using the 6-month average employment values described above, an average annual value for construction workers was derived for each year of the construction period. Average annual values of construction workers are used in order to estimate the emissions of non-attainment or maintenance area pollutants or their precursors (i.e., NO_x, SO₂, PM_{2.5}, VOC) on an annual basis so that these values can be compared against the conformity determination thresholds of 40 CFR 51, Subpart W. Since 2016 includes only two additional months of construction the 2015 worker value is assumed to apply for 2016. The resulting amount of construction workers for each year of the 62-month construction period are displayed in the second column of Table 1.

It is reasonable that a portion of the fleet of construction workers during construction of Fermi 3 will carpool. Therefore, column 3 of Table 1 displays a carpool adjustment factor of 0.72 vehicles per employee. This carpool adjustment factor is based on morning and afternoon carpooling trends observed during an outage for Fermi 2 as contained in Reference 2.

The resulting annual values of construction workers after applying the carpooling adjustment factor are displayed in the fourth column of Table 1. It is important to note that these values represent annual averages of construction workers derived from average 6-month estimates of construction workers that contain a monthly peak of 2,900 workers. The annual values of construction workers after applying the carpooling adjustment factor in Table 1 are further divided by two to represent the assumed fleet of worker vehicles that are 50% passenger cars and 50% light-duty gasoline trucks. For example the value for the year 2013 in Table 1, 1334.34 vehicles per day, would be divided by two resulting in 667.17 passenger cars and 667.17 light-duty gasoline trucks per day. The split values of average annual numbers of construction worker vehicles after carpool adjustment are used as trips per day in the emissions estimate for passenger vehicles on pages A.1.1-19 and A.1.1-20 of the Technical Memorandum. The values of trips per day are then combined with the roundtrip distance traveled by workers to and from the Fermi site through the non-attainment/maintenance area, the number of Days per Month, and the appropriate emission factor to derive the estimated emissions in tons/month.

References

- 1) United States Department of Energy (DOE), "DOE NP2010 Nuclear Power Plant Construction Infrastructure Assessment," MPR-2776, Revision 0, October 21, 2005.
- 2) The Mannik & Smith Group, Inc., "Traffic Study: Fermi Nuclear Power Plant Unit 3 Expansion," p. 26, November 10, 2009.
- 3) Emission Factors for Passenger Car (LDGV) and Light-Duty Gasoline Truck (LDGT All) from USEPA MOBILE6.2 Model

Proposed COLA Revision

Proposed revision to ER Section 4.4.1.2 is shown on the attached markup.

Markup of Detroit Edison COLA
(following 1 page)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

4.4.1.2 Air Quality

The Fermi site is located in the northeastern part of Monroe County and along the western shoreline of Lake Erie. Air quality at the Fermi site is heavily influenced by the Detroit and Toledo metropolitan areas and surrounding emission sources. The MDEQ evaluates the air quality in the Detroit metropolitan area with a network of monitors mostly located in Wayne County, north of the Fermi site. The MDEQ routinely monitors the USEPA criteria pollutants of NO₂, SO₂, CO, PM_{2.5}, PM₁₀, and ozone. Monroe County and the counties that include the Detroit metropolitan area are designated by USEPA as a non-attainment areas for annual PM_{2.5} standard and a maintenance area for the 8-hour ozone standards (Reference 4.4-8). The USEPA, as of March 12, 2008, strengthened the definition of ozone non-attainment areas as those that record a 3-year average of the fourth highest daily maximum 8-hour average ozone concentration levels of 0.075 ppm or higher (Reference 4.4-9). For PM_{2.5} the USEPA considers areas in violation of the standard when the 3-year average of the weighted annual mean PM_{2.5} concentration is equal to or exceeds 15 µg/m³. Subsection 2.7.2 provides further details about the historical air quality in the Fermi vicinity.

Some increase in air pollution from criteria pollutants will arise during construction due to construction activities, including engine exhaust from worker vehicles and machinery. The vehicles and machinery will comply with applicable government standards during construction, including the Clean Air Act and the National Emission Standards for Hazardous Air Pollutants for Source Categories in 40 CFR 63. Detroit Edison will also obtain all air quality approvals necessary to allow for the construction of Fermi 3 from the MDEQ. The MDEQ has been delegated authority by the EPA to implement the aforementioned federal rules which are designed to be protective of air quality. Given the relatively isolated nature of the construction area from the offsite residences and facilities, the emissions during construction activities will not only have little effect on the nearby ozone maintenance and PM_{2.5} non-attainment areas, but will have minimal impact on the local and regional air quality as well. The net impact on air quality during construction is projected to be SMALL, and no mitigative measures are needed.

Additionally, the various types of construction activities and equipment will also emit carbon dioxide (CO₂) during construction of Fermi 3. The expected construction activities include those from worker vehicles, heavy duty construction equipment, locomotive engines, marine engines, and operation of other miscellaneous mobile fossil-fuel combustion sources such as generators. The total estimate of CO₂ emissions resulting from Fermi 3 construction activities is ~~40,180~~ tons/year.

4.4.1.3 Dust

The State of Michigan has adopted regulatory code that provides typical control methods of fugitive emissions including dust. Portions of Rule 336.1372 are provided here that deal with dust producing activities and their typical control methods.

§Rule 336.1372

3. All of the following provisions apply to the transporting of bulk materials as a source of fugitive dust:

**Attachment 2
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

**RAI Question GE3.1-1
RAI Question TE4.3.1-1**

NRC RAIs

The following RAIs are related to the Fermi 3 site layout. Detroit Edison has elected to address these RAIs with a single response.

RAI GE3.1-1

Provide updated site layout information and a complete evaluation and assessment of short-term and long-term direct, indirect, and cumulative impacts on all resources based on site layout changes.

Supplemental Information

At the site audit, Detroit Edison indicated that a modified site layout was being developed to reduce impacts to critical environmental resources. This information would represent a significant change to the ER and would be important for all aspects of the EIS.

RAI TE4.3.1-1

Provide revised terrestrial ecology impacts data for the Fermi site based on the revised Fermi 3 site layout.

Supplemental Information

Prior to the site audit, Detroit Edison decided to make major changes in the site plan. Impacts from construction and operation of Fermi 3 would be substantially affected, compared to the previous proposal. At the site audit, staff discussed the need to revise existing resources conditions and impacts for the revised site plan. All information provided must address the revised site plan locations. Revised data will be used to complete the impact analyses that will be presented in the EIS.

Supplemental Response

The original responses to the RAIs listed above were submitted to the NRC in Detroit Edison letter NRC3-09-0017 (ML093650121), dated December 23, 2009. Based on discussions with the NRC on February 11, 2010, Detroit Edison agreed to provide an Environmental Report (ER) markup to clarify the responses to these RAIs. The original responses created confusion between the stated commitments of affected acreages for permanent and temporary impacts depending on whether land use, terrestrial ecology, operational, or construction impacts were being discussed. These additional changes were provided to the NRC in Detroit Edison letter NRC3-10-0014 (ML100850542), dated March 24, 2010.

In a telephone discussion on August 9, 2010, the NRC requested that the ER be updated to address two inconsistencies. The first was identified in ER Section 2.4.1 regarding terrestrial ecology. The number of acres of some onsite vegetation communities and the percentage of those acres relative to the entire site were not correctly updated when the site layout was changed. The second was to update ER Table 4.3-4 to reflect only vegetation communities within the undeveloped 10.8 mile length of the proposed transmission corridor. The current table incorrectly provides information on the entire 29.4 mile transmission corridor. The total area of the communities described is an estimate based on GIS data and does not sum to 100% of the area under consideration.

Proposed COLA Revision

Proposed revisions to ER Section 2.4 and Tables 2.2-1, 2.4-1, 4.3-1, and 4.3-4 are shown on the attached markup.

Markup of Detroit Edison COLA
(following 11 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

Table 2.2-1 Acreage Associated with Land Uses on Fermi Site

	Area ¹ Acres	
Total Site	1260	
Water	230 ←	215
Forest	256	
Wetland	272	
Grassland	130 ←	145
Other	136	
Developed Areas	206	
Onsite Transmission Corridor	30	

Notes:

1. Acreages given are approximate based on Figure 2.4-5 and Table 2.4-1.

2.4 Ecology

The purpose of this section is to describe the terrestrial and aquatic environment and biota of the site and vicinity, transmission corridors, and offsite areas to provide a baseline from which to judge the construction and operational impacts on these areas. Subsection Terrestrial Ecology and Subsection Aquatic Ecology identify and describe the terrestrial and aquatic species composition, spatial and temporal distribution, abundance, and other structural and functional attributes of biotic assemblages that could be impacted by Fermi 3. Important terrestrial and aquatic natural resources are identified, as well as wildlife sanctuaries, preserves, and other natural areas that are potentially affected.

2.4.1 Terrestrial Ecology

The Fermi 3 project is located on the shore of Lake Erie at the west end of the Lake Erie Basin in the Southern Lower Peninsula Ecoregion (SLPE) (Reference 2.4-1). West of the Fermi site is primarily agricultural land (row crops) with scattered rural residences. The general land use in the vicinity of the Fermi site is illustrated in Figure 2.1-1. To the south the area is equally divided between residential properties and a narrow lagoon off Lake Erie that is surrounded by brushy forest. The general area of interest around the existing Fermi 2 is illustrated in Figure 2.4-1.

The SLPE includes approximately the southern half of the Lower Peninsula of Michigan. The eastern portion of the region where the project is located has a prevalence of flat plains, the Lake Erie basin, that eventually give way to the main body of Lake Erie. The region is underlain by Paleozoic bedrock and was completely glaciated during the late Wisconsin Period, some 18,000 to 20,000 years ago (Reference 2.4-2). Today this type of broad lacustrine plain is found around most areas of the Great Lakes and typically extends several to many miles inland (Reference 2.4-1). Nearly all of Monroe County lies on this plain, making the landward extent of the plain in the project vicinity about 25 miles.

Reconnaissance surveys to the Fermi site and vicinity were made between November 2006 and May 2008. Detailed terrestrial surveys were conducted at the site from 2008 through 2009. The purpose of these investigations was to observe and assess existing conditions of the ecological resources, including vegetation and wildlife. Several previous wildlife and plant studies have been made on the property. NUS Corporation examined the site between 1973 and 1974 (Reference 2.4-3). In 2000 the Detroit Edison Fermi 2 Plant Wildlife Habitat Team in cooperation with the Wildlife Habitat Council prepared a Wildlife Management Plan, which included updated wildlife occurrence lists for the site. The Wildlife Management Plan was re-certified in 2002 and again updated the wildlife occurrence lists. Information from these studies is included and considered in the present study. As indicated above, Detroit Edison performed a confirmatory updated terrestrial ecological survey of the site that provides a year's worth of seasonal sampling data to reflect variations in terrestrial populations (Reference 2.4-95 and Reference 2.4-96).

A topographic map of the Fermi area showing the property boundaries is provided in Figure 2.4-2. Figure 2.4-3 is an aerial photograph of the Fermi area taken in 1981 during the construction of Fermi 2. Figure 2.4-4 is an aerial photograph taken in 2005 that is representative of current existing

conditions. The most notable difference in the two photographs is the much higher water conditions in the lagoons in 1981 compared to 2005 and the difference in cover types present due to Fermi 2 construction activities in 1981.

2.4.1.1 Terrestrial Communities

Following are brief discussions of the floral and faunal components found at the Fermi site. The vicinity surrounding Fermi consists of similar habitats but is dominated by Lake Erie (about 50 percent), urban areas, rural residences, and agricultural lands.

2.4.1.1.1 Vegetation on Site and Vicinity

The flora at the Fermi site was studied during site reconnaissance between 2006 and 2008 and again in a detailed survey between 2008 and 2009 (Reference 2.4-95). Using current aerial photography of the Fermi property, plant community boundaries were drawn on a provisional basis. The property was then divided into a gridwork of approximately 1,000 feet square parcels. Pedestrian surveys were then made of all areas of the site, using the grid system to effectively examine the habitats on and areas of the property. The surveys were conducted during the spring, summer and fall seasons to account for the variation in flowering time for different plant species. Field inspection of the structure and species composition of these areas was used to refine the boundaries of the plant communities present. Within each terrestrial community identified, point to point transects were examined to determine cover type and dominant species. At least two transects were examined in each habitat area of significant size. For example, if five separated areas of the property were identified as the same habitat, at least two transects were examined in each of these tracts, assuming each tract was large enough to accommodate a 100 meter or longer transect. Random sampling of plants was done within all communities identified to more thoroughly examine microhabitats and better understand the species diversity present. The outcome of the field studies was used to refine the boundaries of the plant communities present and provide an understanding of the character of these communities as they exist on the Fermi property. The discussion that follows is based on the findings of these studies. approximately 61

The 1260 acre Fermi site is composed of approximately 16.4 percent developed areas and 6.0 percent cropland. Terrestrial habitats account for 60.2 percent of the property. The remaining 17.4 percent are water bodies, e.g. Quarry Lake and the main body of Lake Erie that lies east and north of the site. Figure 2.4-5 illustrates the extent and location of the habitats identified and the developed areas on the Fermi site. Table 2.4-1 provides an accounting of the acres present of each habitat. Plant community descriptions (Table 2.4-1 and Figure 2.4-5) are defined biologically, which may differ from the regulatory definitions used in the wetlands delineation (Figure 2.4-19).

Studies of the flora at Fermi between 2006 and 2008 identified 216 plant species present. This should be considered a conservative number of species since in some instances specimens could not be identified beyond the genus. Table 2.4-2 provides a list of plant species observed during reconnaissance visits or reported as occurring. Plant identifications and nomenclature primarily follow that used in the *Michigan Flora* (Reference 2.4-4). Common names primarily follow those found in the *National List of Plant Species that Occur in Wetlands: North Central (Region 3)* (Reference 2.4-5 and Reference 2.4-95).

Early accounts of the Fermi site indicate that as recently as 1961, most of the site was in cultivation or had been otherwise disturbed. The NUS study (Reference 2.4-3) describes nearly all of the habitats on site as being in relatively early stages of succession. For example, most woodlots present in 1973 and 1974, which remain intact today, were nearly all once cleared land at one time. Over time these areas became revegetated by tree species representative of the area as well as some non-native species. But while the tree flora is mostly representative of other areas of southern Michigan, the ground cover remains diminished, presumably due to the lack of an adequate seed bank for ground cover species and probably alterations to soils conditions (fill material, mixing due to scrapping, shading, etc.). The terrestrial habitats present on the Fermi site today are described in the following paragraphs and the distribution of these is illustrated in Figure 2.4-5. The communities are categorized according to the 2006 Michigan Department of Natural Resources Terrestrial Systems for the Lower Peninsula (Reference 2.4-1) with minor modifications.

Grassland: Row Crops (GRC) (brown areas in Figure 2.4-5)

Grassland: Row Crop (GRC) areas are agricultural fields that are planted with a single species (usually corn or soybeans) and harvested annually. Approximately 55 acres or 6.0 percent of the property is completely GRC.

Grassland: Idle/Old Field/Planted (GOF) (orange areas in Figure 2.4-5)

Grassland: Idle/old fields/planted (GOF) are communities of opportunistic plants that take over ground that had once been cleared for agriculture or other purposes. In some cases, these areas are initially planted with a cover grass, usually perennial brome or fescue when the area is to remain idle permanently or for the long term. The GOF communities at the Fermi site are dominated by smooth brome (*Bromus inermis*), but contain a good mix of opportunistic (weedy and invasive) native and introduced species, such as Canada thistle (*Cirsium arvense*), Canada goldenrod (*Solidago canadensis*), and flat-top-fragrant goldenrod (*Euthamia graminifolia*). Invasive shrubs, such as multiflora rose (*Rosa multiflora*) and blackberry (*Rubus* spp.), may also be present but are not dominant. This is a disturbed community and offers limited value to wildlife, although it provides shelter to small mammals, birds, and reptiles and has some forage value. Approximately 75 acres or 8.2 percent of the site is GOF.

Grassland: Right-of-way (GRW) (yellow areas in Figure 2.4-5)

Grassland: Rights-of-way (GRW) are linear features associated with roadways, railways, power lines, pipelines, etc. At Fermi approximately 29 acres or 2.3 percent of the property is right-of-way, including less than one percent along roadways. An existing power line right-of-way accounts for the majority of this classification. The power line right-of-way is periodically mowed to keep the area free of trees for reasons of safety in relation to line clearance issues. About one-half of the area is a prairie creation area while the remainder is unmanaged. The prairie was planted in 2003 by Detroit Edison with the assistance of a North American Wetland Conservation Act grant managed by Ducks Unlimited and the Natural Resources Conservation Service (NRCS). The area is dominated by big bluestem (*Andropogon gerardii*) and Indiangrass (*Sorghastrum avenaceum*). Broomsedge (*Andropogon virginicus*) is an undesirable and invasive grass that is relatively common in the area

and is even abundant in some localities. Other undesirable plants are also present, including purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), teasel (*Dipsacus sylvestris*), and all non-native species. Surveys of the area between 2005 and 2008, including species identified prior to the preparation of this document, listed approximately 110 plant species as occurring in this area. To date, management has consisted of periodic mowing of most of the site to discourage the growth of woody species.

In the lowest portions of the GRW, large grasses like the bluestem and Indiangrass become less dominant. Where broomsedge has not overtaken the ground cover, composition tends to be somewhat representative of a perennial, herbaceous wetland. Grass-like bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.) are present in some areas, as are broadleaf forbs, such as common boneset (*Eupatorium perfoliatum*) and southern blue flag (*Iris virginica*). An unmanaged portion of the right-of-way is dominated by broomsedge in the driest areas and with cattails (*Typha* spp.) in the lowest areas. The variation in hydrologic conditions across this area has encouraged the growth of a substantial variety of forbs representative of native and introduced species.

The GRW is a previously disturbed area that presently provides some limited value to wildlife in the form of diverse foraging and shelter for small mammals, birds, and reptiles and perhaps some grazing for larger mammals.

Shrubland (SHB) (red areas in Figure 2.4-5)

Shrubland (SHB) communities at the Fermi site are upland areas with relatively dry soils that are dominated by deciduous shrubs. Approximately 113 acres or 9.0 percent of the site is SHB. On the Fermi property, all shrublands are located in areas that were filled or otherwise severely disturbed by construction activities for Fermi 1 and 2, with the possible exception of SHB in the extreme southeastern corner of the property. Shrub species, like dogwood (*Cornus* spp.), common buckthorn (*Rhamnus cathartica*), multiflora rose (*Rosa multiflora*), and blackberries (*Rubus* spp.), dominate the site. Saplings of trees in the area are also common, such as honey locust (*Gleditsia triacanthos*), cottonwood (*Populus deltoides*), and green ash (*Fraxinus pennsylvanica*). Despite the cover of shrubs and saplings there generally is substantial ground cover in the form of grasses and coarse forbs are common. Since these areas have been previously disturbed, it is not surprising to find that many of the species present are introduced or native increasers (i.e., plants native to the area but tending to be opportunistic in where they grow). Examples include smooth brome (*Bromus inermis*), prickly lettuce (*Lactuca serriola*), Canada goldenrod (*Solidago canadensis*), and Missouri ironweed (*Vernonia missurica*). Wildlife use in the SHB would include cover, nesting sites, and bedding areas but is expected to be limited for foraging due to lack of appropriate plant species.

Thicket (TKT) (light orange areas in Figure 2.4-5)

Areas identified as Thicket (TKT) on the Fermi property are generally located in areas between wetlands and upland. Approximately 23 acres or 1.8 percent of the site is designated TKT. These areas are densely populated with small trees, such as hawthorn (*Crataegus* spp.), and box elder (*Acer negundo*). Shrubs are also common, including European privet (*Ligustrum vulgare*),

dogwoods (*Cornus* spp.). Saplings of eastern cottonwood (*Populus deltoides*), peach-leaved willow (*Salix amygdaloides*), and green ash are also prevalent and poison ivy (*Toxicodendron radicans*) is abundant. Ground cover is sparse to lacking except in a few open areas. The low quality species composition present suggests that the area was disturbed in the past. A comparison of the 1981 (Figure 2.4-3) and 2005 (Figure 2.4-4) aerial photographs of the site illustrates the change that has occurred from shrub/grassland habitat to thicket. Regarding wildlife, the TKT area is probably most beneficial to small mammals and birds for shelter and foraging, since large mammals would find it difficult to move through the dense brush.

Forest: Coastal Shoreline (FCS) (dark green hatched areas in Figure 2.4-5)

The Forest: Coastal Shoreline (FCS) community occurs in a narrow, interrupted band along the east side of the property adjacent to the main body of Lake Erie. The area includes about 47 acres of land or 3.7 percent of the property. The area is dominated by large cottonwoods (*Populus deltoides*) and peach-leaved willow (*Salix amygdaloides*), some as much as two feet or more in diameter. Box elder (*Acer negundo*) and green ash (*Fraxinus pennsylvanica*) are also scattered in the area. Shrub growth varies from dense to sparse depending on lake exposure and the extent of high water ponding that occurs. Ground cover is sparse in heavily shaded areas and on the edges includes dense stands of reed canarygrass (*Phalaris arundinacea*). Forbs include primarily species capable of withstanding fluctuations in moisture availability and generally sandy soil conditions, such as stinging nettle (*Urtica dioica*). In this area it is also common to discover unexpected native and introduced species that have likely been dispersed here from other areas via the waters of Lake Erie. Examples include jimson-weed (*Datura stramonium*) and clammy-weed (*Polanisia dodocandra*). Overall, the FCS at Fermi is a dynamic community composed of opportunistic, early succession species. Wildlife value of the area is primarily limited to birds roosting or nesting in the trees.

Forest: Lowland Hardwood (FLH) (dark green areas in Figure 2.4-5)

The Forest: Lowland Hardwood (FLH) community represents the most mature habitat on the Fermi property. The FLH accounts for about 92 acres or 7.3 percent of the site located in areas immediately northeast of Quarry Lake and the south-central portion of the site along the west side of the south lagoon. Like the FCS, cottonwood (*Populus deltoides*) and peach-leaved willow (*Salix amygdaloides*) are present but oaks (*Quercus* spp.), American basswood (*Tilia americana*), and hickory (*Carya* spp.) are well represented. Overall, the habitat is drier and more stable than that found in the FCS and the topsoil is organic to even clayey rather than sandy. The largest trees are found in the area northeast of Quarry Lake where numerous specimens can be found in the range of 18 to 26 inches in diameter. In the south-central area, scattered trees reach this size but most are less than 14 inches in diameter. Larger specimens appear to have been logged out of the area years ago, as evidenced by scattered old stumps. Shrubs are widely scattered in the FLH, so it is generally easy to move about the habitat. Ground cover is overall sparse, but consists of a variety of woodland species, such as woodland bluegrass (*Poa sylvestris*), scattered sedges (*Carex* spp.), enchanter's nightshade (*Circaea lutetiana*), false spikenard (*Smilacina racemosa*), and Virginia stickseed (*Hackelia virginiana*). Poison ivy (*Toxicodendron radicans*) is common as are grape vines

(*Vitis* spp.). The habitat provides substantial cover, shelter and foraging for a variety of wildlife in the area, as evidenced by tracks, nests, and scat observed in the area.

Forest: Woodlot (FWL) (light green areas in Figure 2.4-5)

The Forest: Woodlot (FWL) community is found in the east-central and northwestern portions of the Fermi property and account for about 117 acres or 9.3 percent of the site. The FWL developed over fill material from Fermi 1 and 2 construction or on land otherwise heavily disturbed by Fermi 1 and 2 activities. The canopy is well developed and is composed of Cottonwood (*Populus deltoides*), box elder (*Acer negundo*), and green ash (*Fraxinus pennsylvanica*). Introduced species, such as the tree-of-heaven (*Ailanthus altissimus*) can also be observed. The understory is composed of saplings of the same species, dense in some areas and less dense in other places. Vines of poison ivy (*Toxicodendron radicans*), grape (*Vitis* spp.) and trumpet creeper sometimes form localized thickets. Introduced European privet (*Ligustrum vulgare*) and common buckthorn (*Rhamnus cathartica*) are relatively common. The ground cover is overall sparse and composed entirely of native and non-native invasive or otherwise undesirable species. Some of the more common herbaceous species include burdock (*Arctium minus*), heal-all (*Prunella vulgaris*), and garlic mustard (*Alliaria petiolata*). The value of FWL to wildlife is limited to nesting areas and den areas and sheltered resting areas. Few native species in the community are provided adequate foraging opportunities because of the dominance by non-native species.

21.7

Coastal Emergent Wetland (CEW) (light blue and blue hatched areas in Figure 2.4-5)

The Coastal Emergent Wetland (CEW) is the largest plant community represented on site, covering about 273 acres or 21.6 percent of the site. The area is divided between a north and south lagoon and an unnamed drainage corridor entering the site from the west. From the most recent study, it is estimated that 238 acres is vegetated and 35 acres is open water. The extent of aquatic vegetation present fluctuates annually depending on water conditions in Lake Erie. High water years result in more open water and less in low water years. The 1981 aerial photograph in Figure 2.4-3 illustrates relatively high water conditions, while the 2005 photograph in Figure 2.4-4 shows a marked increase in vegetation in the lagoons during low water periods. At the present time the lagoon is dominated by dense and extensive stands of common reed (*Phragmites australis*) and cattail (*Typha* spp.). The introduced and undesirable purple loosestrife (*Lythrum salicaria*) is present throughout most of the area. The west-side drainage corridor has virtually no open water because of these plant communities. Because these stands are so dense, they provide minimal habitat for wildlife, especially waterfowl. In the south lagoon, and to a lesser extent in the north lagoon, are large stands of American lotus (*Nelumbo lutea*), which is a state listed threatened species. The status of the lotus is discussed in detail in Subsection Important Terrestrial Species and Habitats. Most of the lagoon is quite shallow. The south lagoon has fill deposits scattered throughout. Wading birds utilize the shallow water areas for foraging. A few songbirds use the cattails and reeds for nesting.

Developed Areas (DA) (white areas in Figure 2.4-5)

16.3

Developed areas (DA) include buildings, parking areas, equipment storage areas, roadways, maintained lawns, and similar areas. Approximately 206 acres or 16.4 percent of the site is developed. Plant species present are those planted for ornamental value or undesirable weeds. Wildlife value is very low because of poor plant species diversity, poor cover and exposure to frequent disturbance.

Lakes, Ponds and Rivers (LPR) (dark blue areas in Figure 2.4-5)

Lakes, Ponds and Rivers (LPR) account for 44 acres or 3.5 percent of the site. These water bodies include an unnamed stream draining east across the central portion of the site and Quarry Lake, an abandoned rock quarry from Fermi 1 construction. No significant plant communities as discussed here are present, except for noting that cut-leaf water-milfoil (*Myriophyllum pinnatum*), a noxious plant native to Europe, has been observed in the waters. These waters are discussed further in Subsection Aquatic Ecology.

171

Lake Erie (main body)

13.6

The main body of Lake Erie lies north and east of the project. Lake Erie accounts for about 186 acres or 13.6 percent of the site. These aquatic areas are addressed in Subsection Aquatic Ecology.

2.4.1.1.2 Wildlife on the Site and Vicinity

Habitat diversity in an area generally contributes directly to the diversity of wildlife present in the same area. The more diverse the habitat, the greater the number of wildlife species that can be supported. The Fermi site and vicinity provide primarily a rural agricultural setting with small parcels of disturbed grassland, forest, and wetland habitats scattered throughout the area. The majority of the Fermi site proper is occupied by disturbed forest, lagoons, thickets, and developed areas. The site was extensively surveyed for wildlife in 1973 and 1974 by NUS Corporation (Reference 2.4-3). Wildlife observations were made during site reconnaissance between late 2006 and mid 2008 and during a detailed wildlife survey from mid-2008 until 2009 (Reference 2.4-96) to evaluate the diversity of species potentially present. The following discussions are based on the finding of these studies.

Mammals

The 1973-74 NUS study (Reference 2.4-3) listed 17 species of mammals directly or indirectly observed. The 2000 Wildlife Management Plan listed 41 species as potentially occurring on the property; 14 species were observed, 3 of which were newly observed. In 2002, Wildlife Habitat Program Re-certification document listed one additional newly observed mammal, bringing the total number of mammals observed on the property to 21. Field studies were made for the Fermi 3 work from late 2006 to mid 2008. Mammals were recorded on the basis of direct observation, tracks, and scat, anytime while on the property, but the most intense study periods occurred concurrently with the flora studies described in Subsection Vegetation on Site and Vicinity. During the 2007-2008 studies, 13 of the 21 species listed for the site were observed. Table 2.4-3 provides a composite list of mammals observed at the site.

Table 2.4-1 Approximate Acres per Plant Community Present on the Fermi Site

Habitat ¹	Acres	% of Site
Coastal Emergent Wetland (CEW) Open Water	35	2.8
Coastal Emergent Wetland (CEW) Vegetated	238	18.8
Grassland: Right-of-Way (GRW)	29	2.3
Grassland: Idle/Old Field/Planted (GOF)	75	5.2
Grassland: Row Crop (GRC)	55	6.0
Shrubland (SHB)	113	9.0
Thicket (TKT)	23	1.8
Forest: Coastal Shoreline (FCS)	47	3.7
Forest: Lowland Hardwood (FLH)	92	7.3
Forest: Woodlot (FWL)	117	9.3
Developed Areas (DA)	206	16.4
Lakes, Ponds, Rivers (LPR)	44	3.5
Lake Erie (main body)	186	13.9
Totals	1260	100

1. Habitats are based on Michigan's Wildlife Action Plan, Michigan Department of Natural Resources (Reference 2.4-1).

Table 4.3-1 Potential Impacts to Terrestrial Communities on the Fermi Site from Construction of Fermi 3

Plant Community	Permanent Impacts (acres)	Temporary Impacts (acres)	Total Area of Community Onsite (acres)	Total Area of Community in Vicinity ¹ (7.5 mile radius) (acres)	Percent of Community in Vicinity Permanently Impacted
Coastal Emergent Wetland (CEW) Open Water	0	0	35	66,520	0
Coastal Emergent Wetland (CEW) Vegetated	2.3	0.8	238	1550	0.1
Grassland: Right-of-Way (GRW)	0	25.8	29	1209	0
Grassland: Idle/Old Field/Planted (GOF)	11.5	7.3	75	6932	0.2
Grassland: Row Crop (GRC)	9.5	60	70	23,465	<0.1
Shrubland (SHB)	3.3	31	113	95 (Note a)	Note a
Thicket (TKT)	0	6.3	23	Note b	--
Forest: Coastal Shoreline (FCS)	0	0	47	Note c	--
Forest: Lowland Hardwood (FLH)	0	24.9	92	3331	0
Forest: Woodlot (FWL)	0	6.3	117	3318	0
Lakes, Ponds, Rivers (LPR)	0	0	44	Note d	--
Lake Erie (main body)	Note e	Note e	186	Note d	--
Totals	116.2 ² 26. 6	162.4		171	
Total Impacts (Permanent + Temporary) = 189acres					

1. Figures taken from Subsection 2.2.1.2.3

Notes:

- Table 2.2-7 indicates 95 acres of Shrubland in the vicinity, while 113 acres were mapped just on the Fermi site. Based on visual observations in 2007 that many acres of this disturbed or early succession habitat are present in the vicinity but it is uncertain how the study used to produce Table 2.2-7 Table 2.2-7 categorized the community recognized herein as Shrubland. Therefore, no percent of the regional community impacted is provided.
- Included in Shrubland based on land use breakdown in Subsection 2.2.1.2.3.
- Included in Forest: Lowland Hardwood based on land use breakdown in Subsection 2.2.1.2.3.
- Included in Coastal Emergent Wetland (Open Water) based on land use breakdown in Subsection 2.2.1.2.3.
- Impacts to aquatic ecosystem are addressed in Subsection 4.3.2, therefore not included here.

Table 4.3-4 Vegetation Communities Occurring along the Transmission Corridor¹

Plant Community	Acres in Corridor	Percentage of Acres in Region Impacted	Acres in Region ²
United States			
Open Water	0	0	725,910
Developed	68 ← 11	0.000 ← 0.001	1,089,795
Barren Land	0	0	10,346
Deciduous Forest	209 ← 170	0.07 ← 0.06	282,046
Evergreen Forest	0	0	6717
Mixed Forest	0	0	5765
Shrub/Scrub	6	0.19	3179
Grassland/Herbaceous	38 ← 10	0.09 ← 0.02	41,308
Pasture/Hay	110 ← 45	0.05 ← 0.02	219,241
Cultivated Crops	465 ← 90	0.04 ← 0.007	1,217,689
Woody Wetlands	408 ← 74	0.08 ← 0.06	128,090
Emergent Herbaceous Wetland	43 ← 9	0.02	56,711
Canada			
Open Water	0	0	678,492
Urban	0	0	60,749
Woodlot	0	0	22,173
Agriculture	0	0	413,285
Wetlands	0	0	6826

Notes:

- Information within Table 4.3-4 is specific to the 10.8 mile tract of existing undeveloped corridor along the route to the Milan substation.
- The plant communities and acreages of communities present in the 50-mile radius (region) of the Fermi site in this table is taken from Table 2.2-7.

uses estimated acreages based on GIS land cover data and

**Attachment 3
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

RAI Question HH5.4.2-1

NRC RAI HH5.4.2-1

Provide input and output data (in electronic format) of the LADTAP and GASPAR computer codes.

Supporting Information

ESRP 5.4.2, Section III, states "Assess the computer outputs to ensure that data were entered properly and that the outputs appear normal."

The input and output files for LADTAP and GASPAR codes used in dose calculations will enable the staff to perform confirmatory analyses. Provide the basis for any factors other than defaults used as input to the computer codes.

Supplemental Response

The requested LADTAP and GASPAR input and output files were originally provided in Detroit Edison letter NRC3-09-0019 (ML092380595), dated July 29, 2009. Dose analysis updates related to DCD Rev. 6 were provided in Detroit Edison letter NRC3-10-0013, dated March 24, 2010. Since that time, the GASPAR input and output files were updated to DCD Rev. 7 changes and provided in Detroit Edison letter NRC3-10-0040, dated September 1, 2010. There were no DCD Rev. 7 impacts to LADTAP.

The requested DCD Rev. 6 revised LADTAP input and output files are provided in Enclosure 1.

Proposed COLA Revision

None

**NRC3-10-0048
RAI Question HH5.4.2-1**

Enclosure 1

LADTAP Input/Output Files
(following 1 page)

LADTAP Input/Output Files

Directory of D:\LADTAP Files

09/03/2010 11:52 AM	13,315	Fermi_DCD-Rev6_LakeMixOnly_MEI-NE_BiotaDF-10
09/03/2010 11:52 AM	13,318	Fermi_DCD-Rev6_LakeMixOnly_MEI-S_BiotaDF-10
09/03/2010 11:52 AM	2,569	LAD_INP_Dec_MEI-NE
09/03/2010 11:52 AM	2,571	LAD_INP_Dec_MEI-S
09/03/2010 11:52 AM	42,661	LAD_OUT_Dec_MEI-NE
09/03/2010 11:52 AM	42,661	LAD_OUT_Dec_MEI-S

6 File(s) 117,095 bytes

0 Dir(s) 0 bytes free

**Attachment 4
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

**RAI Question NO4.4.1-1
RAI Question NO4.4.1-2**

NRC RAIs

The following RAIs are related to the noise modeling analysis. Detroit Edison has elected to address these RAIs with a single response.

RAI NO4.4.1-1

Provide the noise modeling analysis for construction on a typical and “worst” day (day with the highest levels of construction emissions).

Supporting Information

Noise modeling for construction that assumes a reasonable combination of the number of heavy equipment operating and load factor for the average and worst day is needed for the impact analysis to be presented in the EIS.

RAI NO4.4.1-2

Provide the noise and vibration modeling analysis for blasting-activities on an average and “worst” day.

Supporting Information

Blasting impacts during construction would be the source of important noise and vibration impacts on nearby structures and neighboring communities. The noise and vibration modeling, along with blasting-related information (e.g., general description of blasting activities, TNT equivalent weight per charge, frequency, and noise and vibration control measures) is needed for the impact analysis to be presented in the EIS.

Supplemental Response

The original response to RAI NO4.4.1-1 was submitted to the NRC in Detroit Edison Letter NRC3-09-0014 (ML093350028), dated September 30, 2009, and the original response to RAI NO4.4.1-2 was submitted to the NRC in Detroit Edison Letter NRC3-09-0015 (ML093090165), dated October 30, 2009. On September 9, 2010, NRC staff requested a description of noise generating activities at night to determine nighttime noise impacts during Fermi 3 construction. This supplemental response is provided in two parts. First an estimation of nighttime noise levels is provided. Second, the mitigation measures that will be implemented to preclude unacceptable nighttime noise levels are described.

Nighttime Noise Estimation

As stated in ER Section 4.4.1.1.4, “noisier construction activities are expected to be limited to daytime hours to minimize the noise impact.” However, it is expected that construction activities will occur during nighttime hours. While these nighttime construction activities will be limited to control off-site noise levels, certain construction activities must proceed continuously and may need to take place during the nighttime hours. For example, a continuous concrete foundation pour may require some construction equipment to be operated during nighttime hours for a few days. This activity would take place in the vicinity of the power block, which is located approximately 3,000 feet from the nearest receptor. This is three times farther than the distance of 1,000 feet used for Table 4.4-1. Therefore, the nighttime construction sound levels at the nearest receptor would be expected to be at least 10 dB lower than the sound levels shown in Table 4.4-1. Further, it is not expected that nighttime construction activities will use all of the equipment listed in Table 4.4-1. Use of construction equipment such as pile drivers can be limited to the day times. Therefore, the nighttime construction sound level is expected to be well below 54 dBA at the nearest receptor.

Mitigation Measures

As outlined in ER Section 4.4.1.1.4, nighttime construction activities would be subject to mitigation measures to limit noise related impacts. Nighttime noise mitigation measures may include limiting the types of construction equipment used during nighttime hours, notifying potentially affected neighbors of planned nighttime activities, establishing a system for accepting and responding to complaints from affected neighbors, and implementing a construction noise monitoring program.

Based on conservative estimations of nighttime offsite noise levels and the mitigation measures to be implemented, the impact of construction noise on the nearest receptor during nighttime hours is expected to be SMALL.

Proposed COLA Revision

None

**Attachment 5
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

**RAI Question SE2.5.2-1
RAI Question SE2.5.2-2**

NRC RAIs

The following RAIs are related to the size of the construction and operations labor forces. Detroit Edison has elected to respond to these RAIs in a single response.

RAI SE2.5.2-1

Provide information on the size and nature of the heavy construction industry and construction labor force within the region (size of labor force, unemployment rates, wages) specific to the job categories that would be used to support Fermi 3 construction (i.e., boilermakers, pipefitters, electricians, ironworkers, insulators, etc.).

Supporting Information

More detailed information is needed to confirm assumptions on the availability of construction workers within the local area to further characterize impacts by jurisdiction on population, housing, public services, education, and public utilities.

RAI SE2.5.2-2

Provide information on the job categories that would be recruited for the operations workforce, and the size of the labor force, unemployment rates, and wages for these laborers within the region.

Supporting Information

More detailed information is needed to confirm assumptions on the availability of operations workers within the local area to further characterize impacts by jurisdiction on population, housing, public services, education, and public utilities.

Supplemental Response

On September 20, 2010, the NRC staff requested a month-by-month breakdown of the number of on-site workers during the construction period, including operating staff. The NRC staff also requested Detroit Edison identify those months where there is an overlap between construction and operating staff.

The Environmental Report currently presents and utilizes an estimate of the average number of on-site workers in six months intervals during the construction period. These six month interval estimates were further refined to estimate the number of on-site workers on a month-by-month basis. The total number of on-site workers was separated to differentiate between the Fermi 3 operating staff and construction workers. Three loading curves for on-site workers were developed and are presented in ER Figures 4.4-1, 4.4-2, and 4.4-3 in the attached markup.

Proposed COLA Revision

Proposed revision to ER Section 4.4 is shown on the attached markup.

Markup of Detroit Edison COLA
(following 6 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

availability of housing or inadequate community facilities and services. The key information to make this determination is the size of the relocating construction workforce relative to the availability of housing and community facilities and services.

Construction employment at the Fermi 3 site will vary significantly over the project. It is anticipated that during Phase 1, the peak employment level will be 150 workers in the second year of activity. During the two-year Phase 1 duration, an average workforce of 100 is assumed. During the Phase 2 activities, the initial workforce will be approximately 200 workers and will gradually increase to an assumed peak construction workforce of approximately 2900.

The Phase 2 construction period can be further divided into three time periods. During the early portion of the Phase 2 activities, which should last approximately 18 to 24 months, up to 90 percent of the onsite craft workforce will consist of civil and structural trades, which include laborers, carpenters, iron workers, cement masons and equipment operating engineers. The balance will consist of mechanical and electrical workers. During the mid-portion of the project, which will last from 18 months to 3.5 years, depending on the number of shifts and scheduling, approximately 50 percent of the craft workforce will consist of the mechanical trades that include boilermakers, pipe fitters, sheet metal workers, and millwrights. The remaining 50 percent of the craft workers during this phase should be divided between electrical workers and civil/structural workers. During the late stage of construction, which could last 3.5 to 4.5 years, approximately 70 percent of the craft workforce will be electrical, 10 percent will be civil and structural, 15 percent will be mechanical, and 5 percent of the craft workforce will be insulators and painters.

In addition to the craft labor, there will also be a non-craft component of the Fermi 3 workforce. The non-craft labor component consists of craft supervision, site indirect labor, quality control inspectors, nuclear steam supply vendor and subcontractor's staff, EPC contractor's managers, engineers and schedulers, owners' O&M staff, start-up personnel, and NRC inspectors.

Wages paid during construction will be linked to the prevailing wage rate for each type of skill needed. An approximate estimate of total wages to be paid can be derived using publicly available data from the U.S. Department of Energy (DOE) publication *Nuclear Power Plant Construction Infrastructure Assessment* (Reference 4.4-10). Based on the semi-annual manpower requirements projected in this DOE publication, adjusted for the anticipated peak labor requirements of 2900 at the Fermi 3 site, it is estimated that the average onsite labor (craft plus non-craft) during the 8-year construction period will be approximately 1000 workers (Reference 4.4-10). Adding for the additional labor required during the 2-year Phase 1 work (100 workers, on average, for two years are assumed), the total man-hour requirements for the Fermi 3 project are estimated to be approximately 17 million man-hours, or 8173 man-years of employment. Based on labor union surveys, it is assumed in the impact analysis that the average direct construction wage for craft workers will be \$31.37 per hour and that the estimated average direct wage for non-craft workers will be \$48.00 per hour (both in 2008 dollars). It is assumed that craft workers will comprise approximately two-thirds of the construction hours and that non-craft workers will comprise approximately one-third of the construction hours. As a result of these wage and hour assumptions, the total direct wages for all construction workers is estimated to be \$627 million. Of this amount, and based on the assumptions set forth in Section 4.4.2.1, approximately \$533 million will be

Insert 1
Here

Insert 1

It is assumed that the general monthly manpower loading pattern for all construction-related workers plus the Fermi 3 operations and maintenance staff will have the general shape shown in Figure 4.4-1. Figure 4.4-2 and Figure 4.4-3 further break down this total manpower requirement into the month-by-month Fermi 3 operations and maintenance staff, and the construction-related manpower requirements less the Fermi 3 O&M staff. All three figures show the loading over the 120 month (10-year) Phase 1 plus Phase 2 total construction length.

(Insert paragraph break after Insert 1)

Table 4.4-6 Fermi 3 Construction Workforce Employment and Earnings Impacts

	15% Relocating		85% Locals	
	Relocating Distribution	Workers @ Peak	Fermi 3 Adjusted	Workers @ Peak
Counties in Primary Impact Area				
Monroe County (MI)	45.0%	196	11.0%	272
Wayne County (MI)	25.0%	109	38.5%	948
Lucas County (OH)	20.0%	87	21.4%	527
Primary Impact Area (PIA) Subtotal	90.0%	392	70.9%	1,746
Washtenaw County (MI)	3.0%	13	6.8%	168
Oakland County (MI)	3.0%	13	10.9%	267
Wood County (OH)	2.0%	9	3.9%	95
Lenawee County (MI)	1.0%	4	3.6%	89
Other County/Misc	1.0%	4	4.0%	99
Region Total	100.0%	435	100%	2,465
Estimated Employment Benefits with Multiplier Impacts				
Total Man Years of Employment (based on 17 million hours)		8,173		
A) In-migrant const. man-years ($8173 \times 0.15 \times .9$)		1,103		
B) Resident Unemployed Man-years ($8173 \times 0.85 \times 0.709 \times 0.25$)		1,230		
C) Man Years Multiplier Applicable (A+B)		2,334		
D) RIMSII Employment Multiplier, Construction Sector		1.7113		
E) PIA Man Years, Multiplier Applicable (C*D)		3,994		
F) PIA Man-years not Multiplier Applicable ($8173 \times 0.85 \times 0.709 \times 0.75$)		3,691		
G) Total Man-years of Employment in PIA (E+F)		7,685		
H) Regional Man-years not in PIA ($(8173 \times 0.15 \times 0.1) + (8173 \times 0.85 \times 0.291)$)		2,148		
I) Total Regional Impact, with PIA multiplier impact (H + G)		9,833		
Estimated Earnings Benefits with Multiplier Impacts				
Total Earnings Estimate		\$627,526,667		
J) In-migrant const. earnings ($\$627.5 \text{ M} \times 0.15 \times 0.9$)		\$84,716,100		
K) Resident Unemployed Earnings ($\$627.5 \text{ M} \times 0.85 \times 0.709 \times 0.25$)		\$94,478,062		
L) Earnings Multiplier Applicable (J+K)		\$179,194,162		
M) RIMS II Earnings Multiplier, Construction Sector		1.5998		
N) PIA Earnings, Multiplier Applicable (L*M)		\$286,674,820		
O) PIA Earnings Not Multiplier Applicable ($\$627.5 \text{ M} \times 0.85 \times 0.709 \times 0.75$)		\$283,434,185		
P) Total Earnings in PIA (N+O)		\$570,109,005		
Q) Regional Earnings not in PIA ($(\$627.5 \text{ M} \times 0.15 \times 0.1) + (\$627.5 \text{ M} \times 0.85 \times 0.291)$)		\$164,898,320		
R) Total Regional Impact, with PIA multiplier impact (P+Q)		\$735,007,325		

Note: The formulas shown in parentheses may differ to the corresponding result due to rounding.

Insert 2 After Table
4.4-6

Insert 2

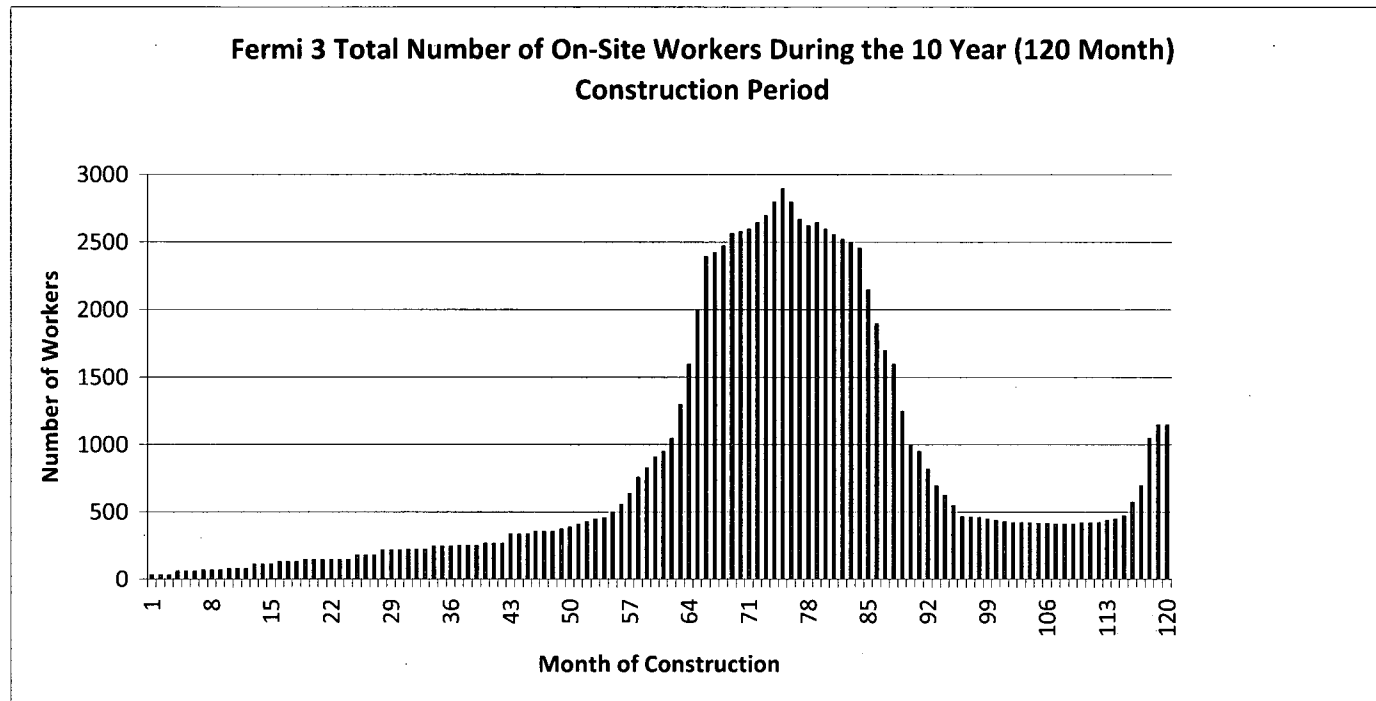


Figure 4-4.1

Insert 2 Continued

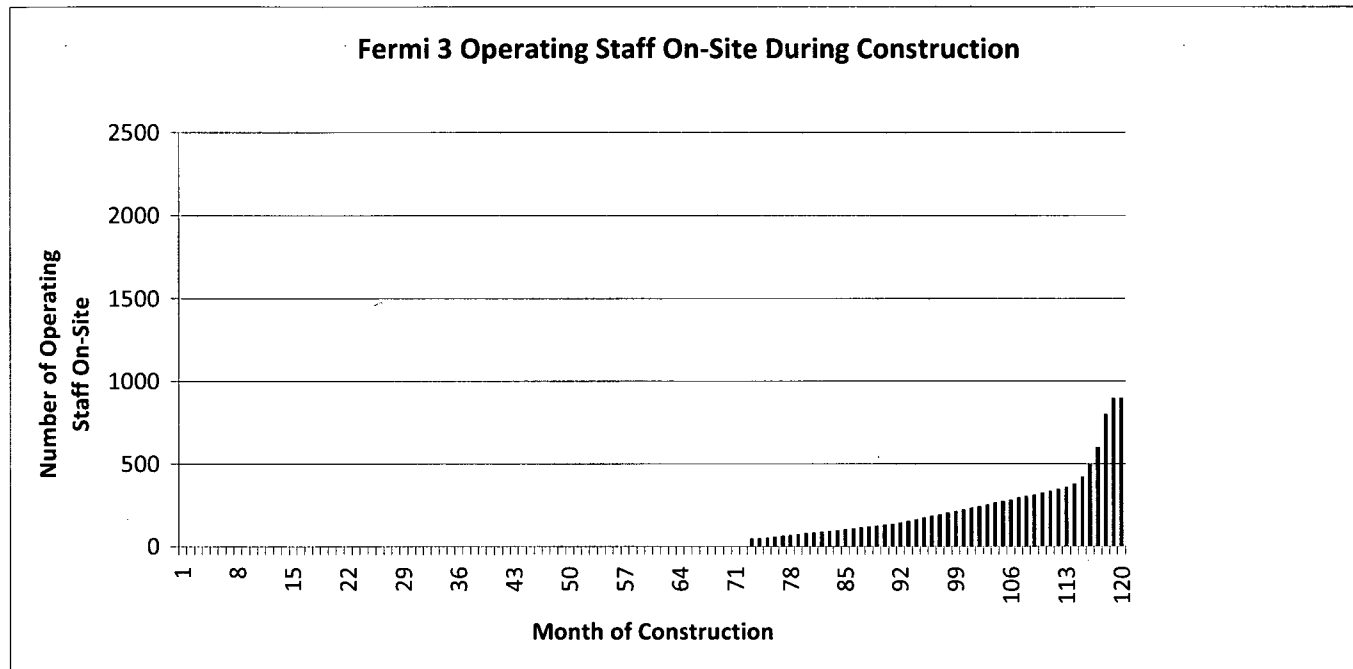


Figure 4.4-2

Insert 2 Continued

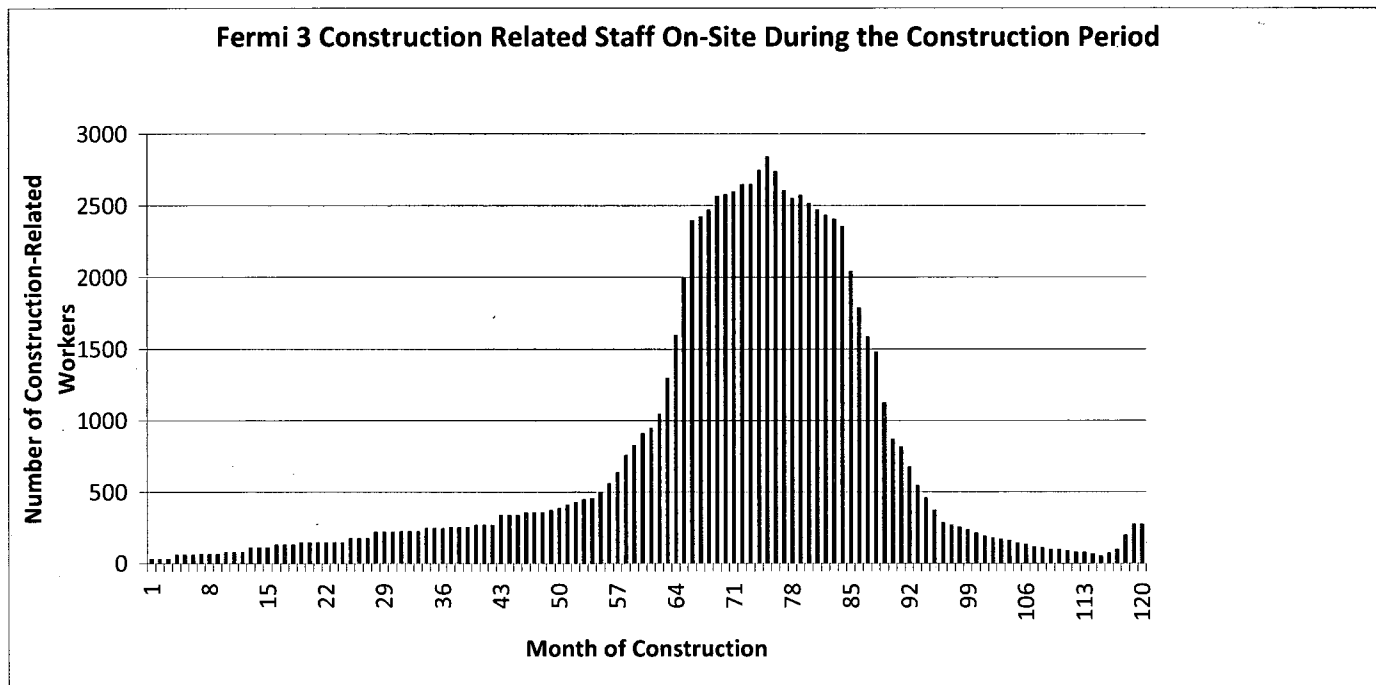


Figure 4.4-3

**Attachment 6
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

RAI Question TE4.3.1-9

NRC RAI TE4.3.1-9

Provide a discussion of measures Detroit Edison is considering to mitigate potential impacts to the eastern fox snake and its habitat.

Detroit Edison should also provide complete documentation of any discussions or correspondence to date with the MDNR Natural Heritage Program related to the project's impact on the eastern fox snake and measures Detroit Edison would consider for mitigating impacts to this snake.

Supporting Information

This RAI is a request to Detroit Edison to document its consideration of mitigation measures to minimize impacts on the eastern fox snake. Detroit Edison has been working with the MDNR to mitigate impacts to this snake, and documentation of those discussions is needed.

Supplemental Response

The Fermi 3 Eastern fox snake mitigation plan was originally provided to the NRC in Detroit Edison letter NRC3-10-0005 (ML100541329), dated February 15, 2010, in RAI TE4.3.1-9. In telephone calls on September 8, 2010 and October 15, 2010, the NRC indicated that the mitigation plan provided should directly address impacts to Eastern Fox snakes on site roadways and requested provisions be made to protect fox snakes during Fermi 3 operations.

Based on the NRC comments, the Fermi 3 construction phase mitigation plan, "Habitat and Species Conservation Plan Eastern Fox Snake (*Elaphe gloydi*)," has been revised. The plan now specifically addresses impacts to Eastern Fox snakes on site roadways and the methods which will be employed to minimize this impact. The revised plan is provided as an enclosure to this response.

The mitigation plan provided only addresses the construction phase of the Fermi 3 project. Detroit Edison will develop a procedure to be used during the operation of Fermi 3 to mitigate impacts to Eastern Fox snakes on-site.

Permitting for impacts to threatened and endangered species was discussed with MDNRE staff on June 15, 2010. During this discussion the process for applying and obtaining permits related to threatened species with the Fermi 3 construction areas was discussed. In following the process, the application for and issuance of a permit will include measures to mitigate impacts.

Proposed COLA Revision

Proposed revisions to ER Sections 4.3.1.2.1 and 4.3.3 are shown on the attached markup.

Markup of Detroit Edison COLA
(following 3 pages)

The following markup represents how Detroit Edison intends to reflect this RAI response in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

designated critical habitat listed by the USFWS under the Endangered Species Act (Reference 4.3-2) would be impacted. The Michigan Department of Natural Resources (MDNR) stated that while there are no occurrence records for these species in the vicinity, terrestrial species may occur in the vicinity. Field studies in 2007 identified one animal and one plant that are State listed that occur on the Fermi site. Table 4.3-2 provides a list of the protected species occurring or potentially occurring on the Fermi site. Following are discussions of the State protected species and important habitats.

4.3.1.2.1 Important Species

Bald Eagle

The bald eagle is a Michigan threatened species. Three nests occurred on the Fermi site in the winter of 2007-2008 in the Coastal Shoreline Forest immediately adjacent to Lake Erie. Two nests were located north of Fermi 2, and one nest was south of Fermi 2. Normally one pair of eagles will occupy one of the three nests each winter. In May 2008, the nest south of Fermi 2 was gone, apparently blown out of the tree during winter storms. One nest, approximately 750 feet east of the Fermi 2 cooling towers, was occupied.

Formerly listed as an endangered species, the bald eagle nationwide (except in parts of Arizona) was federally de-listed in 2007, but continues to be protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. MDNR eagle management guidelines impose activity restrictions within a one-quarter mile radius around active nests from mid-March to the end of June, if young are in the nest. However, because bald eagles are abundant in Michigan, the MDNR is in the process of de-listing the species for Michigan. When the state de-listing process is complete, the MDNR will follow USFWS guidelines for bald eagle management. These guidelines suggest a radius of 660 feet around the nest during the breeding season (Reference 4.3-4). The restricted area is imposed because bald eagles are extremely sensitive to human activity during the first 12 weeks of the breeding season. These guideline limitations will be adhered to during Fermi 3 construction.

American Lotus

The American lotus (a Michigan threatened species) is a wetland plant common in moderately shallow areas of the South and North Lagoons on the Fermi site. Although the species reaches a northern limit of its distribution in southeast Michigan, healthy populations are scattered throughout this portion of the state. American lotus grows from thick and creeping underground tubers that make it impossible to determine how many plants are actually present in a given area. The plants, however, are hardy and relatively easy to transplant.

Construction activities are not expected to affect the North Lagoon and, therefore, no American lotus in this area should be affected. American lotus occurring along the west edge of the south lagoon may be temporarily affected by the construction and utilization of the laydown area southeast of the Fermi 3 cooling tower area. Because state populations of American lotus are healthy, MDNR endangered species specialists have indicated that plants expected to be impacted by Fermi 3 construction activities should be transplanted to other areas of the lagoons on the Fermi site or

possibly offsite to minimize adverse impact. Detroit Edison intends to engage in further consultation with the MDNR in developing the appropriate mitigation strategy that will ensure that the impact to this species will be SMALL.

Arrowhead

The arrowhead (a Michigan threatened species) has not been observed on the Fermi property. Subsection 2.4.1.2.2.2 provides life history and distribution information about the species. Most of the habitat that might have been suitable for the species has been invaded by common reed (*Phragmites australis*). Therefore, impacts from Fermi 3 activities are anticipated to be SMALL, and no mitigative measures are needed.

Eastern Fox Snake

The eastern fox snake (a Michigan threatened species) was sighted two times on the Fermi property, in June 2008. The Michigan Natural Features Inventory has recorded nine occurrences for Monroe County, with the most recent report in 2007 (Reference 4.3-5). The snake was found along the cattail marshes or wetland shorelines around woody debris. The life history of the eastern fox snake is discussed in Subsection 2.4.1.2.2.1. ~~Fermi 3 construction activities are primarily located away from potential habitat for the eastern fox snake and the snake would be expected to move away from these activities. Therefore, the impact to this species from the project is considered SMALL, and no mitigative measures are needed.~~

Insert 1

4.3.1.2.2 Important Habitats

Important habitats for the Fermi site are described in Subsection 2.4.1.2.3 and include the DRIWR and areas of wetlands as discussed below.

Detroit River International Wildlife Refuge

The DRIWR Lagoona Beach Unit is located entirely within the Fermi property and includes a total of 656.4 acres (Figure 2.4-6). The Fermi 3 construction impact area includes approximately 61 acres, or about 9 percent of the Lagoona Beach Unit as illustrated in Figure 4.3-3; 2 acres would be permanent impacts and 59.3 acres temporary impacts. The area of each section of the Lagoona Beach Unit and the area of that unit to be impacted is provided in Table 4.3-3. The agreement between Detroit Edison and the USFWS that established the wildlife refuge allows for modifications to the agreement (such as Fermi 3) by either party at any time (Reference 4.3-6). The construction impacts of reducing the effective area of the DRIWR are principally land-use impacts, which discussed in Subsection 4.1.1.1. The importance of DRIWR as an ecological habitat is principally due to it being a wetlands area. Accordingly, the construction impacts are bounded by the overall wetlands impacts, as discussed below.

Wetlands

Detroit Edison conducted a wetlands investigation to delineate wetland boundaries and assess functions and values of the wetlands present on the Fermi property. The results of the wetland investigation are summarized in Subsection 2.4.1.2.3. Impacts to approximately 49.47 acres of

an SESC Plan. Any small spills of construction-related hazardous fluid would be mitigated according to the PIPP. Impacts to aquatic communities from construction activities are expected to be SMALL.

4.3.3 References

- 4.3-1 Michigan Department of Environmental Quality, Technical Manuals, MDEQ – BMP Design Manuals, http://www.michigan.gov/deq/0,1607,7-135-3313_3682_3714-118554--,00.html, accessed 29 April 2008.
- 4.3-2 Michigan Department of Natural Resources, Natural Heritage Program, http://www.michigan.gov/dnr/0,1607,7-153-30301_31154_31260-54441--,00.html, accessed 5 March 2008.
- 4.3-3 State of Michigan, "Natural Resources and Environmental Protection Act (Act 451 of the Michigan Public Acts of 1994)," Part 365 Endangered Species Act, [http://www.legislature.mi.gov/\(S\(k3qiry55fgux1yywldqkm345\)\)/mileg.aspx?page=getobject&objectname=mcl-451-1994-iii-1-endangered-species-365](http://www.legislature.mi.gov/(S(k3qiry55fgux1yywldqkm345))/mileg.aspx?page=getobject&objectname=mcl-451-1994-iii-1-endangered-species-365), accessed 21 March 2008.
- 4.3-4 U.S. Fish and Wildlife Service, "National Bald Eagle Management Guidelines," May 2007, <http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>, accessed 21 March 2008.
- 4.3-5 Michigan State University Extension, Michigan Natural Features Inventory, Rare Species Explorer, "Pantherophis gloydi, Eastern Fox Snake," <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11505>, accessed 30 April 2008.
- 4.3-6 Establishment of the Lagoon Beach Unit of the Detroit River International Wildlife Refuge, "Cooperative Agreement Between Detroit Edison and U.S. Fish and Wildlife Service," September 25, 2003.
- 4.3-7 Michigan State University Extension, Michigan Natural Features Inventory, Monroe County, http://web4.msue.msu.edu/mnfi/data/cnty_dat.cfm?county=Monroe, accessed 7 February 2008.

4.3-8 "Habitat and Species Conservation Plan, Eastern Fox Snake (*Elaphe gloydi*)" provided to the NRC in Detroit Edison letter NRC3-10-0048, dated October 29, 2010, in RAI TE4.3.1-9.

INSERT 1 : Detroit Edison has prepared a mitigation plan for eastern fox snakes to be used during the construction phase of the project (Reference 4.3-8). The primary goal of this plan is to minimize the impacts to resident fox snakes. Detroit Edison has also committed to developing a procedure which will be used during the operation of Fermi 3 to minimize the impact to fox snakes. [START: COM ER-2.4-016] Detroit Edison will develop a procedure to be used during the operation of Fermi 3 to mitigate impacts to eastern fox snakes on-site. [END: COM ER-2.4-016]

**NRC3-10-0048
RAI Question TE4.3.1-9**

Enclosure 1

Habitat and Species Conservation Plan
(following 12 pages)

Detroit Edison

Fermi 3

Habitat and Species Conservation Plan
Eastern Fox Snake (*Elaphe gloydi*)

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Funding	8
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Executive Summary

The eastern fox snake (*Elaphe gloydi*) is a threatened species in Michigan with four known isolated populations remaining in Southeastern Michigan. Two of these populations occur in Monroe County along the shores of Lake Erie (Reference 8.1). It is known that Detroit Edison's Fermi property has a population of fox snakes. Detroit Edison currently operates one nuclear generating unit on this property and is considering building an additional unit, Fermi 3. The construction of Fermi 3 has the potential to impact the existing fox snake population and its habitat. The site's personnel have an elevated awareness of wildlife habitat and associated wildlife populations as a result of the site's Wildlife Habitat Certification (certified by the Wildlife Habitat Council), functional ISO 14001 certified Environmental Management System and a cooperative agreement with the US Fish and Wildlife Service to manage on-site habitats as part of the Detroit River International Wildlife Refuge. It is the intent of this document to describe measures to be implemented in order to create further employee awareness and decrease impacts on the population of eastern fox snakes and their habitat caused by Fermi 3 construction activities.

1.0 Introduction and Background

1.1 Overview

The construction of Detroit Edison's Fermi 3 Power Plant will involve a significant amount of heavy construction activity. During the course of these construction activities awareness about wildlife and its habitat will need to be discussed during pre-job briefings to help assure that impacts are minimized. The development of an environmental check-list will assist in making construction personnel aware that some activities and the locations in which they are performed may have impacts on wildlife in general and the eastern fox snake in particular. The use of "fox snake" and "snake" refer to the eastern fox snake in this document. Additionally, communicating the behavior, appearance and preferred habitat of the fox snake will promote greater awareness. Undeveloped areas to be impacted will be surveyed by a team of trained personnel to help remove snakes prior to construction activities.

1.2 Regulatory/Legal Framework

The Federal *Endangered Species Act of 1973* (ESA 1973), and the State of Michigan's *Natural Resources and Environmental Protection Act (NREPA)*, *Act 451 of 1994 PART 365* require all parties to include endangered and threatened species protection within project planning. This requires projects to be reviewed by State and/or Federal agencies. This review determines if the project requires an *incidental take permit*, as outlined in ESA 1973. With the application for an incidental take permit a *Habitat Conservation Plan* (HCP) needs to be authored to demonstrate to the agencies that there is a plan in place that reduces the impact on endangered and threatened species. The eastern fox snake is not federal listed species but is listed by the state of Michigan as threatened.

1.3 Plan Area

This plan will cover activities occurring on the Fermi power plant site related directly to the construction of the Fermi 3 power plant. Areas utilized by the eastern fox snake throughout its life cycle include shorelines, wetlands and adjacent uplands which are critical habitat for the fox snake (Reference 8.2). These habitats occur throughout the Fermi Power Plant property and the wetlands are outlined in Fig. 1 in the Appendix. The Michigan Department of Natural Resources and Environment (MDNRE) maintains an *Endangered Species Assessment* website (Reference 8.3) for the specific purpose of project planning. This website is used to obtain a course overview for project planning and users can get an immediate idea if further review by the MDNRE is required for projects. The Fermi Power Plant property is entirely contained within a high priority area for endangered and threatened species as displayed on the MDNRE's map of areas with unique natural features (Reference 8.4).

2.0 *Environmental Setting/Biological Resources*

2.1 *Environmental Setting*

The Fermi site is on the west shore of Lake Erie at the mouth of Swan Creek, approximately 24 miles northeast of Toledo, Ohio and 30 miles southwest of Detroit, Michigan. The Fermi 3 power plant will be located on the current Fermi site in Frenchtown Township; Monroe County, Michigan at the following coordinates:

Latitude	Longitude
41° 57' 39" North	83° 15' 43" West

Zone 17T UTM (NAD83) Coordinates
4,647,902 m Northing 312,551 m Easting

The U.S./Canada international border runs through Lake Erie about seven miles east of the Fermi site. The Power Plant and ancillary systems are built primarily on fill materials.

2.1.1 *Climate*

Bailey's eco-region classification system (Reference 8.5) has been utilized to describe climate, and associated biological interactions, throughout the world. Bailey's eco-region system is widely used by many government and non-government groups to describe climate and associated ecology in project or management areas. The descriptors identifying the eco-region that the Fermi site is located in are as follows:

Baileys Eco-region Classification for Detroit Edison's Fermi Power Plant

Domain	Humid Temperate
Division	Hot Continental
Province	Eastern Broadleaf Forest
Section	Erie and Ontario Lake Plain

2.1.2 *Topography/Geology*

Fermi Power Plant is situated in the Lake Erie lake plain. The topography at this location is flat and formed both by the physical process of Lake Erie and Swan Creek. Historically this region was part of a vast wetland complex associated with Lake Erie, Swan Creek and in part by the hydrologic processes of the Detroit and Raisin Rivers. Large lake plain deposits of clay and sand dominate the soil types as a result of the post glacial Lake Erie formation.

2.1.3 Hydrology/Streams, Rivers and Drainages

Currently the hydrology of the area is influenced greatly by the physical processes of Lake Erie. Lake Erie has a perfect fetch for seiche activity. With a predominant southwest wind pattern Lake Erie is susceptible to great fluctuations in water levels. This is due to sustained winds pushing the lake water to the east, and then, as the winds subside, the water returns to the west. This creates large waterless expanses followed quickly by water inundating into creek and river mouths resulting in a bath tub like “sloshing” effect. This creates unique opportunities for both plants and wildlife. Other local hydrological conditions are dictated by the Swan Creek.

2.1.4 Vegetation

Vegetation varies throughout the Fermi property. A survey was conducted from 2008 through 2009 and the findings have been detailed in, “Fermi 3 Terrestrial Vegetation Survey, Final Report”, November 2009. Numerous land uses preceded the Power Plant including fish farming, residential and recreational. As a result of dikes, filling activity and various other disturbances, many vegetation types are in varying stages of succession.

Undeveloped areas of the site account for 656 acres and are cooperatively managed with USFWS as part of the Detroit River International Wildlife Refuge (DRIWR) Lagoon Beach Unit. The majority of the undeveloped areas are wetlands of various types (e.g., high and low marsh, wet meadow, forested wetland, scrub-shrub wetland, shallow open water, etc.).

2.1.5 Wildlife

The Fermi site has been a certified wildlife habitat site through the Wildlife Habitat Council since 2000. The focus of wildlife habitat certification is to utilize unused lands for the benefit of wildlife. A wildlife survey was conducted on the site from 2008 through 2009 and the results are documented in “Fermi 3 Terrestrial Wildlife Survey, Final Report”, September 2009. The survey contains an assessment of the fox snake as follows:

Eastern fox snake (Elaphe gloydi)

State endangered. The eastern fox snake inhabits Great Lakes emergent wetlands, preferring habitats dominated by herbaceous vegetation, such as cattails (*Typha* spp.). Although primarily a wetland species, eastern fox snakes also use drier habitats such as vegetated dunes and beaches, old fields, and open woodlands. They occasionally use disturbed areas such as farm fields, pastures, woodlots, vacant urban lots, rock riprap, ditches, dikes and residential properties. eastern fox snakes usually are found near water, and are capable of swimming long distances. Specific habitat features required by eastern fox snake are downed woody debris in Great Lakes marshes, lakeplain wet prairie, lakeplain wet-mesic prairie, emergent marsh, open dunes, sand and gravel beach, mesic sand prairie, mesic southern forest and lakeplain oak openings (MNFI, 2007).

Eastern fox snake was observed in wetlands west of Doxy Road by Ducks Unlimited field staff while conducting a wetland delineation of the Fermi site in May and June 2008. The species was not observed during the present study. Portions of habitats used by the snake, principally emergent marsh, would be filled for Fermi 3 construction and some individuals could be accidentally harmed or killed if they do not withdraw from active construction areas. Scheduling of work periods should be timed to coincide with eastern fox snake active periods (as opposed to hibernation) to allow snakes to withdraw from construction areas as needed. If ground disturbing construction work involving potential hibernacula would occur during hibernation periods, it is recommended that a biologist evaluate the work area, including all ingress/egress routes, before any work begins to determine if eastern fox snake or other protected snakes are present. Suitable hibernacula for eastern fox snake generally consist of rock piles or similar structures, including railroad berms and trestle footings. Other features that retain heat from sunlight also could be used by this snake.

Significant marsh and transitional habitat would remain intact post-construction and it is expected that the eastern fox snake population within the Fermi site would persist. A site management plan that includes provisions to protect eastern fox snake habitat during construction and after construction is recommended. Based on the available information, no significant impacts are anticipated. However, available information regarding eastern fox snake habitat requirements is sketchy and as new information becomes available, the potential for impacts should be re-evaluated. Further consultation with MDNRE is recommended before construction begins.

2.1.6 Existing Land Use

The Fermi site is 1,260 acres in area of which 656 acres are undeveloped. The remaining 604 acres is used for a variety of purposes including the Fermi 2 power plant, office buildings, parking lots and maintenance buildings. Permanent impacts resulting from the construction of the Fermi 3 power plant will occur primarily on already developed or highly disturbed areas. A minimal amount of undeveloped land will be permanently impacted and those areas containing wetlands will be mitigated appropriately. A draft mitigation plan has been prepared, "Wetland Mitigation Plan, Detroit Edison, Fermi Plant, Monroe County, MI" and a finalized plan will be written prior to beginning construction activities.

2.2 Species of Concern in Plan Area

The studies which were performed to investigate the terrestrial and aquatic ecology had a particular focus on protected species within the Fermi 3 area of potential effect (APE). In addition to the eastern fox snake a wide range of species were identified as having the potential to utilize the Fermi site. Additional information on these species can be found in these survey reports: "Fermi 3 Terrestrial Vegetation Survey, Final Report", November 2009, "Fermi 3 Terrestrial Wildlife Survey, Final Report", September 2009, and "Aquatic Ecology Characterization Report, Detroit Edison Company Fermi 3 Project, Final Report", November 2009.

3.0 Project Description/Activities Covered by Permits

3.1 Project Description

Detroit Edison proposes to construct and operate an Economic Simplified Boiling Water Reactor (ESBWR) at the Fermi Nuclear Power Plant site. The Fermi site is located in Monroe County, Michigan, approximately 30 miles southwest of Detroit. There are two existing nuclear reactors at Fermi. Fermi 1 is a non-operational demonstration liquid metal fast breeder reactor that is currently undergoing decommissioning. Fermi 2 is an operating boiling water reactor. Fermi 3 will be located adjacent to and generally to the south of Fermi 2 and west of Fermi 1.

Detroit Edison is the sole owner of the existing Fermi 1 and 2 nuclear units. Detroit Edison is the licensed operator of the existing facilities, with control of the Fermi site and existing facilities. Detroit Edison will be responsible for construction and operation of the proposed Fermi 3 power plant.

The ESBWR is a 4,500 MWt reactor that uses natural circulation for normal operation and has passive safety features. General Electric Company (GE, now GE-Hitachi Nuclear Energy Americas, LLC (GEH)) submitted an application for final design approval and standard design certification for the ESBWR on August 24, 2005, which the NRC is currently reviewing under docket number 52-010. It is anticipated that the design certification of the ESBWR will be issued in fall 2011. This COL application references and incorporates the Design Control Document (DCD) currently under review in the design certification proceeding.

All aspects of the Fermi 3 project are detailed in the Fermi 3 Combined Operating and Licensing Application. The project has been designed with a goal to minimize the impacts to undeveloped areas and wetlands. Project structures are primarily to be located in already developed or heavily disturbed areas.

3.2 Activities Covered by Permit

This mitigation plan will be provided to the MDNRE as part of the permit application process. The permit(s) obtained will help determine the scope of construction activities as they pertain to eastern fox snake impacts.

4.0 Potential Biological Impacts

Fermi 3 construction activities have the potential to kill resident eastern fox snakes as well as destroy or degrade their onsite habitat.

5.0 Conservation Program/Measures to Minimize and Mitigate Impacts

Employee Education Documentation – A document will be prepared which describes the eastern fox snake and its habitat and brings attention to its threatened status. The document will contain

pictures and contact information for when sightings are made. Each construction employee will be required to review and sign an acknowledgement prior to beginning work (refer to ISO 14001 pamphlets).

Employee Education/Pre-job brief – At the beginning of each construction work shift, for those construction activities where fox snakes may be encountered, work leaders will review the possibility of discovering eastern fox snakes and the steps to be taken upon a discovery. This pre-job task will be noted on the pre-job brief checklists which are used as part of the project. Job leaders will receive additional education in order to fully understand the fox snake mitigation goals.

Prior to beginning daily work on a developed or already disturbed area, designated employees will walk down the site and observe for eastern fox snakes. In addition, roadways used for construction related vehicles will also be inspected on a daily basis when the snakes are most likely to be present on or along roadways. Any fox snakes located in these areas will be removed by a designated Detroit Edison employee who will then relocate the snakes to undeveloped areas of the site which will not be impacted by Fermi 3 construction.

One week and again one day prior to clearing undeveloped areas, the areas will be walked through by a team led by a biologist familiar with eastern fox snakes and their habitat. Land clearing activities should be scheduled to be performed outside of the fox snakes hibernation periods so that they are active, easier to locate and safely remove from the area. During this walkthrough, any fox snakes observed will be captured and relocated to an undeveloped location on site which will not be impacted by Fermi 3 construction activities. The lead biologist will ensure that the snakes are not harmed while being captured, transported or released. Potential hiding places for the snakes will be uncovered and searched. Construction workers will continue to observe for snakes as clearing progresses. If a construction worker observes a fox snake during work activities, they are to stop work until the snake clears the area or until designated personnel can clear it from the area.

As fox snakes are a mobile species, there will always be a potential of snakes being killed by construction related vehicles. The mitigation measures described will provide a substantial degree of protection for snakes which migrate to active roadways. Employees will be aware of the presence of fox snakes and reminded of their protected status on a daily basis at pre-job briefs. Roadways will be walked down daily in order to ensure that snakes are not present or, if present, removed from the path of danger. Vehicle drivers will be required to stop their vehicles in order to prevent fox snakes from being struck. To further create awareness about the danger posed to snakes from vehicles, road signs indicating that fox snakes are present and must be yielded to, will be installed along construction-related roadways. Lastly, construction-related vehicles will be held to a speed limit of 15 mph while within the construction area. This low rate of speed, provided for construction site safety, will also help allow for snakes to be identified on or along roadways by vehicle drivers prior to being struck.

5.1 Biological Goals

The biological goals of this document have been created utilizing available literature from different sources such as the MDNRE, Michigan Natural Features Inventory, and supplemental

field guides on reptiles. The over-arching goal will be to prevent the deaths of eastern fox snakes as a result of Fermi 3 construction activities through employee education and awareness, capture and release and monitoring. Locations to be used for fox snake release will be determined through consultation with the MDNRE and will consider at a minimum habitat quality, potential threats in and to the areas, and the carrying capacity of the release area.

5.2 Measures to Minimize Impacts

- 5.2.1 Redesign site layout to minimize the impacts to undeveloped areas which provide potential habitat for eastern fox snakes. The redesign has reduced the construction impact by 117 acres.
- 5.2.2 Educate Employees through use of a fox snake manual to be created. Employees are to read and sign manual prior to work beginning.
- 5.2.3 Add fox snake to the pre-job brief checklist so that the issue is reinforced prior to work beginning each day.
- 5.2.4 Capture and release snakes observed during the course of construction in developed areas.
- 5.2.5 Search for and capture snakes found in undeveloped areas to be cleared. Release snakes to onsite undeveloped areas which will not be impacted.

5.3 Measures to Mitigate Unavoidable Impacts

- 5.3.1 Lead Biologist and team will walk the area(s) prior to the start of construction activities, capturing and then releasing any snakes found to a safe area.
- 5.3.2 Develop procedure for capture and relocation of snakes including description of devices to use and locations for release.
- 5.3.3 Employees are to halt work upon discovery of an eastern fox snake until the snake is clear of the activity or is removed by a designated employee.

5.4 Monitoring reports

A log will be maintained, documenting when and where monitoring is performed. In cases where a fox snake is observed while performing a walkthrough, a report will be created noting the number of snakes located and removed and where they were relocated to. A yearly report will also be created summarizing the results of the mitigation efforts. Any snakes killed in the construction process will be reported to the MDNRE as required by applicable take permits.

6.0 Funding

Funding for fox snake mitigation efforts will be provided as part of the Detroit Edison Fermi 3 construction budget.

7.0 *Changed Circumstances*

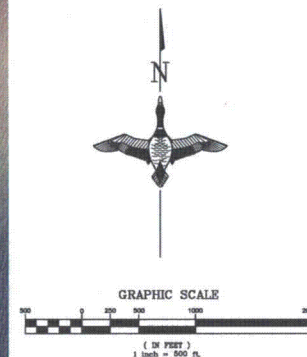
If during the course of construction any changes in the Fermi 3 site layout are made which will potentially impact fox snakes or fox snake habitat then those employees involved with conducting fox snake surveys will be contacted. These employees will modify the scope of their surveyed areas to include the new areas to be impacted.

8.0 *References*

- 8.1 Weatherby, C. A., Michigan Nature Conservancy *Elaphe vulpina gloydi* and *Clonophis kirtlandii* 1986 contracted survey. Michigan Nature Conservancy, Unpublished, rep. 25 pp.
- 8.2 Lee, Y., "Special animal abstract for *Elaphe vulpina gloydi* (eastern fox snake). Michigan Natural Features Inventory, Lansing, MI. 3 pp.
- 8.3 Michigan Department of Natural Resources, Endangered Species Assessment
<http://www.mcgi.state.mi.us/esa>, accessed January 15, 2010
- 8.4 Michigan Department of Natural Resources, Endangered Species Assessment, Map
http://www.mcgi.state.mi.us/esa/map.asp?action=map_south, accessed January 15, 2010
- 8.5 Bailey, R.G., Ecoregions of the United States, 1978

9.0 *Appendix*

Figure 1 – Wetland Delineation



LEGEND

- PSS PALUSTRINE SCRUB SHRUB WETLAND
- PFW PALUSTRINE FORESTED WETLAND
- PFO PALUSTRINE FORESTED WETLAND
- APPROXIMATE PROPERTY LINE
- OPEN WATER (FLAGGED)
- OPEN WATER (NOT FLAGGED)
- WETLAND BOUNDARY
- DATA POINT
- HORIZONTAL & VERTICAL CONTROL

HORIZONTAL CONTROL - Coordinates are NAD 83 (CORS 1996) Michigan State Plane Coordinates, South Zone # 2113, units International feet. Coordinates established from NGS CORS (National Geodetic Survey, Online Positioning User Service) solution for control point B1. Raw data was collected for 5 hours on June 4, 2008 using a Trimble 4700 GPS base receiver, OPUS solution for control point B1, North 167855.889 ft, East 13420948.599 ft.

ONSITE CONTROL, HORIZONTAL

Control Point # 1 - Found concrete monument with brass cap on south side of Farm Drive near sign.
N. 169217.291 ft.
E. 13423438.587 ft.

Control Point # 87 - Found concrete monument with brass cap on south side of Farm Drive, 1.8 feet south of edge of pavement stamped "N.5106.143, E.3600, EL. 580.187".
N. 169181.477 ft.
E. 13423586.221 ft.

Control Point # 81 - Found yellow capped iron rod #29252, lathe marked "B1 DTE".
N. 167855.889 ft.
E. 13420948.599 ft.

NOTICE: CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. UNLIMITED, INC. SHALL NOT ASSUME ANY RESPONSIBILITY FOR THE SAFETY OF THE WORK. UNLIMITED, INC. SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE TO OR LOSS OF PROPERTY OR PERSONS. ALL DATA INCLUDED HEREIN IS THE SOLE PROPERTY OF UNLIMITED, INC. AND SHALL NOT BE USED FOR ANY PURPOSES WITHOUT THE WRITTEN CONSENT OF UNLIMITED, INC. UNLIMITED, INC. ACCEPTS NO RESPONSIBILITY FOR THE USE OF THIS INFORMATION FOR ANY OTHER PURPOSE. UNLIMITED, INC. ALL RIGHTS RESERVED. COPYRIGHT 2008 UNLIMITED, INC.

Attachment 7
NRC3-10-0048

Markups Related to ER Section 9.2.3.1
(following 7 pages)

The following markup represents changes Detroit Edison intends to reflect in the next submittal of the Fermi 3 COLA Revision 3. However, the same COLA content may be impacted by revisions to the ESBWR DCD, responses to other COLA RAIs, other COLA changes, plant design changes, editorial or typographical corrections, etc. As a result, the final COLA content that appears in a future submittal may be different than presented here.

9.2.3.1 Coal-Fired Generation

In general, the environmental impacts of constructing a typical coal-fired power plant are well known because coal, as discussed earlier, is the most prevalent type of central generating technology in the United States. The impacts of constructing a large coal-fired power plant at a "greenfield" site can be substantial, particularly if it is sited in a rural area with considerable natural habitat (Reference 9.2-2).

9.2.3.1.1 Land Use and Related Impacts to Ecology

Since this alternative would involve new construction, one key environmental impact area is land use. In Reference 9.2-2 it is estimated that approximately 1700 acres would be needed for a 1000 MWe coal-fired power plant. This estimate would be scaled up for the approximately 1600 MWe capacity of the proposed coal-fired alternative (i.e., 2720 acres), which is considerably larger than that required for Fermi 3 (approximately 290 acres total, including permanent and temporary impacts). The Fermi site is approximately 1260 acres total, as noted in Section 2.2. Thus, the current site would not support a comparable sized coal-fired power plant.

Since large quantities of coal and lime (or limestone) would be delivered via rail line, new construction would be required to support railcar turnaround facilities. Given the substantial land use (relative to Fermi 3), the associated impacts related to land clearing, erosion and sedimentation, air quality from construction vehicles, impact to the ecology, etc., would be proportionally much greater for the coal-fired alternative.

In Reference 9.2-2, it is estimated that approximately 22,000 acres would be affected for mining the coal and disposing of the waste to support a 1000 MWe coal-fired power plant during its operational life. Thus, the equivalent land usage requirement for 1600 MWe coal-fired production would be approximately 35,200 acres. In contrast, based on estimates discussed in Reference 9.2-2, uranium mining and processing required to supply fuel during the operating life of a nuclear facility of 1600 MWe capacity would be approximately 1600 acres.

9.2.3.1.2 Waste Generation and Emissions

It is assumed that the new coal-fired power plants would primarily use western sub-bituminous coal – similar to the current fleet of Detroit Edison coal-fired power plants. It is estimated that the proposed power plant would consume approximately 7 million tons/yr of pulverized sub-bituminous coal with corresponding ash content (determined from information in Reference 9.2-14 for Detroit Edison historical coal usage versus power generation). Lime or limestone, used in the scrubbing process for control of sulfur dioxide emissions, is injected as a slurry into the hot effluent combustion gases to remove entrained sulfur dioxide. The lime-based scrubbing solution reacts with sulfur dioxide to form calcium sulfite, which precipitates and is removed from the process as sludge.

As discussed in Reference 9.2-27, coal combustion products (CCP) are among material targeted by the U.S. Environmental Protection Agency (EPA) Resource Conservation Challenge (RCC). The RCC is designed to facilitate changes in the economics and practice of waste generation,

handling, and disposal (e.g., by promoting market opportunities for beneficial use). Currently, the most common beneficial uses for CCPs are as a replacement for virgin materials in concrete and cement making, structural fill and gypsum wallboard. Reference 9.2-27 summarizes results from the most recent survey of generators of CCPs. These results show the application uses for the CCPs along with the total utilization rate for each of the CCPs. For example, the utilization rate for gypsum from the flue gas desulphurization (FGD) process accounts is approximately 77 percent, the majority of the use of FGD gypsum is as a substitute for virgin gypsum in wallboard manufacturing. The total CCP utilization rate for all CCPs combined is 40 percent. The EPA goals discussed in Reference 9.2-27 include achieving an overall 50 percent beneficial use of CCPs by 2011.

Even with current recycling levels and the EPA goals for increasing the recycling levels, there is still a considerable amount of waste products for disposal. Waste impacts to groundwater and surface-water could extend beyond the operating life of the power plant if leachate and runoff from the waste storage area occurs (Reference 9.2-14).

9.2.3.1.3 Air Quality and Human Health

Dust emissions from construction activities for a coal-fired power plant would be similar to those from any similar construction project. Such emissions would be temporary, mitigated using best management practices, and therefore SMALL.

During its operating life, the emissions profile regarding air quality from coal-fired generation will vary significantly from that of a nuclear power generation because of emissions of sulfur oxides, nitrogen oxides, carbon monoxide, particulates, and other constituents. A coal-fired power plant would also have unregulated carbon dioxide emissions that many scientists believe contribute to global warming. The assumed plant design would minimize air emissions through a combination of boiler technology and post-combustion pollutant removal. ~~By scaling levels from Reference 9.2-15, estimates for the coal-fired alternative emissions for particulate matter (PM), nitrogen oxides (NOx), sulfur oxides (SOx), carbon dioxide (CO₂), and mercury are as follows (Table 9.2-5):~~

Estimates	• PM – 946 tons per year ←	48 tons per year
	• NOx – 13,724 tons per year ←	1,330 tons per year
	• SOx – 37,400 tons per year ←	2,260 tons per year
	• CO ₂ – 8,942,000 tons per year ←	17,750,000 tons per year
	• Mercury – 0.174 tons per year ←	0.1 tons per year

The acid rain requirements of the Clean Air Act (42 U.S.C. 7491) capped the nation's sulfur dioxide emissions from power plants. An operator would have to obtain sufficient pollution credits either from a set-aside pool or purchases on the open market to cover annual emissions from the plant. The market based allowance system used for sulfur dioxide emissions is not used for NOx emissions. A new coal-fired power plant would be subject to the new source performance standard for such plants (40 CFR 60.44a(d)(1)), which limits the discharge of any gases that contain NOx (expressed as nitrogen dioxide).

It is further noted that coal-fired power plants are expected to be subject to some form of additional cost related to carbon dioxide. As discussed in Reference 9.2-3:

The urgent problem of global climate change is expected to be addressed at the federal level within the next five years. While there are no known state proposals to tax carbon dioxide, discussion at the federal level is heating up, and it would be imprudent not to consider that such a tax, or other greenhouse gas controls, could emerge in the near future.

As further noted, carbon dioxide emissions regulation could substantially raise the cost of electricity produced by conventional coal. In addition to the expected federal actions, the State of Michigan is also considering implementing actions to reduce emissions. By order of the Governor of the State of Michigan, the Michigan Climate Action Council (MCAC) was established as an advisory board to the Michigan Department of Environmental Quality (MDEQ). Reference 9.2-28 provides an interim report providing short-term, mid-term, and long-term emissions reduction goals for Michigan.

A new coal-fired power plant in southern Michigan would likely need a prevention of significant deterioration permit and an operating permit under the Clean Air Act. The plant would need to comply with the new source performance standards for such plants in 40 CFR 60 Subpart Da. The standards establish emission limits for particulate matter and opacity (40 CFR 60.42a), sulfur dioxide (40 CFR 60.43a), and nitrogen oxide (40 CFR 60.44a).

The EPA has various regulatory requirements for visibility protection in 40 CFR 51, Subpart P, including specific requirements for review of any new major stationary source in an area designated as attainment or unclassified for criteria pollutants under the Clean Air Act (40 CFR 51.307(a)) and areas designated as nonattainment under the Clean Air Act (40 CFR 51.307(b)). The majority of Michigan has been classified as attainment or unclassified for criteria pollutants (40 CFR 81.323). Maintenance areas for the 8-hour ozone standard include Monroe County and seven other counties in the Detroit-Ann Arbor area. Nonattainment areas for PM_{2.5} include Monroe and six other counties in the Detroit-Ann Arbor area.

Section 169A of the Clean Air Act establishes a national goal of preventing future and remedying existing impairment of visibility in mandatory Class I Federal areas when impairment occurs because of air pollution resulting from human activities. In addition, EPA regulations provide that, for each mandatory Class I Federal area located within a State, the State must establish goals that provide for reasonable progress toward achieving natural visibility conditions. The reasonable progress goals must provide for an improvement in visibility for those days on which visibility is most impaired over the period of the implementation plan and ensure no degradation in visibility for the least visibility-impaired days over the same period (40 CFR 51.308(d)(1)). If a new coal-fired power plant were located close to a mandatory Class I area, additional air pollution control requirements could be imposed. Isle Royale National Park and Seney National Wildlife Refuge are Class I areas in the State of Michigan where visibility is an important value (40 CFR 81.414). Both of these areas are located in the Upper Peninsula of Michigan. Air quality in these areas would not likely be affected by a coal-fired power plant at an alternate site in southern Michigan in the vicinity of the Fermi site. In addition, there are no Class I areas in the State of Ohio. (Reference 9.2-17)

Reference 9.2-2 did not quantify emissions from coal-fired power plants, but implied that air impacts would be substantial. Reference 9.2-2 also mentioned global warming from unregulated carbon dioxide emissions and acid rain from sulfur oxides and nitrogen oxide emissions as a potential impact. Adverse human health effects, such as cancer and emphysema, have been associated with the products of coal combustion.

Overall, it is concluded that air quality impacts from coal-fired generation would be MODERATE. The impacts would be clearly noticeable, but would not destabilize air quality.

9.2.3.1.4 Cooling System Considerations, Water Use, and Related Impacts to Ecology

The NRC evaluated the coal-fired power plant with both open and closed cycle cooling systems (Reference 9.2-2). In general, in either case, intake and discharge would be designed to comply with state and federal standards. As discussed in Reference 9.2-2, the closed-cycle system would require slightly more land, but the difference is insignificant relative to the overall land use requirement noted above. The open-cycle system, with a higher intake and discharge flow rate, could have greater potential impacts, e.g., impingement and entrainment of fish and thermal impacts, to the aquatic ecosystem. The closed-cycle system would typically rely on large natural draft cooling towers or mechanical fan-cooled cooling towers. The trade-off in this case would be the evaporation, drift, and other impacts from the cooling tower, including discharge of dissolved solids to Lake Erie of cooling tower blowdown. The decreased intake flow rate of the closed-cycle system would have less impact on the aquatic ecosystem (e.g., impingement and entrainment mortalities) and less thermal impact on the receiving water body. Water use impacts depend on the volume of water required and the characteristics of the receiving body.

Similar to Fermi 3, the bulk of the coal-fired power plant's raw water makeup is assumed to come from Lake Erie. As shown on Figure 2.1-4, a new cooling system intake structure on the lake would be required, resulting in temporary impact during construction. However, as evaluated for Fermi 3 in Chapter 4 and Chapter 5, neither the construction nor operation of the coal-fired power plant's intake would be expected to have a significant impact on surface-water. The coal-fired power plant's discharge to the lake would be expected to have impacts comparable to those of Fermi 3, i.e., not significant.

If the coal-fired power plant were placed on an alternate site, there could be impacts depending on available surface-water and groundwater sources. In any case, appropriate permits would govern and limit surface-water and groundwater use and impacts. Overall, the impacts are expected to be SMALL.

9.2.3.1.5 Socioeconomics

The coal-fired power plant would require an estimated construction work force of 2500 workers over a five year period. Thus, surrounding communities would experience demands for housing and public services. And following the conclusion of construction, the communities would then experience the loss of some portion of these construction jobs. With this workforce, area roads would experience increased traffic loads to and from the construction site (Reference 9.2-2). Fermi 3 expects a construction workforce of 2900 over a comparable five to six year period.

- 9.2-12 Oak Ridge National Laboratory, "Relationship Between Power Plant Efficiency and Capacity and Tons/Biomass Required and Acres Required," <http://bioenergy.ornl.gov/resourcedata/powerandwood.html>, accessed 16 April 2008.
- 9.2-13 U.S. Department of Energy, Energy Information Administration, "Electricity Market Module," DOE/EIA-0554, 2007, <http://www.eia.doe.gov/oiarf/aeo/assumption/pdf/electricity.pdf>, accessed 16 April 2008.
- 9.2-14 Detroit Edison, "Energy Generation and Emissions, History and Projections," <http://www.dteenergy.com/environment/2004/pdfs/history.pdf>, accessed 28 April 2008.
- 9.2-15 ~~U.S. Department of Energy, "Emissions and Generation Resource Integrated Data Base, GRID2006," Version 2.1 (April 2007), Year 2004 Summary Tables, http://www.epa.gov/cleanenergy/documents/eGRID2006V2_1_Summary_Tables.pdf, accessed 17 April 2008.~~
- 9.2-16 ~~Detroit Edison, "Fuel Mix," <http://www.dteenergy.com/environment/fuelMix.html>, accessed 17 April 2008.~~
- 9.2-17 U.S. Department of Energy, "List of 156 Mandatory Class I Federal Areas," <http://www.epa.gov/visibility/class1.html>, accessed 17 April 2008.
- 9.2-18 U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants Regarding Palisades Nuclear Plant, Final Report," NUREG-1437, Supplement 27, October 2006.
- 9.2-19 Natural Gas Supply Association, "Natural Gas and the Environment," <http://www.naturalgas.org/environment/naturalgas.asp>, accessed 28 April 2008.
- 9.2-20 State of Michigan, "Qualifications and Updated Direct Testimony of David B. Harwood," Before the Michigan Public Service Commission, Case No. U 15244, <http://efile.mpasc.cis.state.mi.us/efile/docs/15244/0166.pdf>, accessed 16 May 2008.
- 9.2-21 U.S. Department of Energy, Energy Information Administration, "Renewable Energy Annual," Table 3, Electricity Net Generation from Renewable Energy by Energy Use Sector and Energy Source, 2002-2006, 2006 Edition, http://www.eia.doe.gov/cneaf/solar.renewables/page/prelim_trends/table3.xls, accessed 18 April 2008.
- 9.2-22 U.S. Department of Energy, Energy Information Administration, "Renewable Energy Annual," Table 4, U.S. Electric Net Summer Capacity by Energy Source, 2002-2006, 2006 Edition, http://www.eia.doe.gov/cneaf/solar.renewables/page/prelim_trends/table4.xls, accessed 18 April 2008.
- 9.2-23 U.S. Department of Energy, Energy Information Administration, "Renewable Energy Consumption and Electricity Preliminary 2006 Statistics,"

U.S. Environmental Protection Agency, "Bituminous and Subbituminous Coal Combustion," EPA 1998. Air Pollutant Emission Factors, Volume 1, Stationary Point Source and Area Sources, Section 1.1, AP-42. Washington, D.C., September 1998. Available at <http://epa.gov/ttn/chief/ap42/ch01/final/c01s01.pdf>.

Table 9.2-5 Estimated Coal-Fired Power Plant Emissions

Emitted Compound	Typical Plant Emissions (lb/MWh) ¹	Plant Output (MWe) ²	Capacity Factor (%) ³	tons/year ⁴
Particulate Matter	0.15	1600	90	946
NOx	2.176	1600	90	13,724
SO ₂	5.93	1600	90	37,400
CO ₂	Replace with updated Table 9.2-5 (Insert 1)		90	8,912,000
Mercury			90	0.174

Notes: 1. Typical Plant Emissions are taken from Reference 9.2-15, with the exception of the Particulate Matter; which is taken from Reference 9.2-16. The values in Reference 9.2-15 are conservative relative to the Detroit Edison specific values (Reference 9.2-16) for NOx, SO₂, CO₂, and Mercury

2. Plant output is gross output for Fermi 3.

3. Capacity Factor is assumed based on performance of modern plants.

4. tons/year = Typical Plant Emissions (lb/MWh) * Plant Output (MWe) * Capacity Factor (%) * 8760 hours/year * ton/2000 lb

Table 9.2-5 Estimated Coal-Fired Power Plant Emissions

Emitted Compound	Emission Factor (lb/MMBtu)⁽¹⁾	Plant Thermal Rating (MWt)⁽²⁾	Capacity Factor (%)⁽²⁾	Total Annual Emissions (tons/year)
Particulate Matter (Filterable PM10)	0.0008	4500	90	48
NOx	0.022	4500	90	1,330
SOx	0.037	4500	90	2,260
CO ₂	293.3	4500	90	17,750,000
Mercury	1.60E-06	4500	90	0.1

Notes:

1. Emissions Factors are developed from Reference 9.2-15 based on the following (Emission Factors include applicable control method):
 - a. Boiler Type, PC, dry bottom, tangentially fired, sub-bituminous
 - b. Power River Basin Sub-bituminous Coal
 - c. Fuel heat value of 8200 Btu/lb
 - d. Fuel Ash Content by Weight = 5.7%, average value from Reference 9.2-16
 - e. Fuel Sulfur Content by Weight = 0.35%, average value from Reference 9.2-16.
 - f. Particulate Matter Control – Fabric Filter, 99.9% Reduction, Reference 9.2-15
 - g. NOx Control – 95% Reduction, Reference 9.2-15
 - h. SOx Control – 95% Reduction, Reference 9.2-15
 - i. CO₂ emissions are based on CO₂ default emission factor
 - j. Mercury – Emission factor based on uncontrolled emission and a typical control efficiency of 90%.
2. Total Annual Emissions is determined based on a plant thermal rating of 4500 MWt (Section 3.2.1) and a capacity factor of 90% (based on performance of modern plants).

**Attachment 8
NRC3-10-0048**

Supplemental Response to RAI letter related to Fermi 3 ER

RAI Question CR4.1.3-8

NRC RAI CR4.1.3-8

Provide a copy of the Maritime Assessment report when available. Report should be in color, and include all figures, photos, and appendices.

Supporting Information

Information included in this report describes the results of archaeological studies in Lake Erie for the Fermi 3 project. The report is critical to ensuring a thorough and complete EIS review of project impacts. This information will be used to complete the NEPA analysis and to support compliance with the Section 106 process.

Supplemental Response

A letter from the Commonwealth Cultural Resource Group, Inc. to Doug Timpe (Black & Veatch) with the subject "Submerged Sites Sensitivity Study, Fermi 3 Project, Monroe County, Michigan" dated December 1, 2008, was provided to the NRC in Detroit Edison letter NRC3-09-0010 (ML091940218), dated June 19, 2009.

An error was identified on Figure 4 of the study, which depicts the location of several shipwrecks on Lake Erie in the vicinity of the Fermi site. The shipwrecks are in the correct location, however, the names were incorrect. Additionally, a clarifying statement was added to the final paragraph of the report stating that any potentially significant maritime resources that may be present within the project area may exhibit degraded integrity, due to the dynamic and turbulent nature of the shallow-water near-shore environment.

A letter from the Commonwealth Cultural Resource Group, Inc. to Doug Timpe (Black & Veatch) with the revised subject "Submerged Sites Sensitivity Study, Fermi 3 Project, Monroe County, Michigan" dated October 12, 2010, is attached.

Note that Figure 5 of the revised study contains information identifying the location of a historic resource and is enclosed separately in Attachment 9. As such, Detroit Edison requests that Figure 5 in Attachment 9 be withheld from public disclosure, in accordance with Section 304 of the National Historic and Preservation Act (NHPA).

Proposed COLA Revision

None

**NRC3-10-0048
RAI Question CR4.1.3-8**

Enclosure 1

**Submerged Sites Sensitivity Study,
Fermi 3 Project, Monroe County, Michigan
(following 16 pages)**



October 12, 2010
J-0584/R-0767.08

Mr. Douglas Timpe
Black & Veatch Corporation
11401 Lamar Avenue
Overland Park, KS 66211

RE: Submerged Sites Sensitivity Study, Fermi 3 Project, Monroe County, Michigan

Dear Mr. Timpe:

Commonwealth Cultural Resource Group, Inc. (CCRG) was contracted by Black & Veatch Corp. to undertake a submerged sites sensitivity study of the proposed near-shore dredging/outfall activity area associated with the Fermi 3 Project. The project is located adjacent to the western shore of Lake Erie, Monroe County, Michigan (Figure 1). For this effort, CCRG identified previously reported submerged sites and maritime-related resources within the vicinity of the area of potential effect (APE) of the dredging/outfall activity area and developed a predictive model to determine the likelihood of the APE to contain cultural resources. Information was gathered at the Michigan State Historic Preservation Office (SHPO) and the Michigan Office of the State Archaeologist (OSA), and additional research was completed at the Michigan State Library. The purpose of the study is to assess the Project's potential to impact underwater resources in the APE. No survey has been conducted for the underwater resources assessment.

Project Overview

The Detroit Edison Company (DECo) proposes to construct and operate a new nuclear power plant at the existing Fermi site, to be designated as Fermi 3, for the purpose of generating electricity for sale. The Fermi 3 Project site is located in the northeastern corner of Monroe County in southern Michigan, near the northern border of Ohio and about 20 mi (32 km) north of the Michigan/Ohio border. The site is on the west bank of Lake Erie, approximately 24 mi (39 km) northeast of Toledo, Ohio, and 30 mi (48 km) southwest of Detroit, Michigan. The U.S./Canada international border runs through Lake Erie about 7 mi (11 km) east of the site, and the River Raisin is located about 6 mi (10 km) southwest of the site. The project site lies within Private Claim 528 and encompasses portions of Sections 16, 17, 20, and 21, T6S/R10E, Frenchtown Township, Monroe County, Michigan. The town of Stony Point, Michigan, is about 2 mi (3 km) south of the Fermi 3 site, and the town of Monroe, Michigan, is approximately 7 mi (11 km) southwest. The location of project site was historically known as Lagoon Beach.

Main Office: 2530 Spring Arbor Road Jackson, Michigan 49203 • (517) 788-3550/Fax (517) 788-6594

New York Office: 2495 Main Street Room 448 Buffalo, New York 14214 • (716) 831-9003/Fax (716) 831-9003

Wisconsin Office: P.O. Box 1061 Minocqua, Wisconsin 54548 • (715) 358-5686/Fax (715) 358-6656

www.ccrinc.com



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October 12, 2010
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Previous Cultural Resources Investigations

In support of the Fermi 3 Project, CCRG has conducted surveys of cultural resources (above-ground and archaeological) to identify historic resources in and near the project site area and to assess possible impacts to these resources (see Demeter et al. 2008). All cultural resources investigations conducted by CCRG have been carried out pursuant to Section 106 of the National Historic Preservation Act (NHPA) (P.L. 89-665, October 15, 1966; 16 U.S.C. 470) and its implementing regulations (36 CFR 800), which require federal agencies to take into account their activities on historic resources that may be impacted as a result of project activities. The work reported herein conforms to the requirements of the NHPA, as well as the regulations contained in the Nuclear Regulatory Commission Office of Nuclear Reactor Regulation Environmental Standard Review Plan (NUREG-1555), and the requirements of the Michigan SHPO.

The cultural resources investigations of archaeological and above-ground resources for the Fermi 3 Project began November 2007 and continued into April 2008. An additional archaeological survey was conducted on one small parcel on July 15, 2008. The archaeological survey resulted in the identification of six previously unrecorded archaeological sites. Four sites (20MR819, 20MR820, 20MR821, 20MR822) were prehistoric isolated findspots, one (20MR818) was a multicomponent (prehistoric and historic) site consisting of a single prehistoric chert flake and a surface scatter of historic artifacts, and one (20MR823) was composed of the remnants of five structures and associated historic artifacts. None of the archaeological sites were considered archaeologically significant and none were recommended eligible for listing in the National Register of Historic Places (NRHP). CCRG's above-ground resources survey recorded 83 properties, of which one four-building district and 19 individual properties were recommended eligible for listing in the NRHP.

Historic Context

The Fermi 3 Project area has been intimately tied to its marine resources from the time of its earliest settlements. Early Euro-American pioneers in the area were dominated by the French who arrived during the eighteenth century, and beginning in 1786, French settlers and speculators routinely acquired large tracts of land extending from Sandy Creek to Swan Creek (Lowrie and Clarke 1832:190). Eventually, a 4 ac (2 ha) mill (the Meldrum and Park Mill) and still house lot on Stony Creek was constructed, allowing the project area settlement (known as Frenchtown) to produce grains to be processed as either flour or distilled spirits for the upper Great Lakes trade (Michigan Pioneer and Historical Society [MPHS] 1886:524; Wing 1890:124). The Stony Creek mill complex proved to be short lived, however, as the mill was destroyed by fire during the War of 1812 (Wing 1890:124, 127).

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October 12, 2010
Page 3

In 1816, a number of French-Canadian families obtained land grants from the government, which led to the settlement and eventual formal organization of Monroe County (Menard 1995:32). The settlers were reminded of the coast of their native France and named their settlement and the bay after the French seaport of Brest (*Observer* 1944; *Monroe Commercial* 1876:1). A decade later, the 1827 opening of the Federal Land Office in the community commenced a period of slow but steady growth during which time newcomers sought rich land to develop towns and shipping on the lake (*Observer* 1944; Wing 1890:124, 137).

The settlements of Brest (on Stony Creek) and Newport (on Swan Creek) both were navigable by light draught boats; however, Brest was to become a significant regional fishing center. Commercial fishing operations were begun at Brest Bay (southwest of the Fermi 3 Project area) in 1857 by the firm of Chittenden and Company, which soon sold out to the Detroit-based shipbuilder and fishing fleet owner John P. Clark (Wing 1890:466). Clark's interest in the area continued through 1887. Two of his employees, Joseph B. Dewey and Jessee N. Dewey, began their own independent operations at the location in 1860. The Dewey brothers' business holdings included several fishing sailboats, a 100-ton passenger steamer the *L. Brickhead*, and 10 to 12 large buildings, including a refrigerator house. At the height of the industry, the brothers employed a large number of men whose catch was three to four tons a day, mostly herring and a few sturgeon. In the winter months, whitefish were harvested (Menard 1995:18-19, 21, 24; *The Observer* 1944). The Dewey brothers eventually expanded their business interests into Lakes Huron and Michigan; however, Brest remained their center of operations. With the construction of the freezer and packing plant at this location, their trade was eventually extended westward as far as Denver. By the 1890s, much of their harvest of sturgeon caviar was reportedly shipped to Europe (Dewey 1885:548; Wing 1890:467).

The commercial outlets that became available to the local fishing industry during the closing decades of the nineteenth century were primarily the direct result of ongoing railroad development initiated with the 1856 completion of the Detroit, Toledo & Monroe Railroad (DTM). Steamers that transported goods also contributed to the area's transportation advantages (Clark 1863:418). Steamers most often docked at the Stage House and Steamboat Hotel in Newport (Oldport).¹ With a population ranging from 500 to 550 inhabitants, Newport figured as an important forwarding center for grain, produce, and lumber well into the 1890s (Polk 1875:584, 1895:1301).

By the opening of the twentieth century, harvesting excesses and pollution had taken a toll on the local fishing industry. Species replacement in the reeded shallows along the shorefront was

¹At that time, Swan Creek was much deeper and wider than it is presently (Childs and DeVries 1956-2002).

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common after the introduction of the German Carp during the 1880s (Bulkley 1913:393), and by the opening of the century, enterprising investors had begun to develop dredged carp ponds along the margins of the Huron and Raisin rivers and Swan Creek. Catering to consumers in urban centers, stocks of carp sold at a rate of 1.5¢ to 2.5¢ per pound. As of 1926, the local commercial fishery was described as, “now confined to carp which are shipped alive to eastern markets” (Hanley 1926:n.p.). The network of multiple canals appearing on U.S. Geological Survey topographic maps is likely associated with one such enterprise (Figures 2 and 3).

Tourism and resorting soon replaced commercial fishing as a significant industry. The new wealth of Detroit’s growing working classes that emerged out of the region’s industrial expansion during World War I created a new potential in real estate marketing. The premium placed on rural lakefront properties in Monroe County during the 1920s drew heavily on the new transportation technologies of the automobile and the removable “Rowboat Engine” or outboard motor (Mirken 1970:1045). The boom era in vacation property investments was short-lived, however, and was obliterated by the financial collapse of the Great Depression. During the 1930s, only two new subdivisions were recorded, with a similar number recorded in the 1940s. Other properties north and south of the project vicinity were acquired as state-owned parklands during this period, including the Pointe Mouillee State Game Area and Wildlife Refuge at the mouth of the Huron River and Sterling State Park at the mouth of Sandy Creek.

Previous Investigations of Underwater Resources

Lake Erie, the twelfth largest freshwater lake in the world, is the shallowest and warmest of the five Great Lakes. Consequently, it has gained the reputation as being the most treacherous. Over 1,700 shipwrecks are known to be submerged there; the locations of only 277 are known (Ohio State University Extension 2008). Despite this number of known wrecks, few systematic surveys of submerged sites have been conducted in the area. A 2003 pilot study conducted by the Ohio Department of Natural Resources and the U.S. Geological Survey documented seven shipwrecks off the coast of Ohio using GPS technology and side-scan sonar (Liebenthal et al. 2007). That same year, Pennsylvania-based archaeologists and recreational divers began a program of identifying and mapping shipwreck sites in Lake Erie (Spice 2003). No formal investigations of underwater resources have been conducted within the Fermi 3 Project dredging/outfall area or the near vicinity.

Project Area Submerged Sites

Due to the dynamic nature of submerged sites and the absence of precise location information, all recorded resources within 3 mi (4.8 km) of the Fermi 3 Project area were included within this study. Four previously identified shipwrecks are located within this 3 mi (4.8 km) area (Figure

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4), as recorded either on the 1978 map of Lake Erie shipwrecks (Midwest Explorer's League 1978) or the 1998 Lake Erie dive chart (Ackerman 1998). The *Adieu* is listed as a steamer yacht that foundered on September 16, 1906. The *Fame* is listed as schooner loaded with general cargo that capsized and foundered off of the Monroe Piers on August 31, 1858. The *Roy* is listed as a tug that struck ice and sank southeast of Stony Point in August 1895. The *General Franz Spiegel*, which is plotted at the same location as the *Roy*, is listed as a schooner that sank off of River Raisin in July 1903.

A search of the files maintained by the Michigan OSA indicated one previously recorded archaeological site (20MR702) on the Lake Erie shoreline of the existing Fermi property (Figure 5). This site is listed as a prehistoric site of unknown cultural period, and it has not been evaluated for possible listing in the NRHP. During CCRG's archaeological survey of the existing Fermi property, no evidence of the site was found (Demeter et al. 2008).

Project Area Submerged Sites Sensitivity Evaluation

Submerged Prehistoric Archaeological Sites

One prehistoric archaeological site of unknown age/cultural affiliation (20MR702) is recorded on the Lake Erie shoreline within the Fermi 3 Project site. CCRG archaeologists investigated the shoreline in the area of 20MR702 during the spring of 2008 and found the entirety of the beach along the south half of the Fermi tract as either rip rap boulder fill or as a naturally occurring cobble beach (Figures 6 and 7). Freshly exposed cobbles farther to the north, towards Swan Creek, appeared where the soils had been heavily eroded (Figures 8 and 9). No evidence of 20MR702 was encountered, nor was there evidence of archaeological remains in any other area along the beach.

With regard to shoreline prehistoric habitation or use sites, it is assumed that lakeshores were densely occupied during the Archaic period; however, many occupation sites are currently underwater as a result of water level fluctuations in the Huron-Michigan-Erie basins beginning eight millennia ago (Shott 1999:73). The Fermi 3 Project area has been extensively modified by landfilling and dredging operations that have likely destroyed any evidence of prehistoric occupation that may be submerged. Fermi 3 Project activities are unlikely to impact submerged prehistoric archaeological sites.

Submerged Historic Maritime Sites

The bathymetric data show that the depth of the project area ranges from 2 ft (0.6 m) to 16 ft (5.1 m) (National Geophysical Data Center 1998). This shallow-water environment indicates that

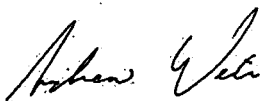
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submerged resources within the APE would be easily locatable. The imprecise location data for the four previously identified submerged resources in the vicinity of project area, combined with dynamic nature of submerged sites, indicates a distinct possibility that these sites may reside in whole or in part within the APE. The lack of recorded submerged cultural resources directly within the APE is likely the result of limited research in the area rather than an absence of submerged sites.

Furthermore, the historic record documents a number of commercial and recreational activities along the Lake Erie shoreline in the vicinity of the project area. The shallow depth of the lake further enhances the possible existence and preservation of near-shore maritime resources such as historic docks, rock and fish cribs, or other maritime-related structures.

Based on proximity to known submerged resources in the vicinity of the project area, the lack of research on submerged sites within the area, and the shallow-water environment of the project area, the entire APE must be considered as having a moderate to high sensitivity for containing previously unidentified maritime resources. Despite the proposed project area's previous disturbance from construction and dredging activities for Fermi I, the dynamic nature of the near-shore environment supports this high sensitivity assessment. However, due to the dynamic and turbulent nature of the shallow-water near shore environment typical of the Great Lakes and present within the project area, any potentially significant maritime resources that may be present within project area may exhibit degraded integrity.

Sincerely,



Andrew J. Weir,
President and Project Underwater Archaeologist

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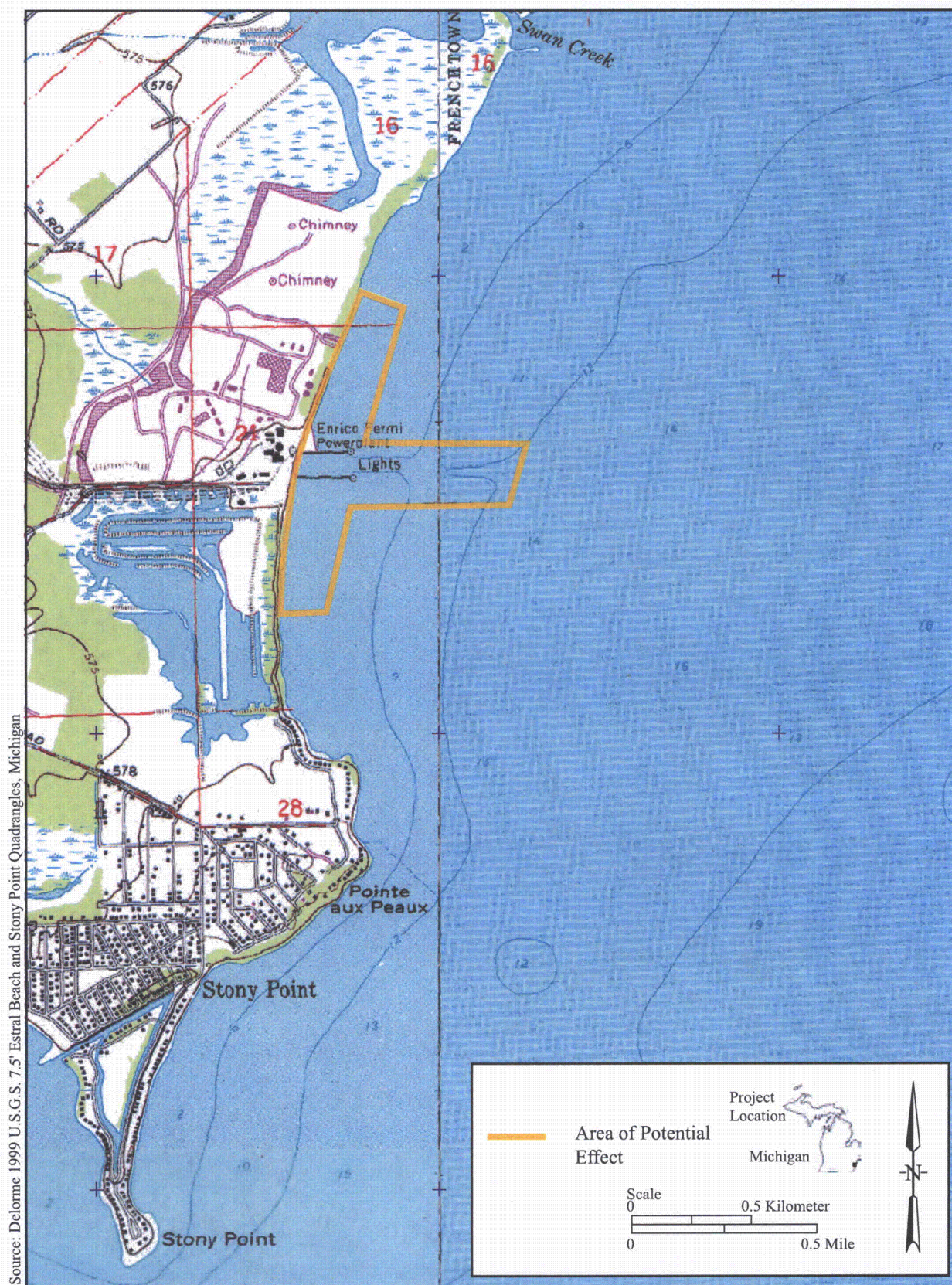


Figure 1. Project Location and Area of Potential Effect

Source: U.S.G.S. 7.5' Stony Point Quadrangle, Michigan 1942

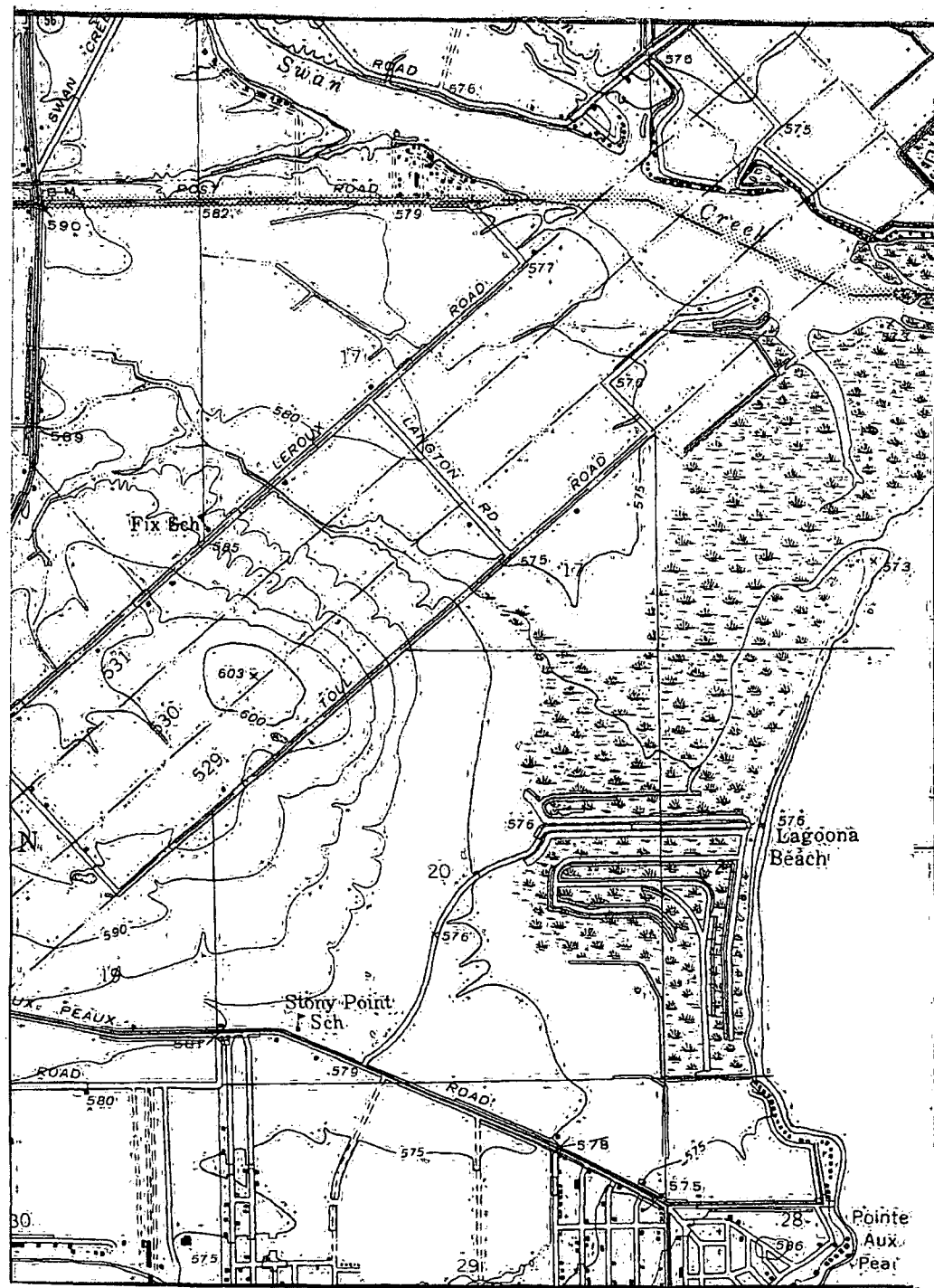


Figure 2. Fermi Site, 1940

Source: U.S.G.S. 7.5' Stony Point Quadrangle, Michigan 1952

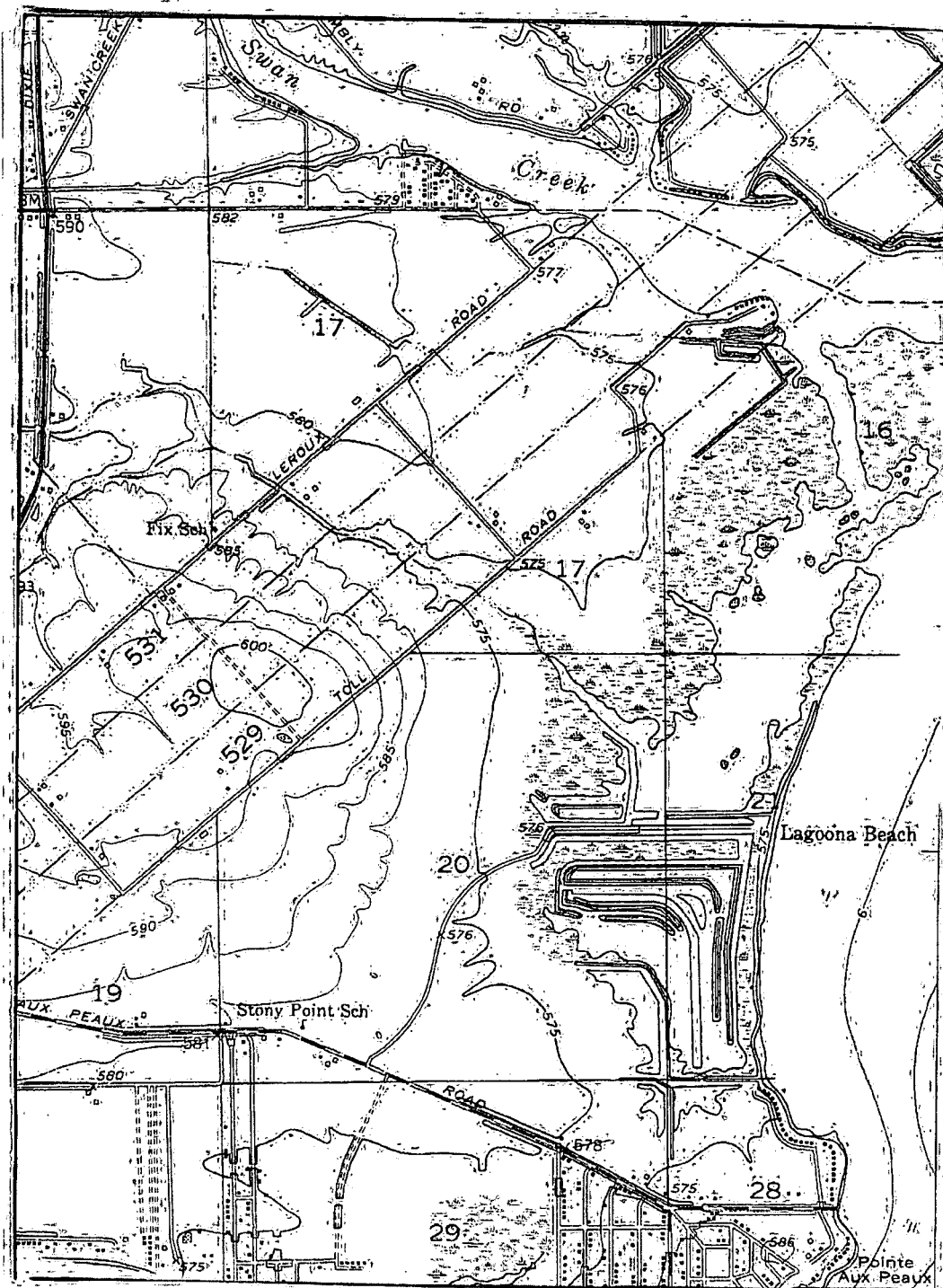


Figure 3. Fermi Site, 1952

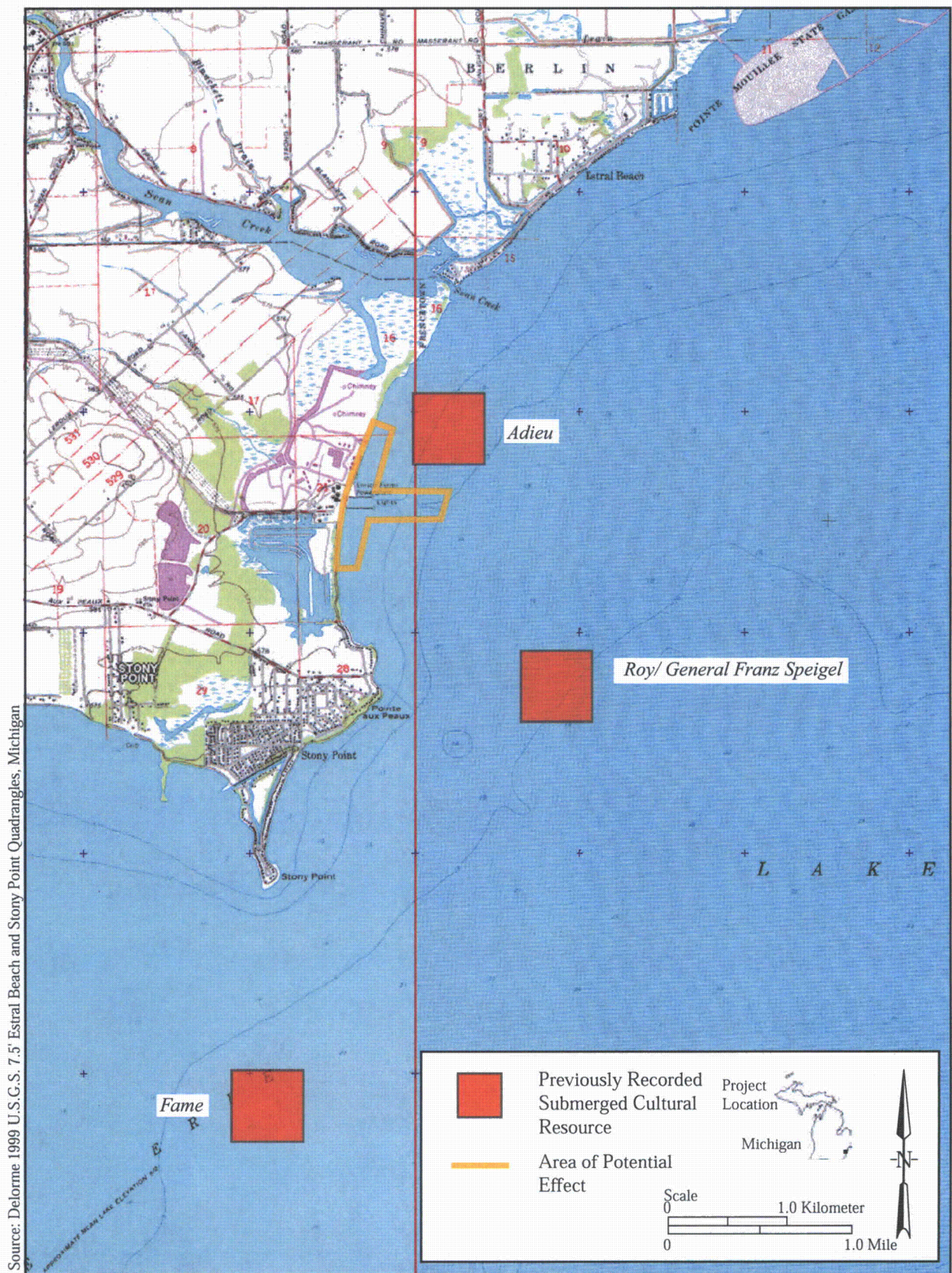


Figure 4. Previously Recorded Submerged Cultural Resources Locations

Figure 5. Fermi 3 Project Area Previously Recorded Archaeological Sites

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Figure 6. Site 20MR702, Reported Site Location, Rip Rap on Lake Erie Shore, View North



Figure 7. Site 20MR702, Reported Site Location, Cobble Beach on Lake Erie Shore, View South

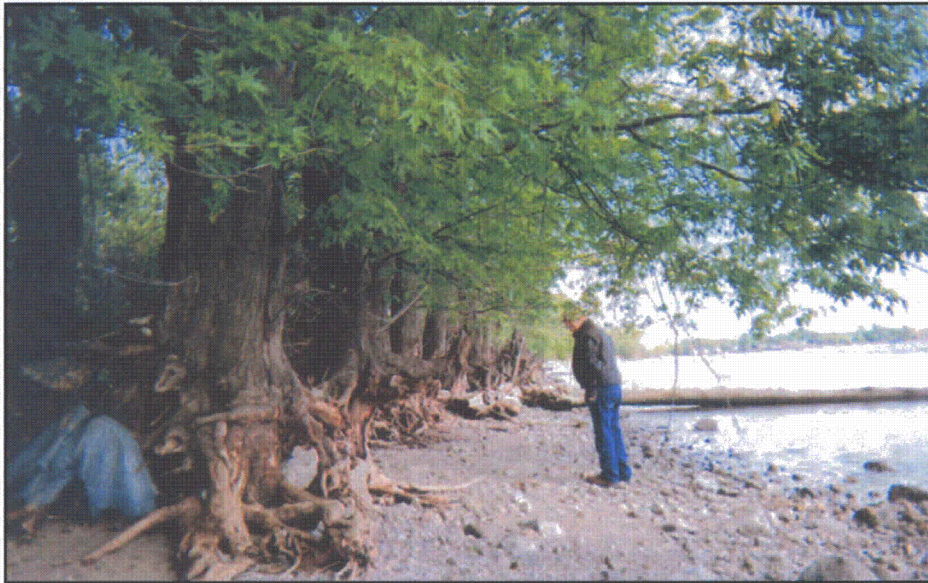


Figure 8. Site 20MR702, Reported Site Location, Eroded Lake Erie Shore, View North



Figure 9. Site 20MR702, Reported Site Location, Eroded Lake Erie Shore, View South