Chapter 5

Assessment of New and Significant Information

5.1 Discussion

NRC

"...The environmental report must contain any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware." 10 CFR 51.53(c)(3)(iv)

NRC regulations do not require an applicant's environmental report to contain analyses of the impacts of Category 1 issues. Nevertheless, the regulations [10 CFR 51.53(c)(3)(iv)] do require that an applicant identify any new and significant information of which the applicant is aware that would negate any of the generic findings that NRC has codified or evaluated in the *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS) (NRC 1996a). The purpose of this requirement is to alert NRC staff to such information, so the staff can determine whether to seek the Commission's approval to waive or suspend application of the rule with respect to the affected generic analysis. NRC has explicitly indicated, however, that an applicant is not required to perform a site-specific validation of GEIS conclusions (NRC 1996b).

EGC expects that new and significant information would include:

- information that identifies a significant environmental issue not covered in the GEIS and codified in the regulation, or
- information that was not covered in the GEIS analyses and that leads to an impact finding different from that codified in the regulation.

NRC does not specifically define the term "significant". For the purpose of its review, EGC used guidance available in Council on Environmental Quality (CEQ) regulations. The National Environmental Policy Act authorizes CEQ to establish implementing regulations for federal agency use. NRC requires license renewal applicants to provide NRC with input, in the form of an environmental report, that NRC will use to meet National Environmental Policy Act requirements as they apply to license renewal (10 CFR 51.10). CEQ guidance provides that federal agencies should prepare environmental impact statements for actions that would significantly affect the environment (40 CFR 1502.3), focus on significant environmental issues (40 CFR 1502.1), and eliminate from detailed study issues that are not significant [40 CFR 1501.7(a)(3)]. The CEQ guidance includes a lengthy definition of "significantly" that requires consideration of the context of the action and the intensity or severity of the impact(s) (40 CFR 1508.27). EGC expects that moderate or large impacts, as defined by NRC, would be significant. Chapter 4 presents the NRC definitions of "moderate" and "large" impacts.

EGC is aware of no new and significant information regarding the environmental impacts of DNPS Units 2 and 3 license renewal.

5.2 References

NRC (U.S. Nuclear Regulatory Commission), 1996a. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants (GEIS)*, Volumes 1 and 2, NUREG-137, Washington, DC, May

NRC (U.S. Nuclear Regulatory Commission), 1996b. *Public Comments on the Proposed 10 CFR 51 Rule for Renewal of Nuclear Power Plant Operating Licenses and Supporting Documents: Review of Concerns and NRC Staff Response*, Volumes 1 and 2, NUREG-1529, Washington, DC, May.

Chapter 6

Summary of License Renewal Impacts and Mitigating Actions

6.1 License Renewal Impacts

EGC has reviewed the environmental impacts of renewing the DNPS Units 2 and 3 operating licenses and has concluded that all impacts would be small and would not require mitigation beyond current activities. This environmental report documents the basis for EGC's conclusion. Chapter 4 incorporates by reference NRC findings for the 58 Category 1 issues that apply to DNPS as well as the 2 "NA" issues for which NRC came to no generic conclusion), all of which have impacts that are small (Table 4-2). The rest of Chapter 4 analyzes Category 2 issues, all of which are either not applicable or have impacts that would be small. Table 6-1 identifies the impacts that DNPS license renewal would have on resources associated with Category 2 issues.

6.2 Mitigation

NRC

"The report must contain a consideration of alternatives for reducing adverse impacts...for all Category 2 license renewal issues..." 10 CFR 51.53(c)(3)(iii)

"The environmental report shall include an analysis that considers and balances...alternatives available for reducing or avoiding adverse environmental effects..." 10 CFR 51.45(c) as incorporated by 10 CFR 51.53(c)(2) and 10 CFR 51.45(c)

All impacts of license renewal are small and would not require mitigation. Current operations include mitigation and monitoring activities that would continue during the term of the license renewal. EGC performs routine mitigation and monitoring activities to ensure the safety of workers, the public, and the environment. These activities include the radiological environmental monitoring program, emissions monitoring, effluent chemistry monitoring, and monitoring the water quality and fishery of the Illinois River.

6.3 Unavoidable Adverse Impacts

NRC

The environmental report shall discuss... "[a]ny adverse environmental effects which cannot be avoided should the proposal be implemented...." 10 CFR 51.45(b)(2) as adopted by 10 CFR 51.53(c)(2)

This environmental report adopts by reference NRC findings for applicable Category 1 issues, including discussions of any unavoidable adverse impacts (Table 4-2). EGC examined 21 Category 2 issues and identified the following unavoidable adverse impacts of license renewal:

- Waste heat that results from operation of the Station is discharged to the Illinois River and locally affects its thermal pattern. The continuation of heat loading could cause a small reduction in productivity of fish, phytoplankton, and benthos near the shoreline. The additional heat in the river is released to the atmosphere via evaporation, which results in some water loss from the river.

- Disposal of sanitary, chemical, and radioactive wastes have adverse impacts on land commitments. The generation of electricity results in spent nuclear fuel, a highly radioactive waste that has no permanent disposal option.

- Operation of the Station results in a very small increase in radioactivity in the air and water. However, doses from natural background radiation are greater than the small incremental increase in dose to the local population. Operation also establishes a very low probability risk of accidental radiation exposure to inhabitants of the area.

- Some fish are impinged on the traveling screens at the intake structures.

- Some larval fish and shellfish are entrained in the cooling water system.

- For purposes of analysis, EGC assumed that license renewal would require 60 additional workers, which would create an additional 111 indirect jobs. A total of 171 direct and indirect jobs (123 in the two counties in which the majority of workers reside) would be created. The addition of 123 housing units to the two counties in which the majority of the current DNPS workers reside would result in small impacts to housing availability, transportation infrastructure, and public utilities that could be characterized as adverse, but would not be significant.

6.4 Irreversible and Irretrievable Resource Commitments

NRC

The environmental report shall discuss any "...irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented..." 10 CFR 51.45(b)(5) as adopted by 10 CFR 51.53(c)(2)

The continued operation of DNPS for the license renewal term will result in irreversible and irretrievable resource commitments, including the following:

- Nuclear fuel, which is consumed in the reactor and converted to radioactive waste
- The land required to dispose of spent nuclear fuel, low-level radioactive wastes generated as a result of plant operations, and solid and sanitary wastes generated from normal industrial operations
- Elemental materials that will become radioactive, and
- Materials used for the normal industrial operations of the Station that cannot be recovered or recycled or that are consumed or reduced to unrecoverable forms.

6.5 Short-Term Use Versus Long-Term Productivity of the Environment

NRC

The environmental report shall discuss the "...relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity...". 10 CFR 51.45(b)(4) as adopted by 10 CFR 51.53(c)(2)

The current balance between short-term use and long-term productivity at DNPS was established when the Station began the operation of Unit 1 in 1960. DNPS' Final Environmental Statement (AEC 1973) evaluated the impacts of constructing and operating DNPS Units 2 and 3 in rural Grundy and Will Counties, Illinois. Approximately 2,500 total acres were acquired for the Station, the cooling canals, and the cooling pond. At that time, the area was predominately agricultural, with a few nearby industrial sites.

The use of the 2,500-acre site for electrical generation conforms to the physical plan for Grundy County as noted in the Comprehensive County Plan, Grundy County, Illinois, 1967. After Station operations cease, the DNPS site could be used for other industrial purposes. Long-term productivity of the terrestrial and aquatic habitats in the vicinity of DNPS is not adversely affected by the Station. Continued operations for an additional 20 years would not alter this conclusion.

Table 6-1. Environmental Impacts Related to License Renewal at DNPS.

No.	Issue	Environmental Impact
	Surface Water Quality, Hydrology, and Use (for all plants)	
13	Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	**Small.** Evaporation and seepage losses from the cooling pond and cooling towers represent only 6 percent of the lowest recorded mean daily flow during indirect open-cycle. Evaporative losses from the cooling towers are negligible.
	Aquatic Ecology (for plants with once-through and cooling pond heat dissipation systems)	
25	Entrainment of fish and shellfish in early life stages	**Small.** DNPS has a current NPDES permit which constitutes compliance with CWA Section 316(b) requirements.
26	Impingement of fish and shellfish in early life stages	**Small.** DNPS has a current NPDES permit which constitutes compliance with CWA Section 316(b) requirements.
27	Heat shock	**Small.** DNPS has a current NPDES permit which constitutes compliance with CWA Section 316(a) requirements.
	Groundwater Use and Quality	
33	Groundwater use conflicts (potable and service water, and dewatering; plants that use > 100 gpm)	**None.** This issue does not apply because DNPS uses < 100 gpm of groundwater.
34	Groundwater use conflicts (plants using cooling towers or cooling ponds withdrawing make-up water from a small river)	**Small.** The water in the Dresden Pool would distribute any loss due to evaporative cooling from the cooling pond and cooling towers in such a way as to be insignificant to the alluvial aquifer.
35	Groundwater use conflicts (Ranney wells)	**None.** This issue does not apply because DNPS does not use Ranney wells.
39	Groundwater quality degradation (cooling ponds at inland sites)	**Small.** Interaction between the aquifer and cooling pond is limited and no significant chemical alteration of cooling water occurs; therefore, groundwater degradation is minor.
	Terrestrial Resources	
40	Refurbishment impacts	**None.** No impacts are expected because DNPS will not undertake refurbishment
	Threatened or Endangered Species	
49	Threatened or endangered species	**Small.** EGC is not aware of any resident threatened or endangered species at DNPS or along associated transmission corridors.
	Air Quality	
50	Air quality during refurbishment (nonattainment and maintenance areas)	**None.** No impacts are expected because DNPS will not undertake refurbishment.

Table 6-1. Environmental Impacts Related to License Renewal at DNPS (continued).

No.	Issue	Environmental Impact
		Human Health
57	Microbiological organisms (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	**Small.** The thermal characteristics of the Illinois River near the DNPS discharge and the absence of a seed source or inoculant are such that Station operations should not stimulate growth or reproduction of thermophilic organisms
59	Electromagnetic fields – acute effects	**Small.** The largest modeled induced current under the DNPS transmission lines is 5.2 milliamperes. The National Electric Safety Code® standard (5 milliamperes) for preventing electric shock from induced current contains a single significant digit. Therefore, EGC concludes that DNPS induced current values conform to the code and impacts would be small.
		Socioeconomics
63	Housing impacts	**Small.** DNPS is located in a high-population area that does not have growth control measures. Therefore, in accordance with NRC standards, housing impacts would be small.
65	Public services: public utilities	**Small.** Any increase in public water requirements from a potential 171 new households would not impinge on the water supplies of the affected communities.
66	Public services: education (refurbishment)	**None.** No impacts are expected because DNPS will not undertake refurbishment
68	Offsite land use (refurbishment)	**None.** No impacts are expected because DNPS will not undertake refurbishment.
69	Offsite land use (license renewal term)	**Small.** No plant-induced changes to offsite land use are expected from license renewal. Impacts from continued operation would be positive.
70	Public services: transportation	**Small.** Any additional employees (up to 60) would be less than the typical refueling outage workforce of approximately 760 additional employees. Existing access roads are adequate to support this outage traffic.
71	Historic and archaeological resources	**Small.** Continued operation of DNPS would not require construction at the site or new transmission lines. Therefore, EGC concludes that license renewal would not adversely affect historic or archaeological resources.
		Postulated Accidents
76	Severe accidents	**Small.** The benefit/cost analysis identified no severe accident mitigation alternatives that would avert public risk.

6.6 References

AEC (U.S. Atomic Energy Commission), 1973. *Final Environmental Statement related to operation of Dresden Nuclear Station Units 2 & 3*, Docket Nos. 50-237 and 50-249 Directorate of Licensing, Washington, DC, November.

Chapter 7

Alternatives to the Proposed Action

NRC

The environmental report shall discuss "Alternatives to the proposed action...." 10 CFR 51.45(b)(3), as adopted by reference at 10 CFR 51.53(c)(2).

"...The report is not required to include discussion of need for power or economic costs and benefits of ... alternatives to the proposed action except insofar as such costs and benefits are either essential for a determination regarding the inclusion of an alternative in the range of alternatives considered or relevant to mitigation...." 10 CFR 51.53(c)(2).

"While many methods are available for generating electricity, and a huge number of combinations or mixes can be assimilated to meet a defined generating requirement, such expansive consideration would be too unwieldy to perform given the purposes of this analysis. Therefore, NRC has determined that a reasonable set of alternatives should be limited to analysis of single, discrete electric generation sources and only electric generation sources that are technically feasible and commercially viable." (NRC 1996a, Section 8.1).

"...The consideration of alternative energy sources in individual license renewal reviews will consider those alternatives that are reasonable for the region, including power purchases from outside the applicant's service area...." (NRC 1996b, Section II.H, pg. 66541, column 3).

Introduction

Chapter 7 addresses alternatives to DNPS license renewal. The chapter evaluates what might happen if NRC did not renew the Station operating licenses: what alternative actions might be undertaken, which alternatives are not reasonable and why and, for reasonable alternatives, what the associated environmental impacts might be. Chapter 8 compares these impacts to those associated with license renewal.

In determining the level of detail and analysis that it should provide in Chapter 7, EGC relied on the NRC decision-making standard for license renewal:

"...the NRC staff, adjudicatory officers, and Commission shall determine whether or not the adverse environmental impacts of license renewal are so great that preserving the option of license renewal for energy planning decision makers would be unreasonable." (10 CFR 51.95[c][4]).

EGC has determined that the environmental report would support NRC decision making as long as the document provides sufficient information to clearly indicate whether an alternative would have a smaller, comparable, or greater environmental impact than the proposed action. Providing additional detail or analysis serves no function if it only brings to light, for example, additional adverse impacts of alternatives to license renewal. This approach is consistent with regulations of the Council on Environmental Quality, which provide that the consideration of alternatives (including the proposed action) should enable reviewers to evaluate their comparative merits (40 CFR 1500-1508). EGC believes that Chapter 7 provides sufficient detail about alternatives to establish the basis for necessary comparisons to the Chapter 4

discussion of impacts from the proposed action.

7.1 No-Action Alternative

7.1.1 DECOMMISSIONING

Regardless of whether NRC renews the DNPS operating licenses, and regardless of which alternatives are undertaken should NRC not renew the licenses, EGC must comply with NRC requirements for decommissioning a nuclear power plant.

The *Generic Environmental Impact Statement* (GEIS) (NRC 1996a) defines decommissioning as the safe removal of a nuclear facility from service and the reduction of residual radioactivity to a level that permits release of the property for unrestricted use and termination of the license. NRC-evaluated decommissioning options include immediate decontamination and dismantlement (DECON), and safe storage of the stabilized and defueled facility (SAFSTOR) for a period of time, followed by decontamination and dismantlement. Regardless of the option chosen, decommissioning must be completed within a 60-year period. Under the no-action alternative, EGC would continue operating DNPS until the current license expires, then initiate decommissioning activities in accordance with NRC requirements.

The GEIS describes decommissioning activities based on an evaluation of an example reactor (the "reference" boiling water reactor is the 1,155-megawatts-electrical (MWe) Energy Northwest's Columbia plant (formerly Washington Public Power Supply System's WNP-2 plant). This description is comparable to decommissioning activities that EGC would conduct at DNPS, although EGC notes that the DNPS units are smaller than the referenced reactor.

As the GEIS notes, NRC has evaluated environmental impacts from decommissioning. NRC-evaluated impacts include occupational and public radiation dose, impacts of waste management, impacts to air and water quality, ecological, economic, and socioeconomic impacts. In its GEIS on decommissioning, NRC indicated that the environmental effects of greatest concern (i.e., radiation dose and releases to the environment) are substantially less than the same effects resulting from reactor operations (NRC 1988). EGC adopts by reference the NRC conclusions regarding environmental impacts of decommissioning.

EGC notes that decommissioning activities and their impacts are not discriminators between the proposed action and the no-action alternative. EGC will have to decommission DNPS; license renewal would only postpone decommissioning for another 20 years. NRC has established in the GEIS that the timing of decommissioning operations does not substantially influence the environmental impacts of decommissioning. EGC adopts by reference NRC findings (10 CFR 51 Appendix B, Table B-1, Decommissioning) to the effect that delaying decommissioning until after the renewal term would have small environmental impacts. The discriminators between the proposed action and the no-action alternative lie within the choice of options for replacing DNPS capacity. Section 7.2.2 analyzes the impacts from these options.

EGC concludes that the decommissioning impacts under the no-action alternative would not be substantially different from those occurring following license renewal, as identified in the GEIS (NRC 1996a) and in the decommissioning generic environmental impact statement (NRC 1988). These impacts would be temporary and would occur at the same time as the impacts from meeting system generating needs.

7.1.2 REPLACEMENT CAPACITY

In 2000, DNPS provided approximately 13.2 terawatt hours of electricity (EIA 2001a). A terawatt hour is one billion kilowatt hours. This is approximately 15 percent of the energy generated by nuclear power that EGC provides to its 3.5 million customers in Illinois (ComEd 2000). DNPS' capacity provides electricity for approximately 350,000 industries, commercial establishments, and residences. EGC believes that any alternative would be unreasonable if it did not include replacing this capacity. Replacement could be accomplished by (1) building new generating capacity, (2) purchasing power from outside the EGC system, or (3) reducing power requirements through demand reduction. Section 7.2.1 describes each of these possibilities in detail, and Section 7.2.2 describes environmental impacts from feasible alternatives.

7.2 Alternatives that Meet System Generating Needs

7.2.1 ALTERNATIVES CONSIDERED

7.2.1.1 Technology Choices

The current mix of power generation options in Illinois is one indicator of the feasible choices for electric generation technology within the State. EGC evaluated Illinois' electric generation capacity and utilization characteristics using statistics from 1999, the most recent year for which a complete set of data is available. "Capacity" is the quantification of the various installed technology choices. "Utilization" is the degree to which each choice is actually used.

In 1999, Illinois' electric industry had a total generating capacity of 34,338 megawatts-electric. As Figure 7-1 indicates, this capacity includes units fueled by coal (46.7 percent); nuclear (31.2 percent); gas (15.7 percent); oil (3.2 percent); dual (e.g., oil/gas)-fired (0.9 percent), hydroelectric (0.1 percent), and other (2.3 percent) (EIA 2001b).

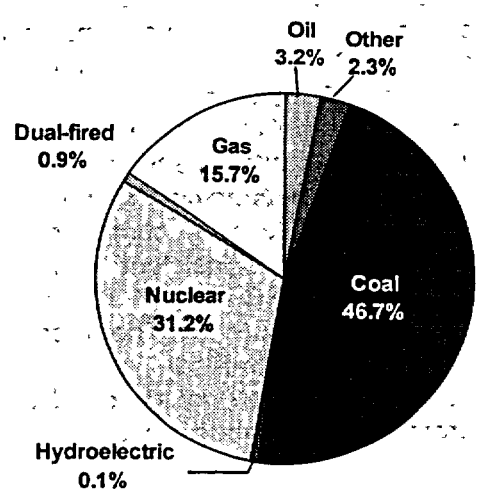

Figure 7-1. Illinois Electric Industry Generating Capacity, 1999

Based on 1999 generation data, Illinois' electric industry provided approximately 164 terawatt hours of electricity. As Figure 7-2 depicts, Illinois' generation utilization was primarily from nuclear (50 percent), followed by coal (45.3 percent), gas (3.4 percent), oil (0.5 percent), other (0.7 percent), and hydroelectric (0.1 percent) (EIA 2001b).

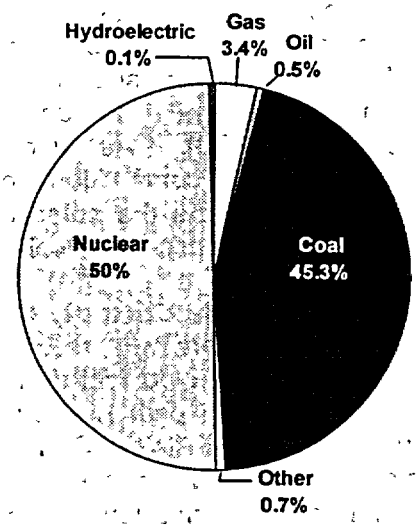

Figure 7-2. Illinois Electric Industry Generation Utilization, 1999

The difference between capacity and utilization is the result of preferential usage. For example, in 1999 nuclear energy represented 31.2 percent of Illinois' installed capability, but produced 50 percent of the electricity generated (EIA 2001b). This reflects Illinois' preferential reliance on nuclear energy as a base-load generating source.

7.2.1.2 Effects of Deregulation

Efforts to deregulate the electric utility industry began with passage of the National Energy Policy Act of 1992. Provisions of this Act required electric utilities to allow open access to their transmission lines and encouraged development of a competitive wholesale market for electricity. The Act did not mandate competition in the retail market, leaving that decision to the states (NEI 2000).

In December 1997, the State of Illinois began the process of restructuring the retail market (i.e., deregulation) by enacting the Illinois Electric Service Customer Choice and Rate Relief Act of 1997 (also known as the Illinois Electricity Choice Law). The Act eliminates regulated generation service areas and enables all customers of electric distribution companies in the State to purchase electricity from their choice of electric generation suppliers by May 1, 2002. Electric generation supply will be based on customers' needs and preferences (ICC 1999). As discussed below, this injection of competition among electric generators affects the selection of alternatives for DNPS license renewal.

Before Illinois enacted its Electricity Choice Law, decisions regarding reasonable alternatives for meeting electrical demands in Illinois were made primarily by two entities, utilities and the Illinois Commerce Commission. As a result of the Law, the Illinois Commerce Commission no longer has a formal role in assessing Illinois' electricity needs or mandating additional capacity. Instead, market forces are expected to spur innovation, attract competition, drive the appropriate supply/demand balance, and attract new power suppliers to the State (IPCB 2000). Therefore, generators of electric power in the State of Illinois are solely responsible for decisions regarding reasonable alternatives for meeting electrical demands.

Since the Illinois Electricity Choice Law was enacted, the Illinois Environmental Protection Agency has received more than 60 applications for construction of new generating facilities. Citizens, local governments, and legislators objected to several of the proposed plants. In response, the Illinois Pollution Control Board conducted hearings to evaluate whether additional siting requirements or other regulation of such proposed plants should be recommended. The Illinois Pollution Control Board recommended that the Illinois Environmental Protection Agency adopt new rules that would tighten restrictions on air emissions and require public participation in the construction permit process, but deferred to the Governor's Office for a decision regarding requirements for siting new generating facilities (IPCB 2000).

It is not clear whether EGC or another supplier would construct new generating units to replace those at DNPS, if its licenses were not renewed. However, regardless of which entities construct and operate the replacement power supply, certain environmental parameters would be constant among these alternative power sources. Therefore, Chapter 7 discusses the impacts of reasonable alternatives to DNPS license renewal without regard to whether they would be implemented by EGC.

7.2.1.3 Mixture

NRC indicated in the GEIS that, while many methods are available for generating electricity and a huge number of combinations or mixes can be assimilated to meet system needs, such expansive consideration would be too unwieldy given the purposes of the alternatives analysis. Therefore, NRC determined that a reasonable set of alternatives should be limited to analysis of single discrete electrical generation sources and only those electric generation technologies that are technically reasonable and commercially viable (NRC 1996a). Consistent with the NRC determination, EGC has not evaluated mixes of generating sources. The impacts from coal- and gas-fired generation presented in this chapter would bound the impacts from any generation mixture of the two technologies.

7.2.1.4 Fossil-Fuel-Fired Generation

EGC analyzed locating hypothetical new coal- and gas-fired units at the existing DNPS site. Using an existing site could minimize environmental impacts by building on previously disturbed land and by making the most use possible of existing facilities such as transmission lines, roads and parking areas, office buildings, and the cooling system. Locating hypothetical units at the existing site has, therefore, been applied to the coal-and gas-fired units.

EGC notes that the U.S. Environmental Protection Agency has revised requirements that could affect the design of cooling water intake structures for new facilities (EPA 2001) and has proposed requirements that could affect modifications at existing facilities (EPA 2002a). These requirements could necessitate the use of recirculating cooling water systems for the coal- and gas-fired alternatives if surface water were used for cooling.

It must be emphasized that these are hypothetical scenarios. EGC does not have plans for such construction at the DNPS site.

Coal-Fired Generation

NRC has evaluated coal-fired generation alternatives for the Calvert Cliffs Nuclear Power Plant (NRC 1999a) and for the Oconee Nuclear Station (NRC 1999b). For Oconee, NRC analyzed 2,500 MWe of coal-fired generation capacity. EGC has reviewed the NRC analysis, believes it to be sound, and notes that it analyzed substantially more generating capacity than the 1,824 MWe discussed in this analysis. In defining the DNPS coal-fired alternative, EGC has used site- and Illinois-specific input and has scaled from the NRC analysis, where appropriate.

EGC defined the DNPS coal-fired alternative as consisting of three 550-MWe units. EGC chose this configuration to be equivalent to the gas-fired alternative described below. This equivalency makes impact characteristics most comparable, facilitating impact analysis.

Table 7-1 describes assumed basic operational characteristics of the coal-fired units. EGC based its emission control technology and percent-control assumptions on alternatives that the U.S. Environmental Protection Agency (EPA) has identified as being available for minimizing emissions (EPA 1998). For the purposes of analysis, EGC has assumed that coal and lime (calcium oxide) would be delivered by rail after upgrading the existing rail spur into DNPS.

Gas-Fired Generation

EGC has chosen to evaluate gas-fired generation, using combined-cycle turbines, because it has determined that the technology is mature, economical, and feasible. A scenario, for example, of three units with a net capacity of 608 MWe could be assumed to replace the 1,824-MWe DNPS total net capacity. However, EGC's experience indicates that, although customized unit sizes can be built, using standardized sizes is more economical. Existing manufacturers' standard-sized units include a gas-fired combined-cycle plant of 550-MWe net capacity, consisting of two 184-MWe gas turbines and 182 MWe of heat recovery capacity (e.g., General Electric Frame 7FA).

EGC assumed three 550-MWe units, having a total capacity of 1,650 MWe, as the gas-fired alternative at the DNPS site. Although this provides less capacity than the existing unit (1,650 MWe for this alternative versus 1,824 MWe for existing capacity), it ensures against overestimating environmental impacts from the alternatives. The shortfall in capacity could be replaced by other methods, such as importing power. However, for the reasons discussed in Section 7.2.1.3, EGC did not analyze a

mixture of these alternatives and imported power.

Table 7-2 describes assumed basic operational characteristics of the gas-fired units. As for the coal-fired alternative, EGC based its emission control technology and percent-control assumptions on alternatives that the EPA has identified as being available for minimizing emissions (EPA 1998). For the purposes of analysis, EGC has assumed that it would ensure gas availability through its parent company, EGC Corporation.

7.2.1.5 Purchased Power

In a traditional alternatives analysis for utility generation capacity, the purchased power alternative meant that the utility would meet a portion of its service area demand using power that it purchased from another utility. Deregulation, however, is changing this traditional analysis. First, the end-user could purchase electricity from another entity (in this case, from a company other than EGC). Second, EGC expects retail competition to decrease generators' incentives to provide wholesale power to competing companies such as EGC for resale, thus reducing the availability of power for EGC to purchase and resell competitively.

EGC has evaluated conventional and prospective power supply options that could be reasonably implemented before the current DNPS license expires. In 1999, Unicom completed the sale of its ComEd fossil-fuel-fired coal, gas, and oil units to Midwest Generation. As part of the sale, Unicom (now EGC) entered into long-term purchase contracts with Midwest Generation to provide firm capacity and energy (ComEd 1999). Because these contracts are part of EGC's current and future capacity, however, EGC does not consider these power purchases to be a feasible option for the purchased power alternative.

Illinois is a net exporter of power; in 1999, Illinois exported 76 terawatt-hours of electricity (EIA 2001c). While some of these exports may be the result of contracts that would prevent use to replace DNPS generation, EGC cannot rule out the possibility that power would be available for purchase as an alternative to DNPS license renewal. Therefore, EGC has analyzed purchased power as a reasonable alternative.

EGC assumes that the generating technology used to produce purchased power would be one of those that NRC analyzed in the GEIS. For this reason, EGC is adopting by reference the GEIS description of the alternative generating technologies as representative of the purchased power alternative.

7.2.1.6 Demand-Side Management

Historically, state regulatory bodies have required regulated utilities to institute programs designed to reduce demand for electricity. Demand-side management (DSM) programs included energy conservation and load modification measures. In the current deregulated Illinois market, EGC anticipates that it will not be able to offer competitively priced power if it retains an extensive conservation and load-modification-incentive program. However, EGC has evaluated the DSM alternative because future legislation could require such measures.

In the past, EGC (then ComEd) offered DSM programs that either conserved energy or allowed the Company to reduce customers' load requirements during periods of peak demand. EGC's DSM programs fell into the following categories:

Conservation Programs

- Educational programs that encouraged the wise use of energy

Energy Efficiency Programs

- Discounted residential rates for Good Cents homes and homes that met specific energy efficiency standards
- Free Home Energy Audit Program that provided residential energy audits and encouraged efficiency upgrades
- Incentive Programs that encouraged customers to replace old, inefficient appliances or equipment with new high-efficiency appliances or equipment
- Government Partnerships that assisted federal facilities in meeting mandated energy efficiency goals through design and installation of high-efficiency lighting systems and computerized energy management.

Load Management Programs

- Standby Generator Program – encouraged customers to let EGC switch loads to the customer's standby generators during periods of peak demand
- Interruptible Service Program – encouraged customers to allow blocks of their load to be interrupted during periods of peak demand
- Real Time Pricing – encouraged customers to discontinue usage during specific times

EGC annually projects both the summer and winter peak power, annual energy requirements, and impacts of DSM. Projections for future DSM show substantial decreases in DSM initiatives that were in effect during past years. Market conditions, which provided the initial support for utility-sponsored conservation and load management efforts during the late 1970s and early 1980s, can be broadly characterized by:

- Increasing long-term marginal prices for capacity and energy production resources
- Forecasts projecting increasing demand for electricity across the nation
- General agreement that conditions (1) and (2) would continue for the foreseeable future
- Limited competition in the generation of electricity
- Economies of scale in the generation of electricity, which supported the construction of large central power plants, and
- The use of average embedded cost as the basis for setting electricity prices within a regulated context.

These market and regulatory conditions would undergo dramatic changes in a deregulated market. Changes that have significantly impacted the cost effectiveness of utility-sponsored DSM, can be described as follows:

1. A decline in generation costs, due primarily to technological advances that have reduced the cost of constructing new generating units (e.g., combustion turbines), and
2. National energy legislation, which has encouraged wholesale competition through open access to the transmission grid, as well as state legislation designed to facilitate retail competition.

Consistent with (1) and (2) above, the utility planning environment features lower capacity and lower energy prices than during earlier periods, shorter planning horizons, lower reserve margins, and increased reliance on market prices to direct utility resource planning. These have greatly reduced the number of cost-effective DSM alternatives.

Other significant changes include the following.

- The adoption of increasingly stringent national appliance standards for most major energy-using equipment and the adoption of energy efficiency requirements in state building codes. These mandates have further reduced the potential for cost-effective utility-sponsored measures.

- In states that are currently transitioning into deregulation, third parties are increasingly providing energy services and products in competitive markets at prices that reflect their value to the customer. Market conditions can be expected to continue this shift among providers of cost-effective load management.

For these reasons, EGC determined that the remaining DSM programs, which are primarily directed toward load management, are not an effective substitute for any of its large base-load units such as DNPS that operate at high capacity factors.

7.2.1.7 Other Alternatives

This section identifies alternatives that EGC has determined are not reasonable and the EGC basis for this determination. EGC accounted for the fact that DNPS is a base-load generator and that any feasible alternative to DNPS would also need to be able to generate base-load power. In performing this evaluation, EGC relied heavily upon NRC's GEIS (NRC 1996a).

Wind

Wind power, by itself, is not suitable for large base-load capacity. As discussed in Section 8.3.1 of the GEIS, wind has a high degree of intermittence, and average annual capacity factors for wind plants are relatively low (less than 30 percent). Wind power, in conjunction with energy storage mechanisms, might serve as a means of providing base-load power. However, current energy storage technologies are too expensive for wind power to serve as a large base-load generator.

According to the Wind Energy Resource Atlas of the United States, areas suitable for wind energy applications must be wind power class 3 or higher. Approximately eight percent of the land area in Illinois has a wind power classification of three or higher. However, land-use conflicts such as urban development, farmland, and environmentally sensitive areas reduce the amount of land suitable for wind energy applications to about five percent of the land area in Illinois, mostly in the west-central uplands (NREL 1986).

The GEIS estimates a land use of 150,000 acres per 1,000 MWe for wind power. Therefore, replacement of DNPS generating capacity with wind power, even assuming ideal wind conditions, would require dedication of about 430 square miles. Based on the lack of sufficient wind speeds and the amount of land needed to replace DNPS, the wind alternative would require a large greenfield site, which would result in a large environmental impact. Additionally, wind plants have aesthetic impacts, generate noise, and harm birds.

EGC has concluded that, due to the limited availability of area in Illinois having suitable wind speeds and also due to the amount of land needed (approximately 430 square miles), wind power is not a reasonable alternative to DNPS license renewal.

Solar

By its nature, solar power is intermittent. In conjunction with energy storage mechanisms, solar power might serve as a means of providing base-load power. However, current energy storage technologies are too expensive to permit solar power to serve as a large base-load generator. Even without storage capacity, solar power technologies (photovoltaic and

thermal) cannot currently compete with conventional fossil-fueled technologies in grid-connected applications, due to high costs per kilowatt of capacity. (NRC 1996a).

Solar power is not a technically feasible alternative in EGC's service area. The Chicago area receives about three kilowatt hours of solar radiation per square meter per day, compared with 5 to 7.2 kilowatt hours per square meter per day in areas of the West, such as California, which are most promising for solar technologies (NRC 1996a).

Finally, according to the GEIS, land requirements for solar plants are high, at 35,000 acres per 1,000 MWe for photovoltaic and 14,000 acres per 1,000 MWe for solar thermal systems. Therefore, replacement of DNPS generating capacity with solar power would require dedication of about 100 square miles for photovoltaic and 40 square miles for solar thermal systems. Neither type of solar electric system would fit at the DNPS site, and both would have large environmental impacts at a greenfield site.

EGC has concluded that, due to the high cost, limited availability of sufficient incident solar radiation, and amount of land needed (approximately 40 to 100 square miles), solar power is not a reasonable alternative to DNPS license renewal.

Hydropower

A small portion (about 80 MW) of Illinois utility generating capacity is hydroelectric. As the GEIS points out in Section 8.3.4, hydropower's percentage of United States generating capacity is expected to decline because hydroelectric facilities have become difficult to site as a result of public concern over flooding, destruction of natural habitat, and destruction of natural river courses. According to the *U.S. Hydropower Resource Assessment for Illinois* (INEL 1997), there are no remaining sites in Illinois that would be environmentally suitable for a large hydroelectric facility.

The GEIS (Section 8.3.4) estimates land use of 1,600 square miles per 1,000 MWe for hydroelectric power. Based on this estimate, replacement of DNPS generating capacity would require flooding more than 2,900 square miles. This would result in a large impact on land use. Further, operation of a hydroelectric facility would alter aquatic habitats above and below the dam, which would impact existing aquatic species.

EGC has concluded that, due to the lack of suitable sites in Illinois and the amount of land needed (approximately 2,900 square miles), hydropower is not a reasonable alternative to DNPS license renewal.

Geothermal

As illustrated by Figure 8.4 in the GEIS, geothermal plants might be located in the western continental United States, Alaska, and Hawaii, where hydrothermal reservoirs are prevalent. However, because there are no high-temperature geothermal sites in Illinois, EGC concludes that geothermal is not a reasonable alternative to DNPS license renewal.

Wood Energy

The use of wood waste to generate electricity is largely limited to those states with significant wood resources, such as California, Maine, Georgia, Minnesota, Oregon, Washington, and Michigan. Electric power is generated in these states by the pulp, paper, and paperboard industries, which consume wood and wood waste for energy, benefiting from the use of waste materials that could otherwise represent a disposal problem. However, the largest wood waste power plants are 40 to 50 MW in size.

Further, as discussed in Section 8.3.6 of the GEIS, construction of a wood-fired plant

would have an environmental impact that would be similar to that for a coal-fired plant, although facilities using wood waste for fuel would be built on smaller scales. Like coal-fired plants, wood-waste plants require large areas for fuel storage, processing, and waste disposal (i.e., ash). Additionally, operation of wood-fired plants has environmental impacts, including impacts on the aquatic environment and air.

EGC has concluded that, due to the lack of significant wood resources in Illinois and the lack of an obvious environmental advantage, wood energy is not a reasonable alternative to DNPS license renewal.

Municipal Solid Waste

As discussed in Section 8.3.7 of the GEIS, the initial capital costs for municipal solid waste plants are greater than for comparable steam turbine technology at wood-waste facilities. This is due to the need for specialized waste separation and handling equipment.

The decision to burn municipal solid waste to generate energy is usually driven by the need for an alternative to landfills, rather than by energy considerations. The use of landfills as a waste disposal option is likely to increase in the near term; however, it is unlikely that many landfills will begin converting waste to energy because of unfavorable economics, particularly with electricity prices declining.

Estimates in the GEIS suggest that the overall level of construction impacts from a waste-fired plant should be approximately the same as that for a coal-fired plant. Additionally, waste-fired plants have the same or greater operational impacts (including impacts on the aquatic environment, air, and waste disposal). Some of these impacts would be moderate, but still larger than the environmental effects of DNPS license renewal.

EGC has concluded that, due to the high costs and lack of obvious environmental advantages, burning municipal solid waste to generate electricity is not a reasonable alternative to DNPS license renewal.

Other Biomass-Derived Fuels

In addition to wood and municipal solid waste fuels, there are several other concepts for fueling electric generators, including burning energy crops, converting crops to a liquid fuel such as ethanol (ethanol is primarily used as a gasoline additive), and gasifying energy crops (including wood waste). As discussed in Section 8.3.8 of the GEIS, none of these technologies has progressed to the point of being competitive on a large scale or of being reliable enough to replace a base-load plant such as DNPS. Further, estimates in the GEIS suggest that the overall level of construction impacts from a crop-fired plant should be approximately the same as that for a wood-fired plant. Additionally, crop-fired plants would have similar operational impacts (including impacts on the aquatic environment and air). In addition, these systems have large impacts on land use, due to the acreage needed to grow the energy crops.

EGC has concluded that, due to the high costs and lack of obvious environmental advantage, burning other biomass-derived fuels is not a reasonable alternative to DNPS license renewal.

Oil

Illinois has several oil-fired units; however, they produce less than one percent of the State's power generation. The cost of oil-fired operation is more expensive than nuclear or coal-fired operation. In addition, future increases in oil prices are expected to make oil-fired generation increasingly more expensive than coal-fired generation. The high cost of oil has prompted a steady decline in its use for electricity generation. From 1997 to 1998, production of electricity

by oil-fired plants dropped by about 39.9 percent in Illinois (EIA 1998).

Also, construction and operation of an oil-fired plant would have environmental impacts. For example, Section 8.3.11 of the GEIS estimates that construction of a 1,000-MWe oil-fired plant would require about 120 acres. Additionally, operation of oil-fired plants would have environmental impacts (including impacts on the aquatic environment and air) that would be similar to those from a coal-fired plant.

EGC has concluded that, due to the high costs and lack of obvious environmental advantage, oil-fired generation is not a reasonable alternative to DNPS license renewal.

Fuel Cells

Phosphoric acid fuel cells are the most mature fuel cell technology, but they are only in the initial stages of commercialization. Two hundred turnkey plants have been installed in the United States, Europe, and Japan. Recent estimates suggest that a company would have to produce about 100 MW of fuel cell stacks annually to achieve a price of $1,000 to $1,500 per kilowatt. However, the current production capacity of all fuel cell manufacturers only totals about 75 MW per year. EGC believes that this technology has not matured sufficiently to support production for a facility the size of DNPS. EGC has concluded that, due to the cost and production limitations, fuel-cell technology is not a reasonable alternative to DNPS license renewal.

Delayed Retirement

EGC has no plans for retiring any reactors in its fleet of nuclear plants and expects to need additional capacity in the near future. Fossil plants slated for retirement tend to utilize less efficient generation and pollution control technologies. In the face of increasingly stringent restrictions, delaying retirement in order to compensate for a plant the size of DNPS would appear to be unreasonable without major construction to upgrade or replace plant components. EGC concludes that the environmental impacts of such a scenario are bounded by its coal- and gas-fired alternatives.

7.2.2 ENVIRONMENTAL IMPACTS OF ALTERNATIVES

This section evaluates the environmental impacts from what EGC has determined to be reasonable alternatives to DNPS license renewal: coal-fired generation, gas-fired generation, and purchased power.

In characterizing environmental impacts from alternatives, EGC has used the same definitions of "small," "moderate," and "large" that are presented in the Chapter 4 Introduction.

7.2.2.1 Coal-Fired Generation

NRC evaluated environmental impacts from coal-fired generation alternatives in the GEIS (NRC 1996a) and concluded that construction impacts could be substantial, due in part to the large land area required (which can result in natural habitat loss) and the large workforce needed. NRC pointed out that siting a new coal-fired plant where an existing nuclear plant is located would reduce many construction impacts. NRC identified major adverse impacts from operations as human health concerns associated with air emissions, waste generation, and losses of aquatic biota due to cooling water withdrawals and discharges.

The coal-fired alternative defined by EGC in Section 7.2.1.4 would be located at DNPS.

Air Quality

Air quality impacts of coal-fired generation are considerably different from those of nuclear power. A coal-fired plant would

emit sulfur dioxide (SO_2 as SO_x surrogate), oxides of nitrogen (NO_x), particulate matter (PM), and carbon monoxide (CO), all of which are designated under the National Ambient Air Quality Standards (NAAQS) as criteria pollutants. A coal-fired plant would also emit non-methane volatile organic compounds (VOC) which contribute to the formation of ground-level ozone, a criteria pollutant under the NAAQS. In areas that do not meet the ozone NAAQS, such as the Metropolitan Chicago ozone nonattainment area, new plants that emit non-methane VOCs must offset their emissions by eliminating VOC emissions from existing facilities in accordance with the corresponding State Implementation Plan (SIP) for compliance with the NAAQS. As Section 7.2.1.4 indicates, EGC has assumed a plant design that would minimize air emissions through a combination of boiler technology and post-combustion pollutant removal. EGC estimates the coal-fired alternative emissions to be as follows:

SO_2 = 6,605 tons per year

NO_x = 1,721 tons per year

CO = 1,721 tons per year

PM = 238 tons per year

PM_{10} (particulates having a diameter of less than 10 microns) = 55 tons per year

VOC = 207 tons per year

Table 7-3 shows how EGC calculated these emissions.

Coal combustion also results in low emissions of heavy metals such as mercury, hazardous air pollutants such as benzene, polychlorinated dibenzo-p-dioxins, and polychlorinated dibenzofurans.

As DNPS is located in an area designated as severe for ozone, construction of a new plant that emits ozone precursors must be in conformance with the SIP for compliance with the NAAQS. The Illinois SIP calls for offsets of VOC emissions for new sources constructed in ozone nonattainment areas. The SIP offset is removal of 1.3 tons of non-methane VOC for every ton added. Therefore, EGC would be required to locate and remove 269 tons per year VOC emissions from the Metropolitan Chicago ozone nonattainment area. This analysis assumes that EGC would be able to remove 269 tons per year of non-methane VOC emissions from the Metropolitan Chicago ozone nonattainment area.

In 1999, emissions of SO_2 and NO_x from Illinois' generators ranked 7th and 4th nationally, respectively (EIA 2001b). Seventeen Illinois generators were cited in the Clean Air Act Amendments of 1990 to begin compliance in 1995 with stricter emission controls for SO_2 and NO_x. The acid rain requirements of the Clean Air Act Amendments capped the nation's SO_2 emissions from power plants. Each company having fossil-fuel-fired units was allocated SO_2 allowances. To be in compliance with the Act, the companies must hold enough allowances to cover their annual SO_2 emissions. EGC, having no fossil units, would have to purchase allowances from the open market to operate a fossil-fuel-burning plant at DNPS. A company that has fossil units might also have the option of shutting down existing capacity and applying credits from that plant to the new one.

To operate a fossil-fuel-fired plant at the DNPS site, EGC would have to obtain enough NO_x credits to cover annual emissions either from the set-aside pool or by buying NO_x credits from other sources.

In October 1998, EPA promulgated the NO_x State Implementation Plan Call regulation that requires 22 states, including Illinois, to reduce their NO_x emissions by over 30 percent to address regional ozone transport (EPA 2002b). The regulation imposes a NO_x "budget" to limit the NO_x emissions from each state. The Illinois

Environmental Protection Agency allocated NO_x credits among the existing electric generating units in the State (IAC 2000). Beginning May 31, 2004, each electric generating unit must hold enough NO_x credits to cover its annual NO_x emissions. A small percentage of NO_x credits was set aside for new sources.

NRC did not quantify coal-fired emissions, but implied that air impacts would be substantial. NRC noted that adverse human health effects from coal combustion have led to important federal legislation in recent years and that public health risks, such as cancer and emphysema, have been associated with coal combustion. NRC also mentioned global warming and acid rain as potential impacts. EGC concludes that federal legislation and large-scale concerns, such as global warming and acid rain, are indications of concerns about destabilizing important attributes of air resources. However, SO_2 emission allowances, NO_x emission offsets, low NO_x burners, overfire air, fabric filters or electrostatic precipitators, and scrubbers are regulatorily imposed mitigation measures. As such, EGC concludes that the coal-fired alternative would have moderate impacts on air quality; the impacts would be clearly noticeable, but would not destabilize air quality in the area.

Waste Management

EGC concurs with the GEIS assessment that the coal-fired alternative would generate substantial solid waste. The coal-fired plant, using coal with an ash content of 6.9 percent, would annually consume approximately 6,900,000 tons of coal (Table 7-3). Particulate control equipment would collect most (99.9 percent) of this ash, approximately 475,000 tons per year. Illinois regulations encourage recycling of coal-combustion by-products, and EGC (then ComEd) historically recycled 87 percent of its coal ash (ComEd 2000). Assuming continuation of this waste mitigation measure, the coal-fired alternative would generate approximately 62,000 tons of ash per year for disposal.

SO_x-control equipment, annually using nearly 116,000 tons of calcium oxide, would generate another 343,000 tons per year of waste in the form of scrubber sludge. EGC estimates that ash and scrubber waste disposal over a 40-year plant life would require approximately 180 acres (a square area with sides of approximately 2,820 feet).

While only half this waste volume and land use would be attributable to the 20-year license renewal period alternative, the total numbers are pertinent as a cumulative impact. Table 7-4 shows how EGC calculated ash and scrubber waste volumes.

EGC believes that, with proper siting coupled with current waste management and monitoring practices, waste disposal would not destabilize any resources. There would be space within the site footprint for this disposal. After closure of the waste site and revegetation, the land would be available for other uses. For these reasons, EGC believes that waste disposal for the coal-fired alternative would have moderate impacts; the impacts of increased waste disposal would be clearly noticeable, but would not destabilize any important resource and further mitigation would be unwarranted.

Other Impacts

Construction of the powerblock and coal storage area would impact approximately 300 acres of land and associated terrestrial habitat. Because most of this construction would be in previously disturbed areas, impacts would be minimal. Visual impacts would be consistent with the industrial nature of the site. As with any large construction project, some erosion and sedimentation and fugitive dust emissions could be anticipated, but would be minimized by using best management

practices. Construction debris from clearing and grubbing could be disposed of onsite and municipal waste disposal capacity would be available. Socioeconomic impacts from the construction workforce would be minimal because worker relocation would not be expected, due to the site's proximity to Chicago (50 miles from the DNPS site). Socioeconomic impacts would result from the decrease in operational workforce from 872 permanent employees to approximately 250 for the coal-fired station. EGC believes that these impacts would be small, due to the mitigating influence of the site's proximity to Chicago. Cultural resource impacts would be unlikely, due to the previously disturbed nature of the site, and could be minimized by survey and recovery techniques (if needed).

Impacts to aquatic resources and water quality would be minimized due to the plant's use of the existing cooling water system. The new stacks, boilers, and rail deliveries would be an incremental addition to the visual impact from existing DNPS structures and operations. Coal delivery would add noise and transportation impacts associated with unit-train traffic. EGC believes that other construction and operation impacts would be small. In most cases, the impacts would be detectable, but they would not destabilize any important attribute of the resource involved. Due to the minor nature of these impacts, mitigation would not be warranted beyond that mentioned.

Design Alternatives

The DNPS site location lends itself to coal delivery by barge, a common practice along the Illinois River waterway. This design alternative would necessitate construction of a barge offloading facility on the Dresden Pool and a conveyor system to the Station coal yard. These new facilities would result in greater construction impacts than upgrading the existing rail line. The alternative would trade barge traffic impacts for rail traffic impacts, a tradeoff that provides no obvious environmental benefit.

7.2.2.2 Gas-Fired Generation

NRC evaluated environmental impacts from gas-fired generation alternatives in the GEIS, focusing on combined-cycle plants. Section 7.2.1.4 presents EGC's reasons for defining the gas-fired generation alternative as a combined-cycle plant on the DNPS site. Land-use impacts from gas-fired units on the site would be less than those of the coal-fired alternative. Reduced land requirements, due to construction on the existing site and a smaller facility footprint, would reduce impacts to ecological, aesthetic, and cultural resources as well. As discussed under "Other Impacts", a smaller workforce could have adverse socioeconomic impacts. Human health effects associated with air emissions would be of concern. Loss of aquatic biota due to cooling water withdrawals would be offset by the concurrent shutdown of the nuclear generators.

The gas-fired alternative defined by EGC in Section 7.2.1.4 would be located at DNPS.

Air Quality

Natural gas is a relatively clean-burning fossil fuel. Also, because the heat recovery steam generator does not receive supplemental fuel, the combined-cycle operation is highly efficient (56 percent vs. 33 percent for the coal-fired alternative). Therefore, the gas-fired alternative would release similar types of emissions, but in lesser quantities than the coal-fired alternative. Control technology for gas-fired turbines focuses on NO_x emissions. EGC estimates the gas-fired alternative emissions to be as follows:

- SO_x = 133 tons per year
- NO_x = 426 tons per year

- CO = 88 tons per year
- PM = 74 tons per year (all particulates are PM_{10})
- VOC = 82 tons per year

Table 7-5 shows how EGC calculated these emissions.

The Section 7.2.2.1 discussion of regional air quality, Clean Air Act requirements, and the NO_x State Implementation Plan Call is also applicable to the gas-fired generation alternative. NO_x effects on ozone levels, SO_2 allowances, and NO_x emission offsets could all be issues of concern for gas-fired combustion. The gas-fired generation alternative would also require offsets of 107-tons per year of VOC for construction in the Metropolitan Chicago ozone nonattainment area. While gas-fired turbine emissions are less than coal-fired boiler emissions, and regulatory requirements are less stringent, the emissions are still substantial. EGC concludes that emissions from a gas-fired alternative located at DNPS would noticeably alter local air quality, but would not destabilize regional resources. Air quality impacts would therefore be moderate, but substantially smaller than those of coal-fired generation.

Waste Management

Gas-fired generation would result in almost no waste generation, producing minor (if any) impacts. EGC concludes that gas-fired generation waste management impacts would be small.

Other Impacts

Similar to the coal-fired alternative, the ability to construct the gas-fired alternative on the existing DNPS site would reduce construction-related impacts.

To the extent practicable, EGC would route the pipeline along previously disturbed rights-of-way to minimize impacts. However, this would still be a costly (i.e., approximately $1 million/mile) and potentially controversial action with ecological impacts from installation of a minimum of two miles of buried 16-inch gas pipeline to DNPS. The pipeline would require an additional 36-40 acres for an easement. EGC would mitigate the political impacts through public hearings and apply best management practices during construction, such as minimizing soil loss and restoring vegetation immediately after the excavation is backfilled. Construction would result in the loss of some less mobile animals (e.g., frogs and turtles). Because these animals are common throughout the area, EGC expects negligible reduction in their population as a result of construction. EGC does not expect that installation of a pipeline would create a long-term reduction in the local or regional diversity of plants and animals.

NRC estimated in the GEIS that 110 acres would be needed for a plant site; this much previously disturbed acreage is available at DNPS, reducing loss of terrestrial habitat. Aesthetic impacts, erosion and sedimentation, fugitive dust, and construction debris impacts would be similar to the coal-fired alternative, but smaller because of the reduced site size. Socioeconomic impacts of construction would be minimal. However, the GEIS estimates a work force of 150 for gas operations. EGC would expect this number to be closer to 25-40 workers for a plant of this size. This reduction in the current work force would result in adverse socioeconomic impacts. EGC believes these impacts would be small and would be mitigated by the site's proximity to Chicago.

7.2.2.3 Purchased Power

As discussed in Section 7.2.1.5, EGC assumes that the generating technology used under the purchased power alternative would be one of those that NRC analyzed in the GEIS. EGC is also adopting by reference the NRC analysis of these

alternatives. Environmental impacts would still occur, but would be located elsewhere within the State. EGC believes that out-of-state imports would not be required.

The purchased power alternative would include constructing up to 200 miles of high-voltage (e.g., 500-kV) transmission lines to get power from the remote locations in Illinois to the EGC network. EGC believes most of the transmission lines could be routed along existing rights-of-way and assumes that the environmental impacts of transmission line construction would be moderate. As indicated in the introduction to Section 7.2.1.4, the environmental impacts of construction and operation of new coal- or gas-fired generating capacity for purchased power at a previously undisturbed greenfield site would exceed those of a coal- or gas-fired alternative located on the DNPS site.

Table 7-1. Coal-Fired Alternative.

Characteristic	Basis
Unit size = 550 MWe ISO rating net[a]	Set to match capacity of gas-fired alternative
Unit size = 583 MWe ISO rating gross[a]	Calculated based on 6 percent onsite power
Number of units = 3	Calculated to be ≤ DNPS Units 2 & 3 total net capacity – 1,824 MWe
Boiler type = tangentially fired, dry-bottom	Minimizes nitrogen oxides emissions (EPA 1998).
Fuel type = bituminous, pulverized coal	Typical for coal used in Illinois
Fuel heating value = 9,648 Btu/lb	1999 value for coal used in Illinois (EIA 2000)
Fuel ash content by weight = 6.9 percent	1999 value for coal used in Illinois (EIA 2000)
Fuel sulfur content by weight = S = 1.01 percent	1999 value for coal used in Illinois (EIA 2000)
Uncontrolled NO_x emission = 10 lb/ton Uncontrolled CO emission = 0.5 lb/ton	Typical for pulverized coal, tangentially fired, dry-bottom, New Source Performance Standard (EPA 1998)
Uncontrolled SO_x emission = 38 lb/ton × S Uncontrolled PM = 10 lb/ton Uncontrolled PM_{10} = 2.3 lb/ton	Typical for pulverized coal, tangentially fired, dry bottom (EPA 1998).
Uncontrolled VOC = 0.6 lb/ton	Typical for pulverized coal, tangentially fired, dry bottom (EPA 1998)
Heat rate = 10,200 Btu/kWh	Typical for coal-fired single-cycle steam turbines (EIA 2000)
Capacity factor = 0.85	Typical for large coal-fired units (EGC experience)
NO_x control = low NO_x burners, overfire air and selective catalytic reduction (95 percent reduction)	Best available and widely demonstrated for minimizing NO_x emissions (EPA 1998).
Particulate control = fabric filters (baghouse-99.9 percent removal efficiency)	Best available for minimizing particulate emissions (EPA 1998)
SO_x control = Wet scrubber – lime (95 percent removal efficiency)	Best available for minimizing SO_x emissions (EPA 1998)

a The difference between "net" and "gross" is electricity consumed onsite.
Btu = British thermal unit
CO = carbon monoxide
ISO rating = International Standards Organization rating at standard atmospheric conditions of 59°F, 60 percent relative humidity, and 14.696 pounds of atmospheric pressure per square inch
kWh = kilowatt hour
lb = pound
MWe = megawatts-electric
NO_x = nitrogen oxides
PM = particulate matter
PM_{10} = particulate matter nominally less than 10 microns diameter
S = sulfur
SO_x = sulfur oxides
VOC = volatile organic compounds

Table 7-2. Gas-Fired Alternative.

Characteristic	Basis
Unit size = 550 MWe ISO rating net:[a] Two 184-MWe combustion turbines and a 182-MW_e heat recovery boiler	Manufacturer's standard size gas-fired combined cycle plant
Unit size = 572-MWe ISO rating gross.[a] Two 191.4-MWe combustion turbines 189.3-MWe heat recovery boiler	Calculated based on 4 percent onsite power
Number of units = 3	Provides 1,650 MWe ≤ DNPS Units 2 & 3 net capacity – 1,824 MWe
Heat rate = 6,120 Btu/kWh	Manufacturer's listed heat rate for General Electric Frame 7FA unit.
Fuel type = natural gas	Assumed
Fuel heating value = 1,021 Btu/ft^3	1999 value for natural gas used in Illinois (EIA 2000)
NO_x emission = 0.0109 lb/MMBtu	Typical for large SCR-controlled gas fired units with water/steam injection (EPA 2000b)
CO emission = 0.00226 lb/MMBtu	Typical for large SCR-controlled gas fired units with water/steam injection (EPA 2000b)
Uncontrolled SO_x emission = 0.0034 lb/ton	Typical for gas-fired units (EPA 2000a)
Uncontrolled PM emission = 0.0066 lb/MMBtu	Typical for gas-fired units (EPA 2000a)
Uncontrolled PM_{10} emission = 0.0066 lb/MMBtu	Typical for gas-fired units (EPA 2000a)
Uncontrolled VOC emission = 0.0021 lb/MMBtu	Typical for gas-fired units (EPA 2000a)
Capacity factor = 0.85	Typical for large gas-fired base load units
NO_x control = selective catalytic reduction (SCR) with steam/water injection (90 percent reduction)	Best available for minimizing NO_x emissions (EPA 2000a)

a. The difference between "net" and "gross" is electricity consumed onsite.

Btu = British thermal unit
ft^3 = cubic foot
ISO rating = International Standards Organization rating at standard atmospheric conditions of 59°F, 60 percent relative humidity, and 14 696 pounds of atmospheric pressure per square inch
kWh = kilowatt hour
MM = million
MWe = megawatt - electric
NO_x = nitrogen oxides
PM = particulate matter
PM_{10} = particulate matter nominally less than 10 microns diameter
SO_x = sulfur oxides
VOC = volatile organic compound

Table 7-3. Air Emissions from Coal-Fired Alternative.

Parameter	Calculation	Result
Annual coal consumption	$3\text{ units}\times\frac{583\text{ MW}}{\text{unit}}\times\frac{10{,}200\text{ Btu}}{\text{kW}\times\text{hr}}\times\frac{1{,}000\text{ kW}}{\text{MW}}\times\frac{\text{lb}}{9{,}648\text{ Btu}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times 0.85\times\frac{24\text{ hr}}{\text{day}}\times\frac{365\text{ day}}{\text{yr}}$	6,884,077 tons of coal per year
SO_x[a,c]	$\frac{38\times 1.01\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times(1-95/100)\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	6,605 tons SO_x per year
NO_x[b,c]	$\frac{10\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times(1-95/100)\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	1,721 tons NO_x per year
CO[c]	$\frac{0.5\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	1,721 tons CO per year
PM[d]	$\frac{10\times 6.9\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times(1-99.9/100)\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	238 tons PM per year
PM_{10}[d]	$\frac{2.3\times 6.9\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times(1-99.9/100)\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	55 tons PM_{10} per year
VOC[e]	$\frac{0.06\text{ lb}}{\text{ton}}\times\frac{\text{ton}}{2{,}000\text{ lb}}\times\frac{6{,}884{,}077\text{ tons}}{\text{yr}}$	207 tons VOC per year

a EPA 1998.
b EPA 1998.
c. EPA 1998.
d. EPA 1998.
e EPA 1998.
CO = carbon monoxide
NO_x = oxides of nitrogen
PM = particulate matter
PM_{10} = particulates having diameter less than 10 microns
SO_x = sulfur oxides
VOC = non-methane volatile organic compounds

Table 7-4. Solid Waste from Coal-Fired Alternative.

Parameter	Calculation	Result
Annual SO_x generated[a]	$\frac{6{,}884{,}077\ \text{ton coal}}{\text{yr}} \times \frac{1.01 \times 38\ \text{lb}}{100\ \text{ton coal}} \times \frac{\text{ton}}{2{,}000\ \text{lb}}$	132,105 tons of SO_x per year
Annual SO_x removed	$\frac{138{,}989\ \text{ton } SO_2}{\text{yr}} \times (95/100)$	125,500 tons of SO_x per year
Annual ash generated	$\frac{6{,}884{,}077\ \text{ton coal}}{\text{yr}} \times \frac{6.9\ \text{ton ash}}{100\ \text{ton coal}} \times (99.9/100)$	474,526 tons of ash per year
Annual lime consumption[b]	$\frac{132{,}105\ \text{ton } SO_2}{\text{yr}} \times \frac{56.1\ \text{ton CaO}}{64.1\ \text{ton } SO_2}$	115,618 tons of CaO per year
Calcium sulfate[c]	$\frac{125{,}500\ \text{ton } SO_2}{\text{yr}} \times \frac{172\ \text{ton } CaSO_4 \bullet 2H_2O}{64.1\ \text{ton } SO_2}$	337,088 tons of $CaSO_4 \bullet 2H_2O$ per year
Annual scrubber waste[d]	$\frac{115{,}618\ \text{ton CaO}}{\text{yr}} \times \frac{(100-95)}{100} + 337{,}088\ \text{ton } CaSO_4 \bullet 2H_2O$	342,869 tons of scrubber waste per year
Total volume of scrubber waste[e]	$\frac{342{,}869\ \text{ton}}{\text{yr}} \times 40\ \text{yr} \times \frac{2{,}000\ \text{lb}}{\text{ton}} \times \frac{\text{ft}^3}{144.8\ \text{lb}}$	189,472,402 ft^3 of scrubber waste
Total volume of ash disposed onsite[f g]	$\frac{474{,}526\ \text{ton}}{\text{yr}} \times \frac{100-87}{100} \times 40\ \text{yr} \times \frac{2{,}000\ \text{lb}}{\text{ton}} \times \frac{\text{ft}^3}{100\ \text{lb}}$	49,350,737 ft^3 of ash
Total volume of solid waste disposed onsite	189,472,402 ft^3 + 49,350,737 ft^3	238,823,139 ft^3 of solid waste
Waste pile area (acres)	$\frac{238{,}823{,}139\ \text{ft}^3}{30\ \text{ft}} \times \frac{\text{acre}}{43{,}560\ \text{ft}^2}$	183 acres of solid waste
Waste pile area (ft × ft square)	$\sqrt{(238{,}823{,}139\ \text{ft}^3/30\text{ft})}$	2,821 feet by 2,821 feet of solid waste

a. Calculations assume 100 percent combustion of coal. Some sulfur remains in ash, resulting in overestimation of SO_x emissions
b. Lime consumption is based on total SO_2 generated.
c. Calcium sulfate generation is based on total SO_2 removed
d. Total scrubber waste includes scrubbing media carryover.
e. Density of $CaSO_4 \bullet 2H_2O$ is 144.8 lb/ft^3.
f. Density of coal bottom ash is 100 lb/ft^3 (FHA 2000).
g Assumed 87 percent of ash is recycled

S = sulfur
SO_2 = sulfur dioxide
SO_x = sulfur oxides
CaO = calcium oxide (lime)
$CaSO_4 \bullet 2H_2O$ = calcium sulfate dihydrate

Table 7-5. Air Emissions from Gas-Fired Alternative.

Parameter	Calculation	Result
Annual gas consumption	$3\,\text{unit} \times \frac{572\,\text{MW}}{\text{unit}} \times \frac{6{,}120\,\text{Btu}}{\text{kW} \times \text{hr}} \times \frac{1{,}000\,\text{kW}}{\text{MW}} \times 0.85 \times \frac{\text{ft}^3}{1{,}021\,\text{Btu}} \times \frac{24\,\text{hr}}{\text{day}} \times \frac{365\,\text{day}}{\text{yr}}$	76,588,928,815 ft^3 per year
Annual Btu input	$\frac{76{,}588{,}928{,}815\ \text{ft}^3}{\text{yr}} \times \frac{1{,}021\,\text{Btu}}{\text{ft}^3} \times \frac{\text{MM Btu}}{10^6\,\text{Btu}}$	78,197,296 MMBtu per year
SO_x[a]	$\frac{0.0034\,\text{lb}}{\text{MM Btu}} \times \frac{\text{ton}}{2{,}000\,\text{lb}} \times \frac{78{,}197{,}296\,\text{MMBtu}}{\text{yr}}$	133 tons SO_x per year
NO_x[b]	$\frac{0.0109\,\text{lb}}{\text{MM Btu}} \times \frac{\text{ton}}{2{,}000\,\text{lb}} \times \frac{78{,}197{,}296\ \text{MMBtu}}{\text{yr}}$	426 tons NO_x per year
CO[b]	$\frac{0.0023\,\text{lb}}{\text{MMBtu}} \times \frac{\text{ton}}{2{,}000\,\text{lb}} \times \frac{78{,}197{,}296\ \text{MMBtu}}{\text{yr}}$	88 tons CO per year
PM[a]	$\frac{0.0019\,\text{lb}}{\text{MMBtu}} \times \frac{\text{ton}}{2{,}000\,\text{lb}} \times \frac{78{,}197{,}296\ \text{MMBtu}}{\text{yr}}$	74 tons filterable PM per year
PM_{10}[a]	$\frac{74\,\text{tons TSP}}{\text{yr}}$	74 tons filterable PM_{10} per year
VOC[a]	$\frac{0.0021\,\text{lb}}{\text{MMBtu}} \times \frac{\text{ton}}{2{,}000\,\text{lb}} \times \frac{78{,}197{,}296\,\text{MMBtu}}{\text{yr}}$	82 tons VOC per year

a EPA 2000a.
b EPA 2000b.
Btu = British thermal units
CO = carbon monoxide
MM = million
NO_x = oxides of nitrogen
PM = particulate matter
PM_{10} = particulates having diameter less than 10 microns
SO_x = sulfur oxides
VOC = volatile organic compounds

7.3 References

Note to reader: Some web pages cited in this document are no longer available, or are no longer available through the original URL addresses. Hard copies of all cited web pages are available in EGC files. Some sites, for example the census data, cannot be accessed through their URLs. The only way to access these pages is to follow queries on previous web pages. The complete URLs used by EGC have been given for these pages, even though they may not be directly accessible.

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Chapter 8

Comparison of Environmental Impacts of License Renewal with the Alternatives

NRC

"To the extent practicable, the environmental impacts of the proposal and the alternatives should be presented in comparative form..."
10 CFR 51.45(b)(3) as adopted by 51.53(c)(2)

8.1 Discussion

Chapter 4 analyzes environmental impacts of DNPS license renewal and Chapter 7 analyzes impacts from license renewal alternatives. Accordingly, Table 8-1 summarizes environmental impacts of the proposed action (license renewal) and the alternatives, so the reader can compare them. The environmental impacts compared in Table 8-1 are those that are either Category 2 issues for the proposed action, license renewal, or are issues that the *Generic Environmental Impact Statement* (GEIS) (NRC 1996) identified as major considerations in an alternatives analysis. For example, although NRC concluded that air quality impacts from the proposed action would be small (Category 1), the GEIS identified major human health concerns associated with air emissions from alternatives (Section 7.2.2). Therefore, Table 8-1 compares air impacts among the proposed action and the alternatives. Table 8-2 is a more detailed comparison of the alternatives.

Table 8-1. Impacts Comparison Summary.

Impact Category	Proposed Action (License Renewal)	Base (Decommissioning)	No-Action Alternative		
			With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
Land Use	SMALL	SMALL	SMALL	SMALL	MODERATE
Water Quality	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE
Air Quality	SMALL	SMALL	MODERATE	MODERATE	SMALL to MODERATE
Ecological Resources	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE
Threatened or Endangered Species	SMALL	SMALL	SMALL	SMALL	SMALL
Human Health	SMALL	SMALL	MODERATE	SMALL	SMALL to MODERATE
Socioeconomics	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE
Waste Management	SMALL	SMALL	MODERATE	SMALL	SMALL to MODERATE
Aesthetics	SMALL	SMALL	SMALL	SMALL	SMALL to MODERATE
Cultural Resources	SMALL	SMALL	SMALL	SMALL	SMALL

SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. MODERATE - Environmental effects are sufficient to alter noticeably, but not to destabilize, any important attribute of the resource. 10 CFR 51, Subpart A, Appendix B, Table B-1, Footnote 3

Table 8-2. Impacts Comparison Detail.

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
	Alternative Descriptions			
DNPS license renewal for 20 years, followed by decommissioning	Decommissioning following expiration of current DNPS license. Adopting the GEIS description by reference (NRC 1996, Section 7.1) as comparable to DNPS decommissioning	New construction at the DNPS site.	New construction at the DNPS site.	Would involve construction of new generation capacity in the state Adopting by reference GEIS description of alternate technologies (Section 7.2.1.5)
		Use existing switchyard and transmission lines	Use existing switchyard and transmission lines.	
		Upgrade existing rail spur.	Construct 2 miles of gas pipeline along existing rights-of-way	Construct up to 200 miles of transmission lines
		Three 550-MW tangentially-fired, dry bottom units; capacity factor 0 85	Three 550-MW units; each consisting of two 184-MW combustion turbines and a 182-MW heat recovery boiler, capacity factor 0 85	
		Existing DNPS cooling water system	Existing DNPS cooling water system	
		Pulverized bituminous coal, 9,648 BTU/pound; 10,200 BTU/kWh; 6 9% ash; 1.01% sulfur, 10 pound/ton nitrogen oxides; 6,884,077 tons coal/yr	Natural gas, 1,021 BTU/ft^3, 6,120 BTU/kWh; 0 0034 lb sulfur/MMBtu, 0 0109 lb NO_x/MMBTU, 76,588,928,815 ft^3 gas/yr	
		Low NO_x burners, overfire air and selective catalytic reduction (95% NO_x reduction efficiency).	Selective catalytic reduction with steam/water injection	

Table 8-2. Impacts Comparison Detail (continued).

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
		Wet scrubber – lime desulfurization system (95% SO_x removal efficiency); 116,000 tons limestone/yr Fabric filters (99 9% particulate removal efficiency)		
872 permanent employees		250 workers (Section 7.2.2.1)	25-40 workers (Section 7 2.2.2)	
Land Use Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2)	SMALL – Not an impact evaluated by GEIS (NRC 1996)	SMALL – Construction at DNPS would be in previously disturbed areas The plant would upgrade existing rail spur and use existing transportation corridors. Twenty years of ash and scrubber waste disposal would require 92 acres and construction of the power block and coal storage areas would impact 300 acres. (Section 7 2.2 1)	SMALL – 110 acres for facility at DNPS location, pipeline could be routed along existing rights-of-way and would require an additional 36-40 acres for easement (Section 7 2.2.2)	MODERATE – most transmission facilities could be constructed along existing transmission corridors (Section 7.2.2.3) Adopting by reference GEIS description of land use impacts from alternate technologies (NRC 1996)

Table 8-2. Impacts Comparison Detail (continued).

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
Water Quality Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2).	SMALL – Adopting by reference Category 1 issue finding (Table 4-2).	SMALL – Construction impacts minimized by use of best management practices Operational impacts minimized by use of existing cooling water system (Section 7.2 2.1).	SMALL – Reduced cooling water demands, inherent in combined-cycle design (Section 7 2 2.2) Construction of pipeline could cause temporary erosion and sedimentation in streams crossed by right of way (Section 7 2 2.2)	SMALL to MODERATE – Adopting by reference GEIS description of water quality impacts from alternate technologies (NRC 1996)
Air Quality Impacts				
SMALL – Adopting by reference Category 1 issue finding (Table 4-2).	SMALL – Adopting by reference Category 1 issue findings (Table 4-2)	MODERATE – 6,605 tons SO_x/yr 1,721 tons NO_x/yr 1,721 tons CO/yr 238 tons TSP/yr 55 tons PM_{10}/yr 207 tons VOC/yr (Section 7.2.2.1)	MODERATE – 133 tons SO_x/yr 426 tons NO_x/yr 88 tons CO/yr 74 tons PM_{10}/yr[a] 82 tons VOC/yr (Section 7 2.2 2)	SMALL to MODERATE – Adopting by reference GEIS description of air quality impacts from alternate technologies (NRC 1996)
Ecological Resource Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2, Issues 15- 24, 28-30, 45-48). DNPS holds a current NPDES permit, which constitutes compliance with Clean Water Act Section 316(b) (Section 4 2, Issue 25; Section 4 3) and 316(a) (Section 4.4)	SMALL – Adopting by reference Category 1 issue finding (Table 4-2)	SMALL – Construction of the power block and coal storage areas and 20 years of ash/sludge disposal would impact approximately 392 acres of terrestrial habitat, displacing various species. (Section 7.2 2.1)	SMALL – Construction of power block and pipeline would impact up to 150 acres of terrestrial habitat, displacing various species (Section 7.2.2.2)	SMALL to MODERATE – Adopting by reference GEIS description of ecological resource impacts from alternate technologies (NRC 1996)

Table 8-2. Impacts Comparison Detail (continued).

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
Threatened or Endangered Species Impacts				
SMALL – No federally listed resident threatened or endangered species are known to occur in the vicinity of the site or along transmission corridors (Section 4.10).	SMALL – Not an impact evaluated by GEIS (NRC 1996)	SMALL – Construction would occur at the DNPS site, which has no federally listed resident threatened or endangered species.	SMALL – Construction would occur at the DNPS site, which has no federally listed resident threatened or endangered species.	SMALL – Federal and state laws prohibit destroying or adversely affecting protected species and their habitats
Human Health Impacts				
SMALL – Adopting by reference Category 1 issues (Table 4-2). Risk from microbiological organisms minimal due to thermal characteristics at the discharge and lack of innoculant (Section 4.12). Risk due to transmission-line-induced currents minimal due to conformance with consensus code (Section 4.13)	SMALL – Adopting by reference Category 1 issue finding (Table 4-2)	MODERATE – Adopting by reference GEIS conclusion that risks such as cancer and emphysema from emissions are likely (NRC 1996)	SMALL – Adopting by reference GEIS conclusion that some risk of cancer and emphysema exists from emissions (NRC 1996)	SMALL to MODERATE – Adopting by reference GEIS description of human health impacts from alternate technologies (NRC 1996)

Table 8-2. Impacts Comparison Detail (continued).

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
Socioeconomic Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2). Location in high population area without growth controls minimizes potential for housing impacts. (Section 4.14). Plant contribution to county tax base is significant, and continued plant operation would benefit county (Section 4.17.2). Capacity of public water supply and transportation infrastructure minimizes potential for related impacts (Section 4.15 and Section 4.18,)	SMALL – Adopting by reference Category 1 issue finding (Table 4-2)	SMALL – Reduction in permanent work force at DNPS to 250 workers would be mitigated by proximity to Chicago (Section 7 2 2.1)	SMALL – Reduction in permanent work force at DNPS to 25-40 workers would be mitigated by proximity to Chicago (Section 7 2 2 2)	SMALL to MODERATE – Adopting by reference GEIS description of socioeconomic impacts from alternate technologies (NRC 1996)
Waste Management Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2)	SMALL – Adopting by reference Category 1 issue finding (Table 4-2)	MODERATE – 62,000 tons of coal ash per year and 343,000 tons of scrubber sludge per year would require 92 acres over the 20-year license renewal term. (Section 7.2.2.1)	SMALL – Almost no waste generation (Section 7.2.2.2)	SMALL to MODERATE – Adopting by reference GEIS description of waste management impacts from alternate technologies (NRC 1996)
Aesthetic Impacts				
SMALL – Adopting by reference Category 1 issue findings (Table 4-2)	SMALL – Not an impact evaluated by GEIS (NRC 1996)	SMALL – Visual impacts would be consistent with the industrial nature of the site (Section 7.2.2.1)	SMALL – Visual impacts would be consistent with the industrial nature of the site (Section 7.2 2 1)	SMALL to MODERATE – Adopting by reference GEIS description of aesthetic impacts from alternate technologies (NRC 1996)

Table 8-2. Impacts Comparison Detail (continued).

Proposed Action (License Renewal)	No Action Alternative			
	Base (Decommissioning)	With Coal-Fired Generation	With Gas-Fired Generation	With Purchased Power
Cultural Resource Impacts				
SMALL – SHPO consultation minimizes potential for impact (Section 4.19)	SMALL – Not an impact evaluated by GEIS (NRC 1996)	SMALL – Impacts to cultural resources would be unlikely due to developed nature of the site (Section 7 2 2.1)	SMALL – Impacts would be small due to developed nature of the site and use of existing pipeline/ transmission rights-of-way (Section 7 2 2.2)	SMALL – Adopting by reference GEIS description of cultural resource impacts from alternate technologies (NRC 1996)

SMALL - Environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource. MODERATE – Environmental effects are sufficient to alter noticeably, but not to destabilize, any important attribute of the resource. 10 CFR 51, Subpart A, Appendix B, Table B-1, Footnote 3.

BTU = British thermal unit
ft^3 = cubic foot
gal = gallon
GEIS = Generic Environmental Impact Statement (NRC 1996)
kW-h = kilowatt-hour
lb = pound
MM = million
All TSP for gas-fired alternative is PM_{10}.

MW = megawatt
NO_x = nitrogen oxide
PM_{10} = particulates having diameter less than 10 microns
SHPO = State Historic Preservation Officer
SO_x = oxides of sulfur
TSP = total suspended particulates
yr = year

8.2 References

NRC (U.S. Nuclear Regulatory Commission), 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), Volumes 1 and 2, NUREG-1437, Washington, DC, May.

Chapter 9

Status of Compliance

9.1 Proposed Action

NRC

"The environmental report shall list all federal permits, licenses, approvals and other entitlements which must be obtained in connection with the proposed action and shall describe the status of compliance with these requirements. The environmental report shall also include a discussion of the status of compliance with applicable environmental quality standards and requirements including, but not limited to, applicable zoning and land-use regulations, and thermal and other water pollution limitations or requirements which have been imposed by Federal, State, regional, and local agencies having responsibility for environmental protection." 10 CFR 51.45(d), as adopted by 10 CFR 51.53(c)(2)

9.1.1 GENERAL

Table 9-1 lists environmental authorizations that EGC has obtained for current DNPS operations. In this context, EGC uses "authorizations" to include any permits, licenses, approvals, or other entitlements. EGC will continue to renew these authorizations during the current license period and through the NRC license renewal period. Based on the new and significant information identification process described in Chapter 5, EGC concludes that DNPS Units 2 and 3 are in compliance with applicable environmental standards and requirements.

Table 9-2 lists additional environmental authorizations and consultations related to NRC renewal of the DNPS licenses to operate. As indicated, EGC anticipates needing relatively few such authorizations and consultations. Sections 9.1.2 through 9.1.5 discuss some of these items in more detail.

9.1.2 THREATENED OR ENDANGERED SPECIES

Section 7 of the Endangered Species Act (16 USC 1531 et seq.) requires federal agencies to ensure that agency action is not likely to jeopardize any species that is listed or proposed for listing as endangered or threatened. Depending on the action involved, the Act requires consultation with the U.S. Fish and Wildlife Service (FWS) regarding effects on non-marine species, the National Marine Fisheries Service (NMFS) for marine species, or both. FWS and NMFS have issued joint procedural regulations at 50 CFR 402, Subpart B, that address consultation, and FWS maintains the joint list of threatened and endangered species at 50 CFR 17.

Although not required of an applicant by federal law or NRC regulation, EGC invited comment from federal and state agencies regarding potential effects that DNPS license renewal might have. Appendix C

includes copies of EGC correspondence with FWS and the Illinois Department of Natural Resources. EGC did not consult with NMFS because species under the auspices of NMFS are not known to be in the DNPS vicinity.

9.1.3 COASTAL ZONE MANAGEMENT PROGRAM COMPLIANCE

The Federal Coastal Zone Management Act (16 USC 1451 et seq.) imposes requirements on applicants for a federal license to conduct an activity that could affect a state's coastal zone (NRC 2001). The Act requires the applicant to certify to the licensing agency that the proposed activity would be consistent with the state's federally approved coastal zone management program [16 USC 1456(c)(3)(A)]. The National Oceanic and Atmospheric Administration has promulgated implementing regulations that indicate that the requirement is applicable to renewal of federal licenses for activities not previously reviewed by the state [15 CFR 930.51(b)(1)]. The regulation requires that the license applicant provide its certification to the federal licensing agency and a copy to the applicable state agency [15 CFR 930.57 (a)].

Participation in the National Oceanic and Atmospheric Administration Coastal Zone Management Program is voluntary; federal assistance is given to states willing to develop and implement a comprehensive coastal management program (DOE 1996). Illinois has opted to not participate in the program and therefore does not need to demonstrate compliance with the Coastal Zone Management Act (NOAA 2000). DNPS is located 50 miles downstream from Lake Michigan's coastal areas and over 1,000 miles upstream from the Gulf of Mexico. For these reasons, EGC believes that DNPS license renewal would affect no coastal resources and that the certification requirement is inapplicable to DNPS license renewal.

9.1.4 HISTORIC PRESERVATION

Section 106 of the National Historic Preservation Act (16 USC 470 et seq.) requires federal agencies having the authority to license any undertaking to, prior to issuing the license, take into account the effect of the undertaking on historic properties and to afford the Advisory Committee on Historic Preservation an opportunity to comment on the undertaking. Committee regulations provide for establishing an agreement with any State Historic Preservation Officer (SHPO) to substitute state review for Committee review (35 CFR 800.7). Although not required of an applicant by federal law or NRC regulation, EGC has chosen to invite comment by the Illinois SHPO. Appendix E includes copies of EGC correspondence with the SHPO regarding potential effects that DNPS license renewal might have on historic or cultural resources.

Based on the EGC submittal and other information, the Illinois SHPO concurred with EGC's conclusion that DNPS license renewal would not affect known historic or archaeological properties.

9.1.5 WATER QUALITY (401) CERTIFICATION

Federal Clean Water Act Section 401 requires applicants for a federal license to conduct an activity that might result in a discharge into navigable waters to provide the licensing agency a certification from the state that the discharge will comply with applicable Clean Water Act requirements (33 USC 1341). NRC has indicated in its *Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants* (GEIS) that issuance of a National Pollutant Discharge Elimination System (NPDES) permit implies certification by the

state (NRC 1996). EGC is applying to NRC for license renewal to continue DNPS operations. Appendix B contains the DNPS NPDES permit. Consistent with the GEIS, DNPS is providing evidence of its NPDES permit as evidence of state water quality (401) certification.

9.1.6 NOISE

In 1998, EGC used portable cooling towers to evaluate the feasibility of augmenting the cooling capability of the station's existing cooling pond system. The portable towers were noisy, and the site received complaints from local residents about the noise levels. EGC removed the portable towers and began phased construction of permanent towers. In June 1999, EGC completed construction of the first permanent 12-cell forced-draft cooling towers. EGC took noise measurements and found no exceedance of the Illinois noise limits. At the end of the summer of 2000, EGC installed two additional 18-cell forced-draft cooling towers. Mid-summer, measurements taken at the site boundary with all cooling towers (48) in operation, the noise exceeded the nighttime limits. In the fall of 2001, EGC constructed a 30-foot high earthen berm (see Figure 3-2) as a sound barrier to mitigate the noise. Measurements taken in the summer of 2002 identified that, although the noise was reduced, the noise levels still exceeded the nighttime limits. EGC has notified the state regarding EGC's plans for additional corrective action.

9.1.7 AIR QUALITY

Dresden operates boilers, diesels, and cooling towers under the requirements of a Federally Enforceable State Operating Permit (FESOP). Appendix G contains the complete FESOP permit for DNPS. Consistent with the GEIS, DNPS is providing evidence of its FESOP permit as evidence of state air quality certification.

9.2 Alternatives

NRC

"The discussion of alternatives in the report shall include a discussion of whether the alternatives will comply with such applicable environmental quality standards and requirements." 10 CFR 51.45(d), as required by 10 CFR 51.53(c)(2)

The coal, gas, and purchased power alternatives discussed in Section 7.2.1 probably could be constructed and operated to comply with all applicable environmental quality standards and requirements. EGC notes that increasingly stringent air quality protection requirements could make the construction of a large fossil-fueled power plant infeasible in many locations. EGC also notes that the U.S. Environmental Protection Agency has revised requirements that could affect the design of cooling water intake structures for new facilities (EPA 2001) and proposed requirements that may affect modifications at existing facilities (EPA 2002). These requirements may necessitate construction of additional cooling towers for the coal- and gas-fired alternatives.

Table 9-1. Environmental Authorizations for Current Operations.

Agency	Authority	Requirement	Number	Issue and Expiration Dates	Activity Covered
U.S. Nuclear Regulatory Commission	Atomic Energy Act (42 USC 2011, et seq.), 10 CFR 50.10	License to operate	DPR – 19 - Unit 2 DPR – 25 - Unit 3	Issued 12/22/69 (provisional) Expires 12/22/09 (Unit 2) Issued 07/02/74 Expires 01/12/11 (Unit 3)	Operation of Units 2 and 3
U.S. Department of Transportation	49 USC 5108	Registration	052901005030JL	Issued 05/30/01 Expires 06/30/04	Hazardous materials shipments
U.S. Environmental Protection Agency	Resource Conservation and Recovery Act (42 USC 6901 et seq.), 35 IAC 703	Part A permit	ID No. ILD000665489	Issued 12/19/00 Expiration not applicable	Storage of radioactive hazardous (i.e., mixed) waste
Illinois Environmental Protection Agency	Clean Water Act (33 USC Section 1251 et seq.), Illinois Environmental Protection Act (Title 35 IAC, Subtitle C, Ch. 1)	NPDES permit	IL0002224	Issued 10/06/00 Expires 10/31/05	Plant discharges to Illinois and Kankakee Rivers
Illinois Environmental Protection Agency	Federal Clean Air Act (42 USC 7661 et seq.), IRS Ch.111-1/2, Sec.1039	Federally enforceable state operating permit	App. # 73020783 ID# 063806AAC	Issued 04/19/01 Expires 04/19/06	Air emissions from boilers, generators, cooling towers, and fuel storage
Illinois Environmental Protection Agency	IRS Ch.111-1/2, Sec.1039	Open burning permit	App # B0012026 ID# 04030 Location ID# 063806AAC	Issued 02/16/02 Expires 02/16/03	Burning for fire fighter training

Table 9-1. Environmental Authorizations for Current Operations (continued).

Agency	Authority	Requirement	Number	Issue or Expiration Date	Activity Covered
Illinois Department of Nuclear Safety	32 IAC 609	Waste tracking permit	IL0101	Not Applicable	Shipments of low-level radioactive waste
Illinois Department of Nuclear Safety	32 IAC 330	Material license	IL-01500-01	Issued 04/05/01 Expires 02/28/05	Possession of radioactive material
Illinois Department of Natural Resources	Rivers, Lakes, and Streams Act (615 ILCS)	Class 1 dam permit	DS 2000233	Issued 12/19/00 Expires 12/19/02	Operation and maintenance of DNPS cooling pond dam and appurtenances
South Carolina Department of Health and Environmental Control	South Carolina Radioactive Waste Transportation and Disposal Act (S.C. Code of Laws 13-7-110 et seq.)	Radioactive waste transport permit	0016-12-02	Issued 12/07/01 Expires 12/31/02	Transportation of radioactive waste in South Carolina
Tennessee Department of Environment and Conservation	Tennessee Code Annotated 68-202-206	License to ship radioactive material	T-IL001-L02	Issued 12/04/01 Expires 12/31/02	Shipments of radioactive material to processing facility in Tennessee
Utah Department of Environmental Quality	Utah Code 19-3-106.4	Generator site access permit	0110 000 029	Issued 11/01/01 Expires 03/31/03	Shipments of radioactive waste to land disposal facility (Envirocore) in Utah

CFR - Code of Federal Regulations
USC - United States Code
IAC - Illinois Administrative Code
ILCS - Illinois Compiled Statutes
IRS - Illinois Revised Statutes
NPDES - National Pollutant Discharge Elimination System

Table 9-2. Environmental Authorizations for License Renewal[a].

Agency	Authority	Requirement	Remarks
U.S. Nuclear Regulatory Commission	Atomic Energy Act (42 USC 2011 et seq.)	License renewal	Environmental report submitted in support of license renewal application
U.S. Fish and Wildlife Service	Endangered Species Act, Section 7 (16 USC 1536)	Consultation	Requires federal agency issuing a license to consult with FWS (Appendix C)
Illinois Environmental Protection Agency	Clean Water Act, Section 401 (33 USC 1341)	Certification	Requires State certification that proposed action would comply with Clean Water Act standards
Illinois Historic Preservation Agency	National Historic Preservation Act, Section 106 (16 USC 470f)	Consultation	Requires federal agency issuing a license to consider cultural impacts and consult with State Historic Preservation Officer (Appendix E)

a No renewal-related requirements identified for local or other agencies.

9.3 References

Note to reader: Some web pages cited in this document are no longer available, or are no longer available through the original URL addresses. Hard copies of all cited web pages are available in EGC files. Some sites, for example the census data, cannot be accessed through their URLs. The only way to access these pages is to follow queries on previous web pages. The complete URLs used by EGC have been given for these pages, even though they may not be directly accessible.

DOE (U.S. Department of Energy), 1996. *OPEA Environmental Law Summary: Coastal Zone Management Act*, available at http://tis-nt.eh.doe.gov/oepa/law_sum/CZMA.htm, accessed March 12, 2001.

EPA (U.S. Environmental Protection Agency), 2001. "National Pollutant Discharge Elimination System – Regulations Addressing Cooling Water Intake Structures for New Facilities; Final Rule." *Federal Register*. Vol. 66, No. 243, December 18.

EPA (U.S. Environmental Protection Agency), 2002. "National Pollutant Discharge Elimination System – Proposed Regulations to Establish Requirements for Cooling Water Intake Structures at Phase II Existing Facilities; Proposed Rule." *Federal Register*. Vol. 67, No. 68, April 9.

NOAA (National Oceanic and Atmospheric Administration), 2000. *The Coastal Zone Management Program*, available at http://www.ocrm.nos.noaa.gov/czm/welcome.html, accessed March 15, 2001.

NRC (U.S. Nuclear Regulatory Commission), 1996. *Generic Environmental Impact Statement for License Renewal of Nuclear Plants* (GEIS), Volumes 1 and 2, NUREG-1437, Washington DC, May.

NRC (U.S. Nuclear Regulatory Commission), 2001. *Procedural Guidance for Preparing Environmental Assessments and Considering Environmental Issues*, NRR Office Instruction No. LIC-203. June 21.

Appendix A

NRC NEPA Issues for License Renewal of Nuclear Power Plants

EGC has prepared this environmental report in accordance with the requirements of NRC regulation 10 CFR 51.53. NRC included in the regulation a list of National Environmental Policy Act issues for license renewal of nuclear power plants. Table A-1 lists these 92 issues and identifies the section in which EGC addressed each issue in the environmental report. For expediency, EGC has assigned a number to each issue and uses the issue numbers throughout the environmental report.

Table A-1. Dresden Nuclear Power Station Environmental Report Cross-Reference of License Renewal NEPA Issues[a].

Issue		Category	Section of this Environmental Report
1.	Impacts of refurbishment on surface water quality	1	4.0
2.	Impacts of refurbishment on surface water use	1	4.0
3.	Altered current patterns at intake and discharge structures	1	4.0
4.	Altered salinity gradients	1	4.0
5.	Altered thermal stratification of lakes	1	4.0
6.	Temperature effects on sediment transport capacity	1	4.0
7.	Scouring caused by discharged cooling water	1	4.0
8.	Eutrophication	1	4.0
9.	Discharge of chlorine or other biocides	1	4.0
10.	Discharge of sanitary wastes and minor chemical spills	1	4.0
11.	Discharge of other metals in waste water	1	4.0
12.	Water use conflicts (plants with once-through cooling systems)	1	4.0
13.	Water use conflicts (plants with cooling ponds or cooling towers using make-up water from a small river with low flow)	2	4.1
14.	Refurbishment impacts to aquatic resources	1	4.0
15.	Accumulation of contaminants in sediments or biota	1	4.0
16.	Entrainment of phytoplankton and zooplankton	1	4.0
17.	Cold shock	1	4.0
18.	Thermal plume barrier to migrating fish	1	4.0
19.	Distribution of aquatic organisms	1	4 0
20.	Premature emergence of aquatic insects	1	4.0
21.	Gas supersaturation (gas bubble disease)	1	4.0
22.	Low dissolved oxygen in the discharge	1	4.0
23.	Losses from predation, parasitism, and disease among organisms exposed to sublethal stresses	1	4.0
24.	Stimulation of nuisance organisms (e.g., shipworms)	1	4.0
25.	Entrainment of fish and shellfish in early life stages for plants with once-through and cooling pond heat dissipation systems	2	4.2
26.	Impingement of fish and shellfish for plants with once-through and cooling pond heat dissipation systems	2	4.3
27.	Heat shock for plants with once-through and cooling pond heat dissipation systems	2	4.4

Table A-1. Dresden Nuclear Power Station Environmental Report Cross-Reference of License Renewal NEPA Issues[a] (continued).

Issue		Category	Section of this Environmental Report
28.	Entrainment of fish and shellfish in early life stages for plants with cooling-tower-based heat dissipation systems	1	4.0
29.	Impingement of fish and shellfish for plants with cooling-tower-based heat dissipation systems	1	4.0
30.	Heat shock for plants with cooling-tower-based heat dissipation systems	1	4.0
31.	Impacts of refurbishment on groundwater use and quality	1	4.0
32	Groundwater use conflicts (potable and service water; plants that use < 100 gpm)	1	4.0
33.	Groundwater use conflicts (potable, service water, and dewatering; plants that use > 100 gpm)	2	4.5
34.	Groundwater use conflicts (plants using cooling towers withdrawing make-up water from a small river)	2	4.6
35.	Groundwater use conflicts (Ranney wells)	2	4.7
36.	Groundwater quality degradation (Ranney wells)	1	4.0
37.	Groundwater quality degradation (saltwater intrusion)	1	4.0
38.	Groundwater quality degradation (cooling ponds in salt marshes)	1	4.0
39.	Groundwater quality degradation (cooling ponds at inland sites)	2	4.8
40.	Refurbishment impacts to terrestrial resources	2	4.9
41.	Cooling tower impacts on crops and ornamental vegetation	1	4.0
42.	Cooling tower impacts on native plants	1	4.0
43.	Bird collisions with cooling towers	1	4.0
44	Cooling pond impacts on terrestrial resources	1	4.0
45.	Power line right-of-way management (cutting and herbicide application)	1	4.0
46.	Bird collisions with power lines	1	4.0
47.	Impacts of electromagnetic fields on flora and fauna (plants, agricultural crops, honeybees, wildlife, livestock)	1	4.0
48.	Floodplains and wetlands on power line right-of-way	1	4.0
49.	Threatened or endangered species	2	4.10
50.	Air quality during refurbishment (non-attainment and maintenance areas)	2	4.11
51.	Air quality effects of transmission lines	1	4.0
52.	Onsite land use	1	4.0
53.	Power line right-of-way land use impacts	1	4.0
54.	Radiation exposures to the public during refurbishment	1	4.0
55.	Occupational radiation exposures during refurbishment	1	4.0

Table A-1. Dresden Nuclear Power Station Environmental Report Cross-Reference of License Renewal NEPA Issues[a] (continued).

Issue		Category	Section of this Environmental Report
56.	Microbiological organisms (occupational health)	1	4.0
57.	Microbiological organisms (public health) (plants using lakes or canals, or cooling towers or cooling ponds that discharge to a small river)	2	4.12
58.	Noise	1	4 0
59.	Electromagnetic fields, acute effects	2	4.13
60.	Electromagnetic fields, chronic effects	NA[b]	4.0
61.	Radiation exposures to public (license renewal term)	1	4.0
62.	Occupational radiation exposures (license renewal term)	1	4.0
63.	Housing impacts	2	4.14
64.	Public services: public safety, social services, and tourism and recreation	1	4.0
65.	Public services: public utilities	2	4.15
66.	Public services: education (refurbishment)	2	4.16
67.	Public services: education (license renewal term)	1	4.0
68.	Offsite land use (refurbishment)	2	4.17.1
69.	Offsite land use (license renewal term)	2	4.17.2
70.	Public services: transportation	2	4.18
71.	Historic and archaeological resources	2	4.19
72.	Aesthetic impacts (refurbishment)	1	4.0
73.	Aesthetic impacts (license renewal term)	1	4.0
74.	Aesthetic impacts of transmission lines (license renewal term)	1	4.0
75.	Design basis accidents	1	4.0
76.	Severe accidents	2	4 20
77.	Offsite radiological impacts (individual effects from other than the disposal of spent fuel and high-level waste)	1	4.0
78.	Offsite radiological impacts (collective effects)	1	4.0
79.	Offsite radiological impacts (spent fuel and high-level waste disposal)	1	4.0
80.	Nonradiological impacts of the uranium fuel cycle	1	4.0
81.	Low-level waste storage and disposal	1	4 0
82.	Mixed waste storage and disposal	1	4.0
83.	Onsite spent fuel	1	4.0
84.	Nonradiological waste	1	4.0
85.	Transportation	1	4.0
86.	Radiation doses (decommissioning)	1	4.0
87.	Waste management (decommissioning)	1	4.0

Table A-1. Dresden Nuclear Power Station Environmental Report Cross-Reference of License Renewal NEPA Issues[a] (continued).

Issue	Category	Section of this Environmental Report
88. Air quality (decommissioning)	1	4.0
89. Water quality (decommissioning)	1	4.0
90. Ecological resources (decommissioning)	1	4.0
91. Socioeconomic impacts (decommissioning)	1	4.0
92. Environmental justice	NA[b]	2.6.2

a Source: 10 CFR 51, Subpart A, Appendix A, Table B-1 (Issue numbers added to facilitate discussion.)
b Not applicable Regulation does not categorize this issue
NEPA = National Environmental Policy Act

Appendix B

NPDES Permit

The National Pollutant Discharge Elimination System (NPDES) permit for the Dresden Nuclear Power Station is approximately 100 pages long. Appendix B contains a copy of the permit cover page and pages pertinent to discussion in the Applicant's Environmental Report; Operating License Renewal State; Dresden Nuclear Power Station Units 2 and 3.

NPDES Permit No. IL0002224

Illinois Environmental Protection Agency

Division of Water Pollution Control

1021 North Grand Avenue East

Post Office Box 19276

Springfield, Illinois 62794-9276

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Reissued (NPDES) Permit

Expiration Date: October 31, 2005

Issue Date: October 6, 2000
Effective Date: November 1, 2000

Name and Address of Permittee:

Commonwealth Edison Company
Environmental Services Department
Post Office Box 767
Chicago, Illinois 60690

Facility Name and Address:

Commonwealth Edison Company
Dresden Power Station
6500 North Dresden Road
Morris, Illinois 60450

Discharge Number and Name:	Receiving Waters:
001 Unit 1 House Service Water	Illinois River
A01 Unit 1 Intake Screen Backwash	Illinois River
002 Cooling Pond Blowdown	Illinois River
A02 Unit 2/3 Intake Screen Backwash	Illinois River
B02 Wastewater Treatment System Effluent	Illinois River
C02 Rad waste Treatment System Effluent	Illinois River
D02 Demineralizer Regenerate Waste	Illinois River
E02 NW Material Access Runoff	Illinois River
003 Sewage Treatment Plant Effluent	Kankakee River
004 Cooling Pond Discharge	Kankakee River
005 South East Area Runoff	Kankakee River
006 North East Area Runoff	Kankakee River

In compliance with the provisions of the Illinois Environmental Protection Act, Title 35 of Ill Adm. Code, Subtitle C and/or Subtitle D, Chapter 1, and the Clean Water Act (CWA), the above-named permittee is hereby authorized to discharge at the above location to the above-named receiving stream in accordance with the standard conditions and attachments herein.

Permittee is not authorized to discharge after the above expiration date. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit the proper application as required by the Illinois Environmental Protection Agency (IEPA) not later than 180 days prior to the expiration date.

Thomas G. McSwiggin, P.E.
Manager, Permit Section
Division of Water Pollution Control

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Page 2

NPDES Permit No. IL0002224

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 001 - Unit 1 House Service Water**

This discharge consists of:	Approximate Flow
1. Equipment Cooling Water	4.3 MGD
2. Unit 1 Area Stormwater Runoff	Intermittent
a. East Area Roof Runoff	
b. Unit 1 Yard Area Runoff	
3. Unit 1 Intake Screen Backwash	Intermittent
4. North East Area Runoff*	

Flow (MGD)			Daily	Continuous

*See Special Condition 11.
**See Special Condition 18.

Outfall: A01 - Intake Screen Backwash

There shall be no discharge of collected debris

Page 3

NPDES Permit No. IL0002224

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 002 - Cooling Pond Blowdown

This discharge consists of:	Approximate Flow
1. Unit 2/3 Condenser Cooling Water	
2. Demineralizer Regenerant Waste	0.034 MGD
3. Rad waste Treatment System Effluent	Intermittent
4. Wastewater Treatment System Effluent	0.021 MGD
5. Unit 2/3 House Service Water	86.4 MGD
6. Unit 2/3 House Service Water Strainer Backwash	0.001 MGD
7. Unit 2/3 Intake Screen Backwash	Intermittent
8. Unit 2 Auxiliary Boiler Area Oil/Water Separator	Intermittent
9. 138 KV Switchyard Oil/Water Separator***	Intermittent
10. 345 KV Switchyard Oil/Water Separator***	Intermittent

Flow (MGD)	See Special Condition 1		Daily	Continuous
pH	See Special Condition 2		1/Week	Grab
Temperature	See Special Condition 4		Daily	Continuous
Total Residual Chlorine/ Total Residual Oxidant**		0/2/0.05**	2/Month	Grab**

*Cooling pond blowdown flow during closed cycle: 72 MGD; during indirect open cycle operation: 1548 MGD
**See Special Condition 13.
***See Special Condition 18.

Page 4

NPDES Permit No. IL0002224

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): A01 - Unit 2/3 Intake Screen Backwash

There shall be no discharge of collected debris

Outfall(s): B02 - Wastewater Treatment System Effluent*

This discharge consists of: Approximate Flow: 0.021 MGD

1. Unit 1 Oil/Water Separator Effluent — Intermittent
   a. Unit 1 HPCI Building Floor Drains
   b. Unit 1 Main Power and Auxiliary Power Transformer Area Runoff
   c. Decontamination Area Runoff
2. Unit 2/3 Oil/Water Separator Effluent — Intermittent
   a. West Area Roof Runoff
   b. Station Floor Drains (Turbine building, Turbine Lube Oil Storage Area, Diesel Generator Room, Air Compressor Room)
   c. Unit 2/3 Area Yard Runoff
   d. Unit 2/3 Main Power and Auxiliary Power Transformer Area Runoff
3. Crib House Floor Drains — Intermittent

Flow (MGD)			Daily	Continuous
Total Suspended Solids	15	30	1/Week	24-Hour Composite
Oil and Grease	10	20	2/Month	Grab

*See Special Condition 14.

Page 5

NPDES Permit No IL0002224

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): C02 - Rad Waste Treatment System Effluent

This discharge consists of:	Approximate Flow
1. Equipment Drains in the Drywell, Reactor Building, Rad waste and Turbine Building	0.001 MGD
2. Unit 2/3 Decontamination System Drains	Intermittent
3. Floor Drains	0.001 MGD
4. Laboratory and Sample Drains	Intermittent
5. Unit 1 Heating Boiler Blowdown	Intermittent
6. Unit 2/3 Auxiliary Boiler Blowdown	Intermittent
7. Laundry Wastewater	Intermittent
8. Condenser Polisher Sonic Cleaning Waste	Intermittent

Flow (MGD)			Daily	Continuous
Total Suspended Solids	15	30	1/Week	Discharge Tank Composite
Oil and Grease	15	20	1/Week	Grab

Outfall(s): D02 - Demineralizer Regenerant Waste and Filter Backwash

Approximate Flow: 0.034 MGD

Flow (MGD)			Daily	Continuous
Total Suspended Solids	15	30	1/Month	8-Hour Composite

Outfall(s): E02 - NW Material Access Runoff*

*See Special Condition 18.

Page 8

NPDES Permit No. IL0002224

Effluent Limitations and Monitoring

PARAMETER	LOAD LIMITS lbs/day DAF (DMF) 30 DAY AVERAGE	LOAD LIMITS lbs/day DAF (DMF) DAILY MAXIMUM	CONCENTRATION LIMITS mg/l 30 DAY AVERAGE	CONCENTRATION LIMITS mg/l DAILY MAXIMUM	SAMPLE FREQUENCY	SAMPLE TYPE

1. From the effective date of this permit until the expiration date, the effluent of the following discharge(s) shall be monitored and limited at all times as follows:

Outfall(s): 003 - Sewage Treatment Plant

Approximate Flow: 0.03 MGD

Flow (MGD)	See Special Condition 1				Daily	Continuous
pH	See Special Condition 2				1/Week	Grab
BOD_5	7.78 (18.77)*	15.51 (37.53)*	30	60	1/Week	24-Hour Composite
Total Suspended Solids	7.76 (18.77)*	15.51 (37.53)*	30	60	1/Week	24-Hour Composite
Fecal Coliform**				400/100 mL	1/Week	Grab
Total Residual Chlorine**				0.75	1/Week	Grab

*Load Limits were computed based on a Design Average Flow of 0.031 MGD (Design Maximum Flow of 0.075 MGD). Load limits based on Design Maximum Flow (in parenthesis) shall apply only when flow exceeds Design Average Flow.

**See Special Condition 17.

Outfall(s): 004 - Cooling Pond Discharge*

Flow (MGD)		Daily When Discharging	Estimate
Temperature		*	*
Total Residual Chlorine/ Total Residual Oxidant**	0.2/0.05**	Once Per Discharge Event	Grab

*See Special Condition 10.
**See Special Condition 13.

Outfall(s): 005 South East Area Runoff*
006 North East Area Runoff**

*See Special Condition 18.
**See Special Conditions 11 and 18.

Page 7

NPDES Permit No. IL0002224

Special Conditions

SPECIAL CONDITION 1. Flow shall be reported as a monthly average and a daily maximum on the DMR form.

SPECIAL CONDITION 2. The pH shall be in the range 6 0 to 9 0 The monthly minimum and monthly maximum values shall be reported on the DMR form.

SPECIAL CONDITION 3. Samples taken in compliance with the effluent monitoring requirements shall be taken at a point representative of the discharge, but prior to entry into the receiving stream

SPECIAL CONDITION 4. Discharge of wastewater from this facility must not alone or in combination with other sources cause the receiving stream to violate the following thermal limitations at the edge of the mixing zone which is defined by Section 302.211, Illinois Administration Code, Title 35, Chapter 1, Subtitle C, as amended:

A. Maximum temperature rise above natural temperature must not exceed 5°F (2.8°C).

B. Water temperature at representative locations in the main river shall not exceed the maximum limits in the following table during more than one (1) percent of the hours in the 12-month period ending with any month. Moreover, at no time shall the water temperature at such locations exceed the maximum limits in the following table by more than 3°F (1.7°C). (Main river temperatures are temperatures of those portions of the river essentially similar to and following the same thermal regime as the temperatures of the main flow of the river.)

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
°F	60	60	60	90	90	90	90	90	90	90	90	60
°C	16	16	16	32	32	32	32	32	32	32	32	16

C. The permittee may discharge cooling pond blowdown using an indirect open cycle cooling mode from June 16 through September 30 in accordance with the following limitation in lieu of 35 Ill Adm Code 302.211(d) and 302.211(e) as written above in Special Condition 4A and 4B respectively: During the period June 15 through September 30, the temperature of the plant discharges shall not exceed 32.2°C (90°F) more than 10% of the time in the period and never will exceed 33.9°C (93°F).

D. The Dresden Station shall be operated closed cycle during the period October 1 to June 15. The station may be operated in accordance with the Unit 2/3 Variable Blowdown Plan (governed by the original July 8, 1977 Thermal Compliance Plan calculations) from June 1 to June 15, as deemed necessary by station management.

E. Compliance with the thermal limitations shall be determined by maintaining a continuous temperature and flow record for cooling pond blowdown to the Illinois River. If the variable blowdown plan will be used from June 1 to June 15, data acquisition and records for the parameters necessary to implement the plan shall be maintained.

F. Additional water temperature monitoring shall be continued as follows

1. A continuous water temperature record of water temperature at the Dresden Island Lock and Dam, and the Dresden Station intake shall be maintained during the period of June 15 through September 30.

2. Water temperature recorded at these locations shall be tabulated and submitted to the Agency, Industrial Unit, Division of Water Pollution Control by December 31, each year.

3. Permittee's failure to submit the temperature monitoring data from these locations due to equipment malfunction shall not be deemed a permit violation provided the permittee employs reasonable efforts to repair the malfunction. If the malfunction lasts more than 24 hours; a manual measurement shall be made at least once per day.

G. The station may bypass the cooling pond, that is operate open cycle, only during periods when both generating units have been taken out of service.

SPECIAL CONDITION 5. There shall be no discharge of polychlorinated biphenyl compounds.

SPECIAL CONDITION 6. The "Upset" defense provisions listed under 40 CFR 122.41(N) are hereby incorporated by reference.

Page 8

NPDES Permit No. IL0002224

Special Conditions

SPECIAL CONDITION 7. Commonwealth Edison Company has complied with 35 Ill. Adm. Code 302.211(f) and Section 316(a) of the Clean Water Act in demonstrating that the thermal discharge from its Dresden Nuclear Power Station has not caused and cannot be reasonably expected to cause significant ecological damage to receiving waters as approved by the Illinois Pollution Control Board in PCB Order 73-359 dated January 17, 1974 and PCB Order 79-134 dated July 9, 1981. Pursuant to 35 Ill. Adm. Code 302.211(g), no additional monitoring or modification is now being required for reissuance of this NPDEG Permit.

SPECIAL CONDITION 8. Pursuant to Section 316(b) of the Clean Water Act, a determination for the Dresden Nuclear Power Station has not been made. Data submitted by Commonwealth Edison Company pursuant to Section 316(b) of the CWA for the Dresden Nuclear Power Station has been reviewed by the Illinois Environmental Protection Agency and the review determination is: That where as additional intake monitoring is not being required at this time, further monitoring is not precluded if determined necessary at the time of any modification or reissuance of NPDES Permit No. IL0002224.

SPECIAL CONDITION 9. The permittee shall record monitoring results on Discharge Monitoring Report forms using one such form for each discharge each month. The completed Discharge Monitoring Report form shall be submitted monthly to IEPA, no later than the 15th of the following month, unless otherwise specified by the Agency, to the following address:

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

SPECIAL CONDITION 10. The permittee shall minimize make-up water requirements to the cooling pond system during cooling pond water diversion to the Kankakee River in order to minimize fish impingement losses. This should be accomplished by eliminating to the extent feasible normal closed cycle blowdown flows of 50,000 gpm to the Illinois River except during a discharge from the rad waste treatment system and/or other water conservation measures. Such measures and operations taken by the station to minimize make-up water requirements during diversion shall be documented and reported with monthly discharge monitoring reports.

a. Operating requirements

1. The siphon will be operated for only two runs during the winter, each run lasting no more than 14 days

2. Thermal monitoring at established transects and narrative observations will be recorded during operations in accordance with the siphon Operations Plan dated November, 1993 and a report of findings made available to this Agency in late spring.

3. The maximum amount of heat that will be placed in the Kankakee River shall be <0.5 billion BTUs per hour.

4. A fish barrier net must be in place around the siphon inlet before the siphon is operated, and must remain intact throughout the run.

SPECIAL CONDITION 11. The North East Area Runoff discharges to the Unit 1 intake canal. When the Unit 1 service water system is in use, the discharge will be drawn into the intake and eventually discharged at outfall 001. During those times when the Unit 1 service water system is out of service, this discharge will remain in the intake canal and eventually flow into the Kankakee River.

SPECIAL CONDITION 12. This permit may be modified to include appropriate final limitations, requirements, or conditions, which are consistent with applicable laws, regulations, or judicial orders. The Agency will public notice the permit modification.

SPECIAL CONDITION 13. The cooling pond blowdown shall be monitored twice per month for Total Residual Chlorine or Total Residual Oxidant concentration by grab sample, recording the date and time of sampling, the times and duration of the daily chlorine or bromine dosing periods plus the amount of each chemical applied per day. For purposes of reporting and determining compliance, the highest single instantaneous TRC/TRO concentration measured on any day will be regarded as the daily maximum concentration, and the monthly average shall be the average of all daily discharges.

Total Residual Chlorine may not be discharged from each unit's main cooling condensers for more than two hours in any one day, and is subject to a limit of 0.2 mg/L.

The use of bromine based biocides for micro invertebrate control, and regardless of duration, is subject to the discharge limit of 0.05 mg/L TRO (Total Residual Oxidant) measured as an instantaneous maximum.

Page 9

NPDES Permit No. IL0002224

Special Conditions

SPECIAL CONDITION 14. The Agency has determined that the effluent limitations in this permit constitute BAT/BCT for storm water which is treated in the existing treatment facilities for purposes of this permit reissuance, and no pollution prevention plan will be required for such storm water. In addition to the chemical specific monitoring required elsewhere in this permit, the permittee shall conduct an annual inspection of the facility site to identify areas contributing to a storm water discharge associated with industrial activity, and determine whether any facility modifications have occurred which result in previously-treated storm water discharges no longer receiving treatment. If any such discharges are identified the permittee shall request a modification of this permit within 30 days after the inspection Records of the annual inspection shall be retained by the permittee for the term of this permit and be made available to the Agency on request.

SPECIAL CONDITION 15. The responsibility for outfall 004 - Cooling Pond Discharge will be transferred to the Will County Emergency Management Agency upon issuance of a separate NPDES permit for operation of the Dresden Station siphon Ice Melt system. Upon issuance of a permit to Will County EMA, Commonwealth Edison shall submit a request to terminate the monitoring and reporting requirements associated with outfall 004, in writing to the Agency.

SPECIAL CONDITION 16. There shall be no discharge of complexed metal bearing wastestreams and associated rinses from chemical metal cleaning unless this permit has been modified to include the new discharge.

SPECIAL CONDITION 17. (Outfall 003) The daily maximum fecal coliform count shall not exceed 400 per 100 mL. Fecal Coliform limits for Outfall 003 are effective May through October. Sampling of Fecal Coliform concentrations are only required during this time period.

The Total Residual Chlorine limit of 0.75 mg/L is applicable at all times. If the permittee is chlorinating for any purpose during the months of November through April, sampling is required on a daily grab basis. Sampling frequency for the months of May through October shall be as indicated on page 6 of this permit.

SPECIAL CONDITION 18.

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

A. A storm water pollution prevention plan shall be developed by the permittee for the storm water associated with industrial activity at this facility. The plan shall identify potential sources of pollution which may be expected to affect the quality of storm water discharges associated with the industrial activity at the facility. In addition, the plan shall describe and ensure the implementation of practices which are to be used to reduce the pollutants in storm water discharges associated with industrial activity at the facility and to assure compliance with the terms and conditions of this permit.

B. The plan shall be completed within 180 days of the effective date of this permit. Plans shall provide for compliance with the terms of the plan within 365 days of the effective date of this permit. The owner or operator of the facility shall make a copy of the plan available to the Agency at any reasonable time upon request. [Note: If the plan has already been developed and implemented it shall be maintained in accordance with all requirements of this special condition]

C. The permittee may be notified by the Agency at any time that the plan does not meet the requirements of this condition. After such notification, the permittee shall make changes to the plan and shall submit a written certification that the requested changes have been made. Unless otherwise provided, the permittee shall have 30 days after such notification to make the changes.

D. The discharger shall amend the plan whenever there is a change in construction, operation, or maintenance which may affect the discharge of significant quantities of pollutants to the waters of the State or if a facility inspection required by paragraph G of this condition indicates that an amendment is needed. The plan should also be amended if the discharger is in violation of any conditions of this permit, or has not achieved the general objective of controlling pollutants in storm water discharges. Amendments to the plan shall be made within the shortest reasonable period of time, and shall be provided to the Agency for review upon request.

E The plan shall provide a description of potential sources which may be expected to add significant quantities of pollutants to storm water discharges, or which may result in non-storm water discharges from storm water outfalls at the facility. The plan shall include, at a minimum, the following items:

1. A topographic map extending one-quarter mile beyond the property boundaries of the facility, showing, the facility, surface water bodies, wells (including injection wells), seepage pits, infiltration ponds, and the discharge points where the facility's storm water discharges to a municipal storm drain system or other water body. The requirements of this paragraph may be included on the site map if appropriate

Page 10

NPDES Permit No IL0002224

Special Conditions

2. A site map showing:

   i. The storm water conveyance and discharge structures;

   ii. An outline of the storm water drainage areas for each storm water discharge point;

   iii. Paved areas and buildings;

   iv. Areas used for outdoor manufacturing, storage, or disposal of significant materials, including activities that generate significant quantities of dust or particulates.

   v. Location of existing storm water structural control measures (dikes, coverings, detention facilities, etc.);

   vi. Surface water locations and/or municipal storm drain locations

   vii. Areas of existing and potential soil erosion;

   viii. Vehicle service areas;

   ix. Material loading, unloading, and access areas.

3. A narrative description of the following:

   i. The nature of the industrial activities conducted at the site, including a description of significant materials that are treated, stored or disposed of in a manner to allow exposure to storm water;

   ii. Materials, equipment, and vehicle management practices employed to minimize contact of significant materials with storm water discharges;

   iii. Existing structural and non-structural control measures to reduce pollutants in storm water discharges;

   iv. Industrial storm water discharge treatment facilities.

   v. Methods of onsite storage and disposal of significant materials.

4. A list of the types of pollutants that have a reasonable potential to be present in storm water discharges in significant quantities.

5. An estimate of the size of the facility in acres or square feet, and the percent of the facility that has impervious areas such as pavement or buildings.

6. A summary of existing sampling data describing pollutants in storm water discharges.

F. The plan shall describe the storm water management controls which will be implemented by the facility. The appropriate controls shall reflect identified existing and potential sources of pollutants at the facility. The description of the storm water management controls shall include:

1. Storm Water Pollution Prevention Personnel - Identification by job titles of the individuals who are responsible for developing, implementing, and revising the plan.

2. Preventive Maintenance - Procedures for inspection and maintenance of storm water conveyance system devices such as oil/water separators, catch basins, etc., and inspection and testing of plant equipment and systems that could fail and result in discharges of pollutants to storm water.

3. Good Housekeeping - Good housekeeping requires the maintenance of clean, orderly facility areas that discharge storm water. Material handling areas shall be inspected and cleaned to reduce the potential for pollutants to enter the storm water conveyance system.

4. Spill Prevention and Response - Identification of areas where significant materials can spill into or otherwise enter the storm water conveyance systems and their accompanying drainage points. Specific material handling procedures, storage requirements, spill clean up equipment and procedures should be identified, as appropriate. Internal notification procedures for spills of significant materials should be established.

Page 11

NPDES Permit No. IL0002224

Special Conditions

5 Storm Water Management Practices - Storm water management practices are practices other than those which control the source of pollutants. They include measures such as installing oil and grit separators, diverting storm water into retention basins, etc. Based on assessment of the potential of various sources to contribute pollutants, measures to remove pollutants from storm water discharge shall be implemented. In developing the plan, the following management practices shall be considered:

i. Containment - Storage within berms or other secondary containment devices to prevent leaks and spills from entering storm water runoff;

ii. Oil & Grease Separation - Oil/water separators, booms, skimmers or other methods to minimize oil contaminated storm water discharges;

iii. Debris & Sediment Control - Screens, booms, sediment ponds or other methods to reduce debris and sediment in storm water discharges;

iv. Waste Chemical Disposal - Waste chemicals such as antifreeze, degreasers and used oils shall be recycled or disposed of in an approved manner and in a way which prevents them from entering storm water discharges.

v. Storm Water Diversion - Storm water diversion away from materials manufacturing, storage and other areas of potential storm water contamination;

vi. Covered Storage or Manufacturing Areas - Covered fueling operations, materials manufacturing and storage areas to prevent contact with storm water.

6 Sediment and Erosion Prevention - The plan shall identify areas which due to topography, activities, or other factors, have a high potential for significant soil erosion and describe measures to limit erosion.

7. Employee Training - Employee training programs shall inform personnel at all levels of responsibility of the components and goals of the storm water pollution control plan. Training should address topics such as spill response, good housekeeping and material management practices. The plan shall identify periodic dates for such training.

8. Inspection Procedures - Qualified plant personnel shall be identified to inspect designated equipment and plant areas. A tracking or follow-up procedure shall be used to ensure appropriate response has been taken in response to an inspection. Inspections and maintenance activities shall be documented and recorded.

G. The permittee shall conduct an annual facility inspection to verify that all elements of the plan, including the site map, potential pollutant sources, and structural and non-structural controls to reduce pollutants in industrial storm water discharges are accurate. Observations that require a response and the appropriate response to the observation shall be retained as part of the plan. Records documenting significant observations made during the site inspection shall be submitted to the Agency in accordance with the reporting requirements of this permit.

H. This plan should briefly describe the appropriate elements of other program requirements, including Spill Prevention Control and Countermeasures (SPCC) plans required under Section 311 of the CWA and the regulations promulgated thereunder, and Best Management Programs under 40 CFR 125.100.

I. The plan is considered a report that shall be available to the public under Section 308(b) of the CWA. The permittee may claim portions of the plan as confidential business information, including any portion describing facility security measures

J. The plan shall include the signature and title of the person responsible for preparation of the plan and include the date of initial preparation and each amendment thereto.

Construction Authorization

K. Authorization is hereby granted to construct treatment works and related equipment that may be required by the Storm Water Pollution Prevention developed pursuant to this permit.

This Authorization is issued subject to the following condition(s).

1. If any statement or representation is found to be incorrect, this authorization may be revoked and the permittee there upon waives all rights thereunder.

Page 12

NPDES Permit No. IL0002224

Special Conditions

2. The issuance of this authorization (a) does not release the permittee from any liability for damage to persons or property caused by or resulting from the installation, maintenance or operation of the proposed facilities; (b) does not take into consideration the structural stability of any units or part of this project; and (c) does not release the permittee from compliance with other applicable statutes of the State of Illinois, or other applicable local law, regulations or ordinances.

3. Plans and specifications of all treatment equipment being included as part of the stormwater management practice shall be included in the SWPPP.

4. Construction activities which result from treatment equipment installation, including cleaning, grading and excavation activities which result in the disturbance of five acres or more of land area, are not covered by this authorization. The permittee shall contact the IEPA regarding the required permit(s).

REPORTING

L. The facility shall submit an annual inspection report to the Illinois Environmental Protection Agency. The report shall include results of the annual facility inspection which is required by Part G of the Storm Water Pollution Prevention Plan of this permit. The report shall also include documentation of any event (spill, treatment unit malfunction, etc.) Which would require an inspection, results of the inspection, and any subsequent corrective maintenance activity.. The report shall be completed and signed by the authorized facility employee(s) who conducted the inspection(s).

M. The first report shall contain information gathered during the one year time period beginning with the effective date of coverage under this permit and shall be submitted no later than 60 days after this one year period has expired. Each subsequent report shall contain the previous year's information and shall be submitted no later than one year after the previous year's report was due.

N. Annual inspection reports shall be mailed to the following address:

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section
Annual Inspection Report
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

O. If the facility performs inspections more frequently than required by this permit, the results shall be included as additional information in the annual report.

Appendix C

Special-Status Species Correspondence

Table of Contents

Letter	Page
Jury (EGC) to Millar (U.S. Fish and Wildlife Service of Illinois), January 11, 2002	E.C-1
Millar (U.S. Fish and Wildlife Service of Illinois) to Jury (EGC), February 12, 2002	E.C-8
Jury (EGC) to Shank (Illinois Division of Natural Resources), February 22, 2002	E.C-9
Pietruszka (Illinois Department of Natural Resources) to Jury (EGC), July 8, 2002	E.C-15

Exelon Nuclear

Exelon Generation
4300 Winfield Road
Warrenville IL 60555

www.exeloncorp.com

RS-01-235

January 11, 2002

Ms. Jody Millar
Assistant Field Supervisor
U.S Fish and Wildlife Service
4469 48th Ave Ct.
Rock Island Field Office
Rock Island, IL 61201

Subject. Dresden Nuclear Power Station, Units 2 and 3, License Renewal Request for Information on Threatened or Endangered Species

Exelon Generation Company (EGC), LLC, (formerly Commonwealth Edison Company) is currently preparing an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses for Dresden Nuclear Power Station (DNPS), Units 2 and 3. The current operating licenses for Unit 2 and 3 expire in 2009 and 2011, respectively. The renewal term would be for an additional 20 years beyond the original license expiration date. As part of the license renewal process, the NRC requires license renewal applicants to "assess the impact of the proposed action on threatened or endangered species in accordance with the Endangered Species Act." The NRC will consult with your office under Section 7 of the Endangered Species Act. By contacting your office early in the application process, we hope to identify any potential issues that we may need to address or any information we should provide to your office to expedite the NRC's consultation

Exelon has operated DNPS and its associated transmission lines since 1970. As shown in Attachments A and B, DNPS is located in Goose Lake Township, Grundy County, Illinois, on the south shoreline of the Illinois River, at the confluence of the Des Plaines and Kankakee Rivers at river mile 272.4 The DNPS site is owned by EGC and consists of approximately 2,500 acres. The area within six miles of the site includes both Grundy and Will Counties in Illinois The local terrain is level to gently rolling, except for the Kankakee Bluffs just northeast of DNPS on the north bank of the Illinois River. The area around DNPS is largely rural, characterized by farmland, woodlands, and small residential communities. The Goose Lake Prairie State Natural Area is located approximately one mile southwest of DNPS and the Des Plaines Conservation Area is approximately two miles east of DNPS. As shown on Attachment C the 1,275-acre cooling pond is divided almost equally between Grundy and Will Counties

January 11, 2002
U S. Fish and Wildlife Service
Page 2

As shown in Attachments D and E, the current DNPS transmission line configuration is connected to the power grid through seven 345-kilovolt lines. The Electric Junction corridor contains two lines, running east from DNPS, and then turning north, crossing the Illinois River. The lines run for 31.1 miles and have a right-of-way ranging from 130 to 380 feet wide Two Goodings Grove lines cross the Kankakee River south of DNPS and then run northeast and terminate at the Elwood Substation The Goodings Grove corridor is 12.4 miles long, with a 250 feet wide right-of-way. Pontiac Mid-Point is a 43.3-mile line that runs in a southwesterly direction and terminates south of Pontiac, Illinois with a right-of-way width of 145 feet Powerton is a 104.5-mile line that crosses the Kankakee River twice before heading southwest and terminating near the Illinois River. This corridor has a right-of-way width of 250 feet in most areas The Collins Station line extends 11 8 miles from DNPS to the nearby Collins Station with a right-of-way width of 150 feet.

EGC is committed to the conservation of significant natural habitats and protected species, and expects that the operation of DNPS including maintenance of the transmission lines, through the DNPS renewed license period would not adversely affect any threatened or endangered species. EGC has no plans to alter current operations over the license renewal period. Any maintenance activities necessary to support license renewal would be limited to previously disturbed areas

After your review, we request receiving your input by March 29, 2002. In your response, please detail any concerns you may have about any listed species or critical habitat in the area or confirming our conclusion that operation of DNPS over the license renewal term would have no effect on any threatened or endangered species. This will enable us to meet our NRC application submittal schedule EGC will include a copy of this letter and your response in the Environmental Report that will be submitted to the NRC as part of the DNPS license renewal application.

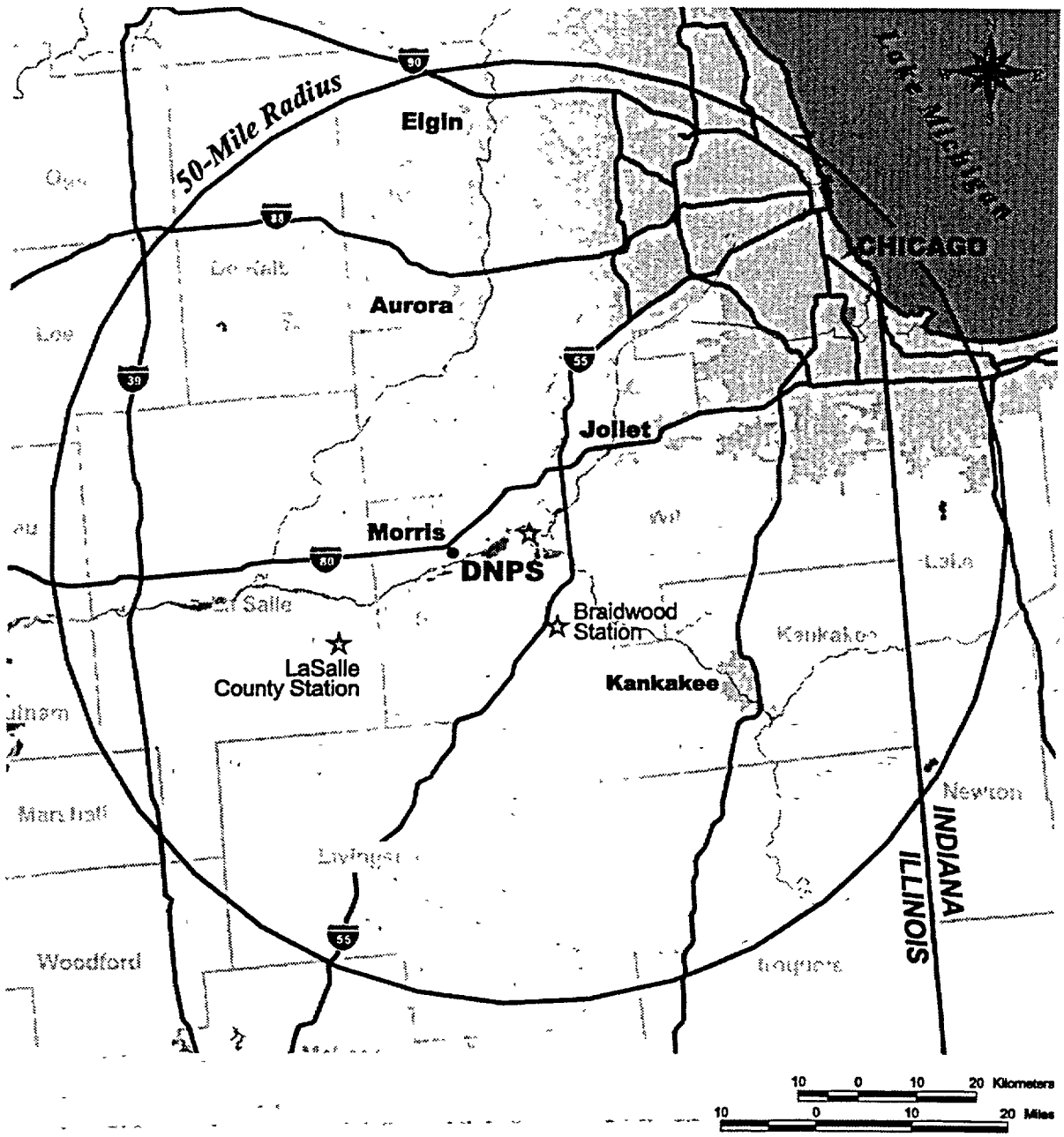
Should you have any questions concerning this letter, please contact Mr. Terry Steinert at (630) 657-3213.

Respectfully,

Keith R. Jury

K. R. Jury
Director – Licensing
Mid-West Regional Operating Group

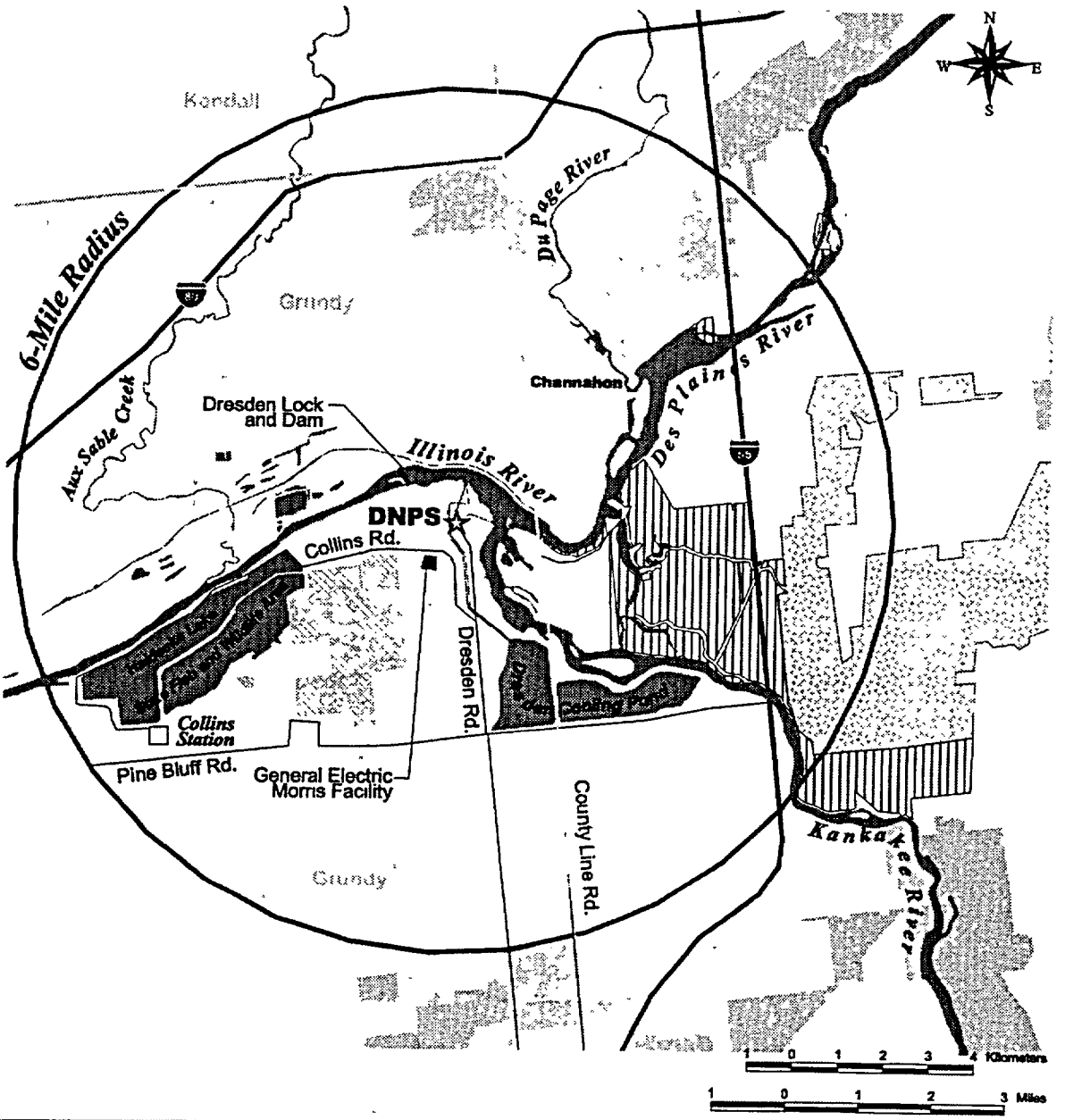
Attachments Attachment A: Figure 2-1, 50-Mile Vicinity Map
Attachment B: Figure 2-2, 6-Mile Vicinity Map
Attachment C: Figure 2-3, Site Boundary
Attachment D: Figure 3-3, Transmission Line Map
Attachment E: Figure 3-4, Detailed Transmission Line Map



LEGEND

- Nuclear Power Plants
- State Boundary
- County Boundaries
- Lakes and Rivers
- Urban Areas

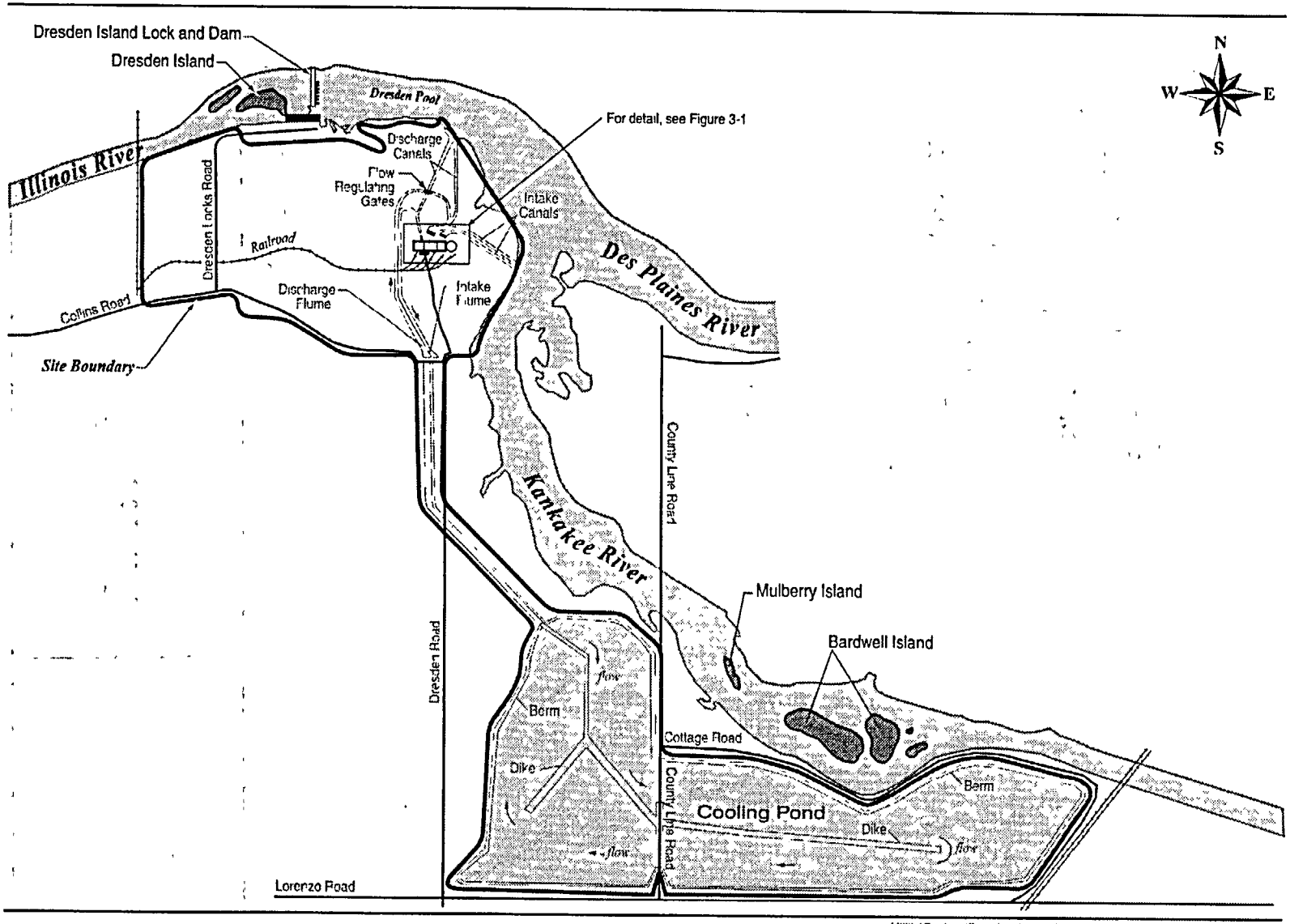
FIGURE 2-1
50-Mile Vicinity Map



LEGEND

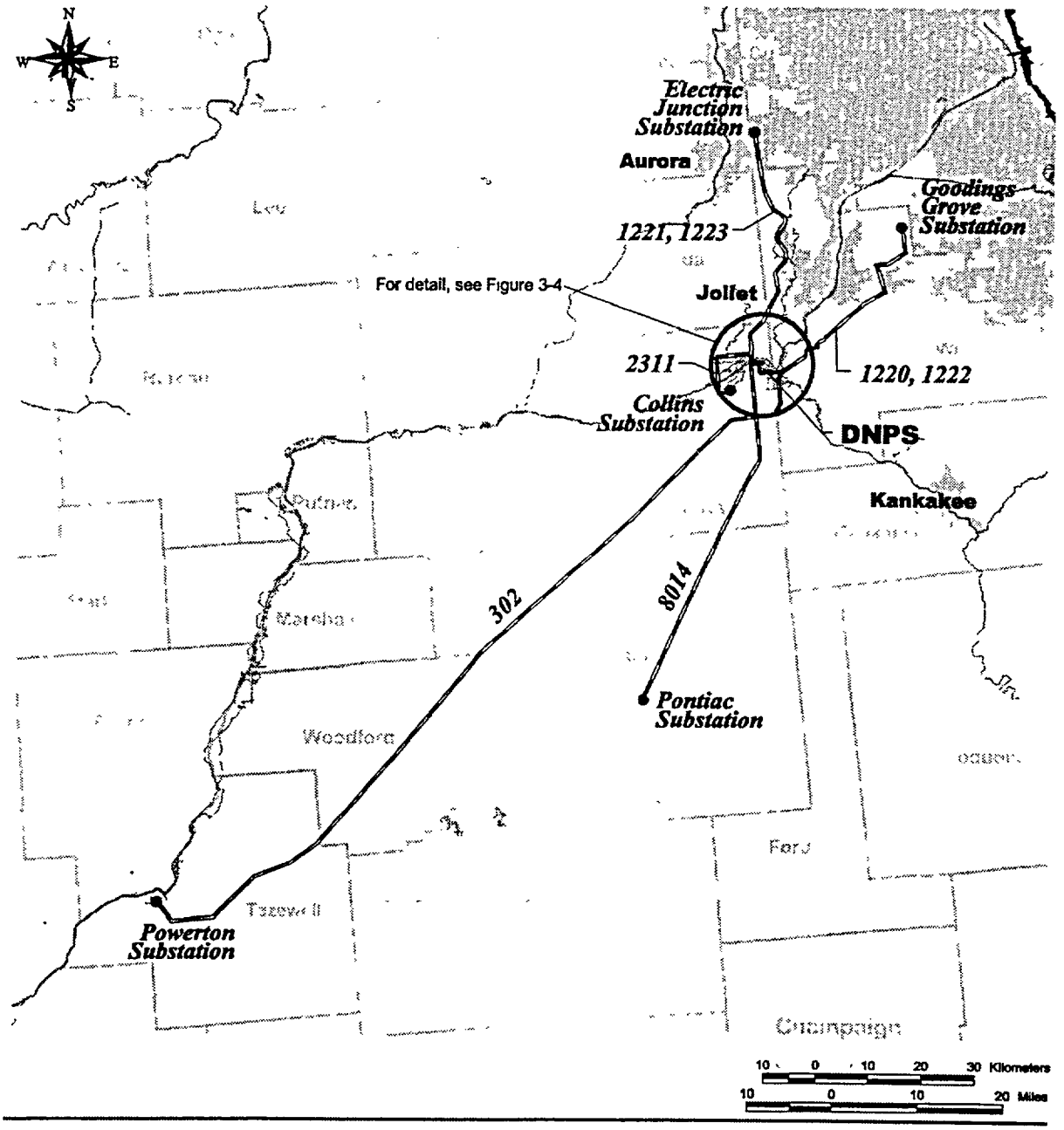
- County Boundaries
- Lakes and Rivers
- Des Plaines Conservation Area
- Goose Lake Prairie Natural Area
- Midewin National Tallgrass Prairie
- Urban Areas

FIGURE 2-2
6-Mile Vicinity Map



Utility\Exelon (Dresden & Quad Cities)\Dresden\Grfx\2-3 Dres Site Bnd ai

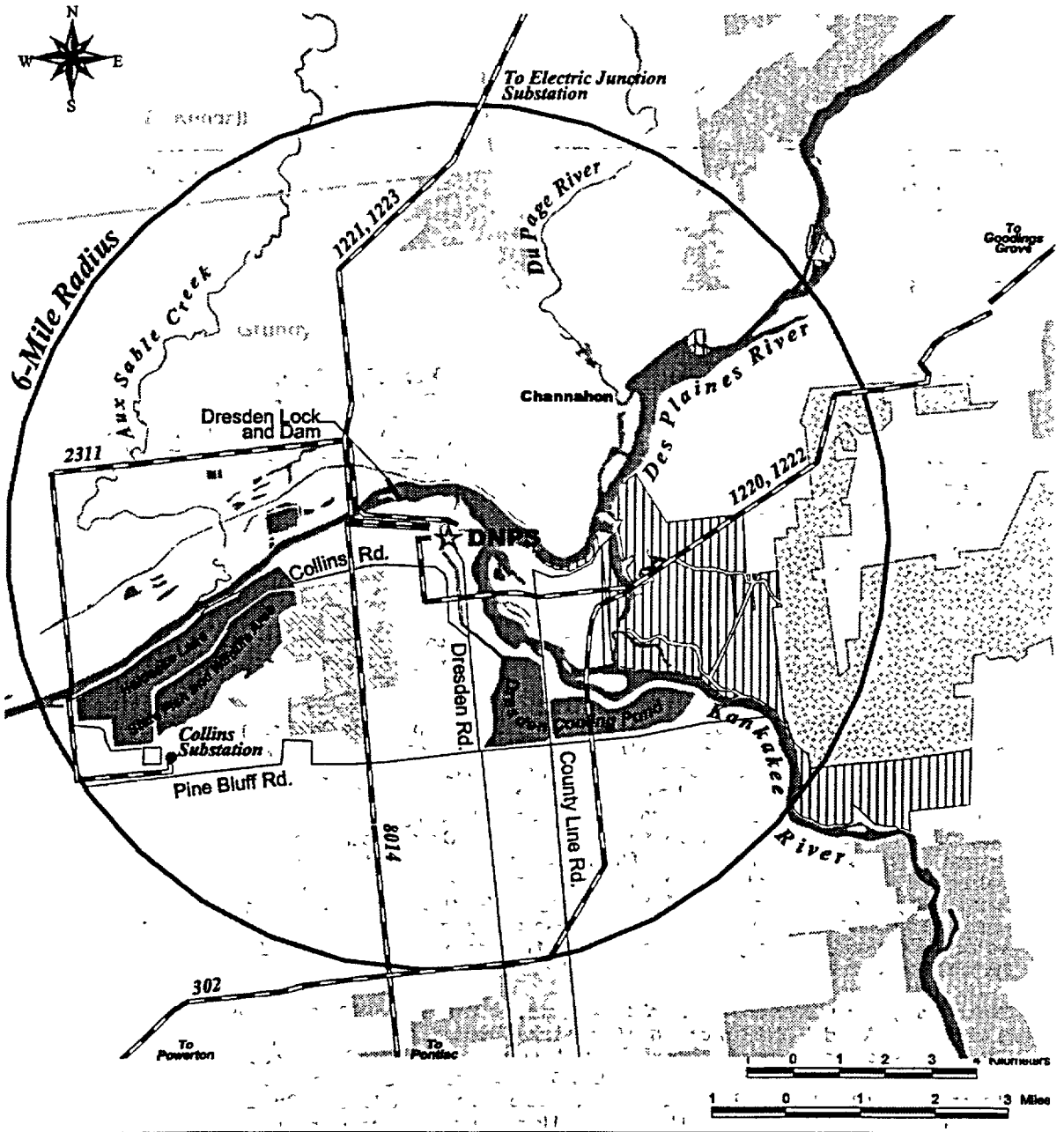
FIGURE 2-3. Site Boundary.



LEGEND

- Substations
- Transmission Lines
- State Boundary
- Lakes and Rivers
- County Boundaries
- Urban Areas

FIGURE 3-3
Transmission Line Map



LEGEND

- Substations
- Transmission Lines
- County Boundaries
- Lakes and Rivers
- Des Plaines Conservation Area
- Goose Lake Praine Natural Area
- Midewin National Tallgrass Praine
- Urban Areas

FIGURE 3-4
Transmission Line Map Detail

Exelon Nuclear

Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

RS-01-235

January 11, 2002

NO OBJECTION
U.S. Fish & Wildlife Service
Rock Island, Illinois
J. Miller 2/12/02
Supervisor Date

Ms. Jody Millar
Assistant Field Supervisor
U.S. Fish and Wildlife Service
4469 48th Ave. Ct.
Rock Island Field Office
Rock Island, IL 61201

Subject: Dresden Nuclear Power Station, Units 2 and 3, License Renewal: Request for Information on Threatened or Endangered Species

Exelon Generation Company (EGC), LLC, (formerly Commonwealth Edison Company) is currently preparing an application to the U.S. Nuclear Regulatory Commission (NRC) to renew the operating licenses for Dresden Nuclear Power Station (DNPS), Units 2 and 3. The current operating licenses for Unit 2 and 3 expire in 2009 and 2011, respectively. The renewal term would be for an additional 20 years beyond the original license expiration date. As part of the license renewal process, the NRC requires license renewal applicants to "assess the impact of the proposed action on threatened or endangered species in accordance with the Endangered Species Act." The NRC will consult with your office under Section 7 of the Endangered Species Act. By contacting your office early in the application process, we hope to identify any potential issues that we may need to address or any information we should provide to your office to expedite the NRC's consultation.

Exelon has operated DNPS and its associated transmission lines since 1970. As shown in Attachments A and B, DNPS is located in Goose Lake Township, Grundy County, Illinois, on the south shoreline of the Illinois River, at the confluence of the Des Plaines and Kankakee Rivers at river mile 272.4. The DNPS site is owned by EGC and consists of approximately 2,500 acres. The area within six miles of the site includes both Grundy and Will Counties in Illinois. The local terrain is level to gently rolling, except for the Kankakee Bluffs just northeast of DNPS on the north bank of the Illinois River. The area around DNPS is largely rural, characterized by farmland, woodlands, and small residential communities. The Goose Lake Prairie State Natural Area is located approximately one mile southwest of DNPS and the Des Plaines Conservation Area is approximately two miles east of DNPS. As shown on Attachment C the 1,275-acre cooling pond is divided almost equally between Grundy and Will Counties.

JAN 1 7 2 2

Exelon Nuclear

Exelon Generation
4300 Winfield Road
Warrenville IL 60555

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RS-02-042

February 22, 2002

Mr. Keith Shank
Manager
Endangered Species Consultation Program
Illinois Division of Natural Resources
320 W. Washington St
Springfield, IL 62704

Subject: Dresden Nuclear Power Station Units 2 and 3, License Renewal: Request For Information On State Listed Species And Important Habitats

Exelon Generation Company (EGC), LLC, (formerly Commonwealth Edison Company) is currently preparing an application to the U.S Nuclear Regulatory Commission (NRC) to renew the operating licenses for Dresden Nuclear Power Station (DNPS) Units 2 and 3. The current operating licenses for Units 2 and 3 expire in 2009 and 2011, respectively. The renewal term would be for an additional 20 years beyond the original license expiration date As part of the license renewal process, NRC requires license renewal applicants to "assess the impact of the proposed action on threatened or endangered species in accordance with the Endangered Species Act." NRC will consult with the U S Fish and Wildlife Service under Section 7 of the Endangered Species Act and may also seek your assistance in the identification of important species and habitats in the project area By contacting your office early in the application process, we hope to identify any issues that we may need to address or any information that we should provide to your office to expedite your evaluation of the potential impact of the continued operation of DNPS on threatened and endangered species.

Exelon has operated DNPS and its associated transmission lines since 1970 As shown in Attachments A and B, the facility is located in Goose Lake Township, Grundy County, Illinois, on the south shore of the Illinois River, at the confluence of the Des Plaines and Kankakee Rivers at river mile 272 4. The area around DNPS is largely rural, characterized by farmland, woodlands, and small residential communities The Goose Lake Prairie State Natural Area and Heidecke Lake State Fish and Wildlife Area are located southwest of DNPS. The Des Plaines Conservation Area and the Midewin National Tallgrass Prairie are located east of DNPS As shown on Attachment B, the 1,275-acre cooling pond is divided almost equally between Grundy and Will Counties.

February 22, 2002
Illinois Division of Natural Resource
Page 2

As shown on Attachments A and B, the current DNPS transmission line configuration is connected to the power grid through seven 345 kilovolt lines The Electric Junction corridor contains two lines, running east from the station, and then turning north and crossing the Illinois River. The lines run for 31.1 miles and have a right-of-way ranging from 130 to 380 feet wide Two Goodings Grove lines cross the Kankakee River south of DNPS and then run northeast and terminate at the Elwood Substation The Goodings Grove corridor is 12.4 miles long, with a 250-feet wide right-of-way. Pontiac Mid-Point is a 43.3-mile line that runs in a southwesterly direction terminate south of Pontiac Illinois with a row of 145 feet. Powerton is a 104.5-mile line that crosses the Kankakee River twice before heading southwest and terminating near the Illinois River This corridor has a right-of-way width of 250 feet in most areas. The Collins Station line extends 11 8 miles from DNPS to the nearby Collins Station with a row of 150 feet. Copies of 7 5 minute USGS Quadrangle maps with the associated transmission corridors highlighted are provided as enclosures to aid in this review

EGC is committed to the conservation of significant natural habitats and protected species, and expects that operation of the station including maintenance of the transmission lines through the license renewal period would not adversely affect any threatened or endangered species. EGC has no plans to alter current operations during the license renewal period. Any maintenance activities necessary to support license renewal would be limited to previously disturbed areas.

After your review we request receiving your input by April 30, 2002. In your response, please detail any concerns you may have about any state-listed species or ecologically-significant habitats in the vicinity of DNPS or in the associated transmission corridors (rights-of-way), or concurring with our conclusion that continued operation of DNPS and the associated transmission corridors would not affect any threatened or endangered species. This will enable us to meet our NRC application submittal schedule. EGC will include a copy of this letter and your response in the Environmental Report that will be submitted to the NRC as part of the DNPS license renewal application

February 22, 2002
Illinois Division of Natural Resource
Page 3

Should you have any questions concerning this letter, please contact Mr. Terry Steinert at (630) 657-3213

Respectfully,

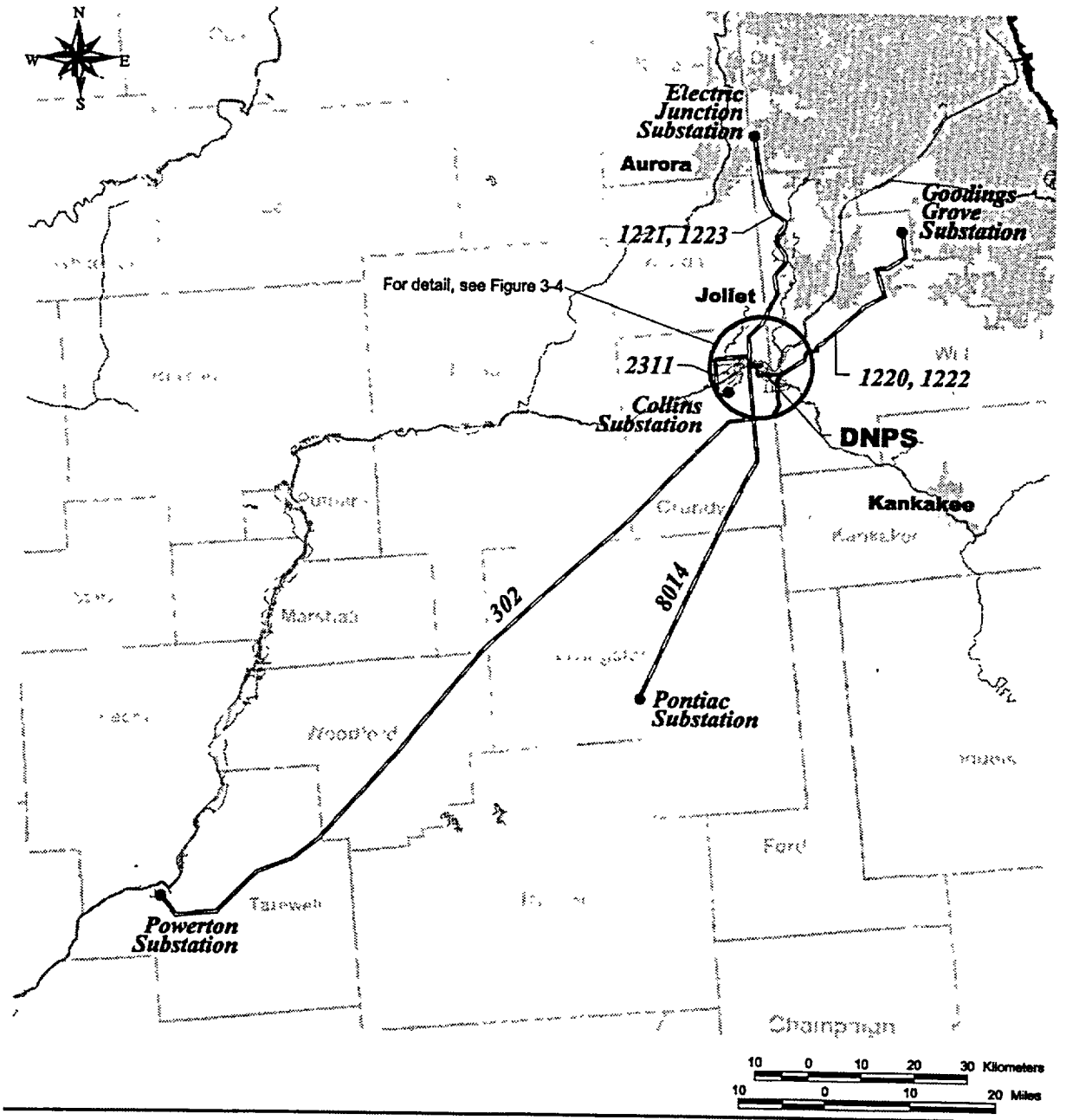
Keith R. Jury

Keith R Jury
Director – Licensing
Mid-West Regional Operating Group

Attachments: Attachment A: Figure 3-3, Transmission Line Map
Attachment B. Figure 3-4, Transmission Line Map Detail

Enclosures 7.5 Minute USGS Quadrangle maps in IL:

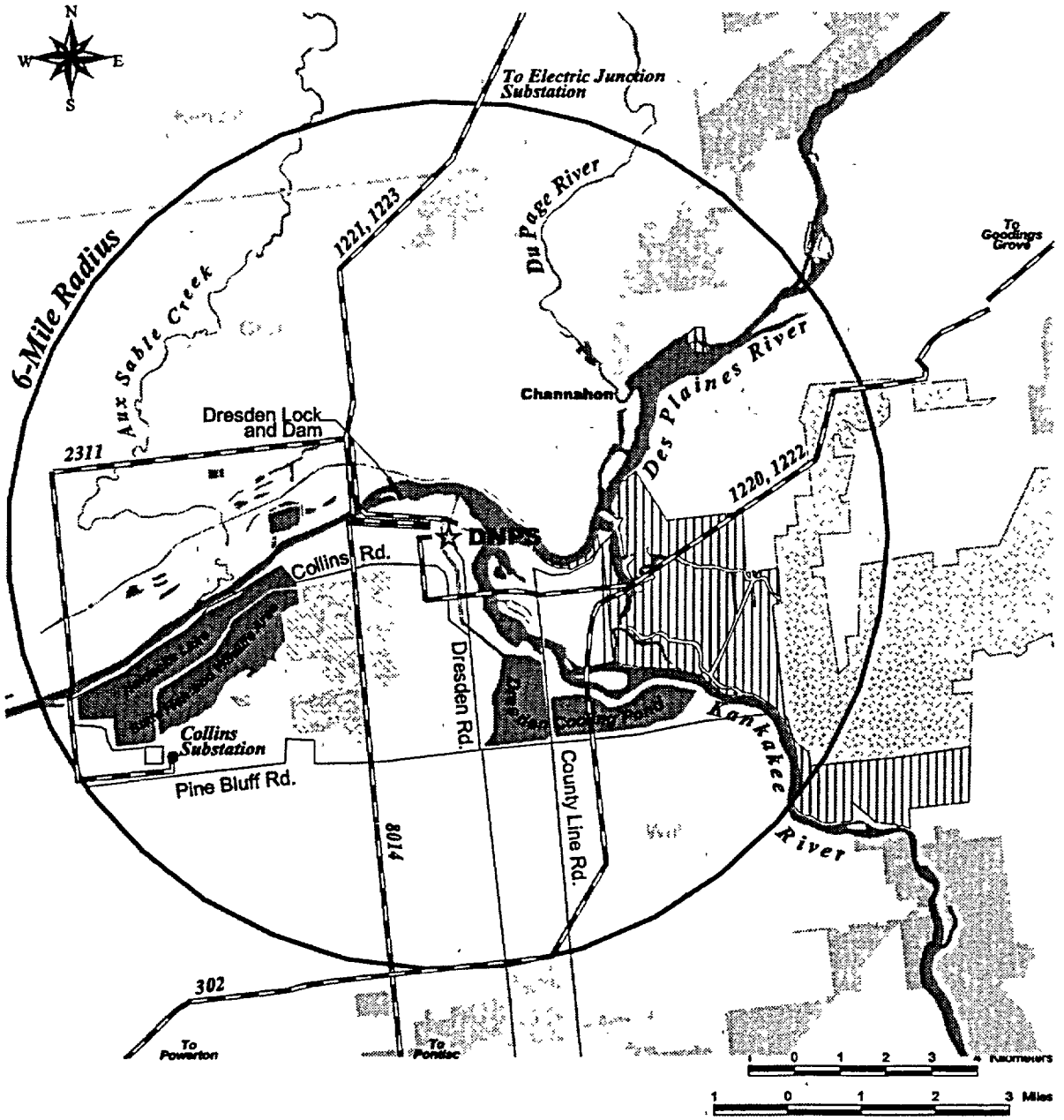
Naperville	Dana
Normantown	Flanagan North
Plainfield	Northeast Pontiac
Mokena	Saunemin
Channahon	Roanoke
Elwood	Benson
Manhattan	Southeast Pontiac
Morris	Eureka
Coal City	Secor
Wilmington	Pekin
Kinsman	Marquette Heights
Mazon	Morton
Gardner	Washington
Streator South	Blackstone
Dwight	Minonk
Minooka	



LEGEND

- Substations
- Transmission Lines
- State Boundary
- Lakes and Rivers
- County Boundaries
- Urban Areas

FIGURE 3-3
Transmission Line Map



LEGEND

- Substations
- Transmission Lines
- County Boundaries
- Lakes and Rivers
- Des Plaines Conservation Area
- Goose Lake Prairie Natural Area
- Midewin National Tallgrass Prairie
- Urban Areas

FIGURE 3-4
Transmission Line Map Detail

Illinois
Natural Resources

Code # 0201015

July 8, 2002

RECEIVED
JUL 11 2002
LICENSING

Mr. Keith Jury
Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

RE **Dresden Nuclear Power Station, Units 2 & 3 License Renewal**
Du Page, Will, Kendall, Grundy, Livingston, Woodford & Tazewell Counties
Endangered Species Consultation Program
Natural Heritage Database Review # 0201015

Dear Mr. Jury

Thank you for submitting the Dresden Nuclear Power Station Units 2 & 3 operating license renewal application for consultation in accordance with the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17] and Title 17 *Illinois Administrative Code* Part 1075. The electric transmission lines associated with the plant traverse the above-referenced counties.

The Natural Heritage Database has identified the presence of State protected resources within the vicinity of portions of the existing transmission line. Protected resources are known to exist within Du Page, Will, Grundy, Livingston and Woodford Counties. Please review the enclosed color quad maps showing the general locations of these protected resources in relation to the existing corridor.

Further project information is needed to adequately assess whether or not any improvements to the existing transmission line or generating plant will adversely impact the aforementioned protected resources. Consequently, **this consultation must remain open at the present time.** Please include the attached Detailed Action Report with further project information as it becomes available.

The Natural Heritage Database cannot provide a conclusive statement as to the presence, absence, or condition of significant natural features in any specific location, consultation cannot replace detailed site surveys. The Department is unable to state, without reservation, that no listed species exist within the project area boundary, nor can it exclude the possibility that listed species other than that mentioned exist within the vicinity.

Consultation is limited to State listed threatened or endangered species, Illinois Natural Areas and dedicated Land & Water Reserves and Nature Preserves. It does not entail a comprehensive environmental impact assessment. The Department may raise concerns through other venues regarding potential impacts to other natural resources as it deems appropriate.

Should you need additional information regarding the consultation process, or should you have any questions please do not hesitate to contact me.

Sincerely,

Rick Pietruszka

Rick Pietruszka, Project Manager
Endangered Species Consultation Program
Division of Natural Resource Review and Coordination
Ph (217) 785-5500
Fax (217) 557-0728

Enclosures Map, Detailed Action Report

ENDANGERED SPECIES CONSULTATION PROGRAM
DETAILED ACTION REPORT

PROJCODE:0201015
DATE DUE:
For Office Use Only

Date Submitted _____

Agency Name _____

Contact Person _____ Phone _____

Agency Address _____

_____

Project Description

Project Name (if any) _____

Project Location Township _____ Range _____ Section _____ County _____

*Please enclose an area map with the project site clearly delineated An appropriate scale and legend should accompany this map

Total Number of Acres in Project Area _____

Estimated Starting/Completion Dates _____

Brief Description of Proposed Action _____

_____

_____

_____

Please mark the appropriate response for each of the items below:

Water Supply	private wells	___	Waste Treatment	individual septic systems ___
	community well	___		private treatment facility ___
	public system	___		public treatment facility ___

Return this report with a copy of each of the items listed below (if available):

Subdivision/Development Plat
County Natural Resource Inventory Report _____
Drainage/Stormwater Management Plan _____
Detailed Erosion Control Procedures _____
Existing & Proposed Topographic Contours _____
List of Landscaping Plant Species _____
Aerial Photograph of Site _____
Wetland Delineation Report _____
Wetland Mitigation Plan _____
U S Army Corps of Engineers Correspondence _____
Restrictive Deeds/Conservation Easement Plans _____
Homeowner Covenants and Restrictions _____
Percolation Test Results (For Septic Systems Only) _____
Soil Boring Data _____
Tree Inventory/Protection Plan _____
Other **Transmission Line Corridor Improvements and Further Project Information Requested as it Becomes Available**

What measures have been, or can be, included in the project plans to minimize adverse effects to endangered or threatened species or natural areas/nature preserves? (Use additional pages if necessary)

_____

_____

Completion of the consultation requirement is mandatory before any State agency and/or local unit of government performs, funds or approves any environmentally altering activity To facilitate effective coordination, please identify all agencies/local governments involved in the project, including primary contact person, and indicate each agency's/local government's respective role in the project

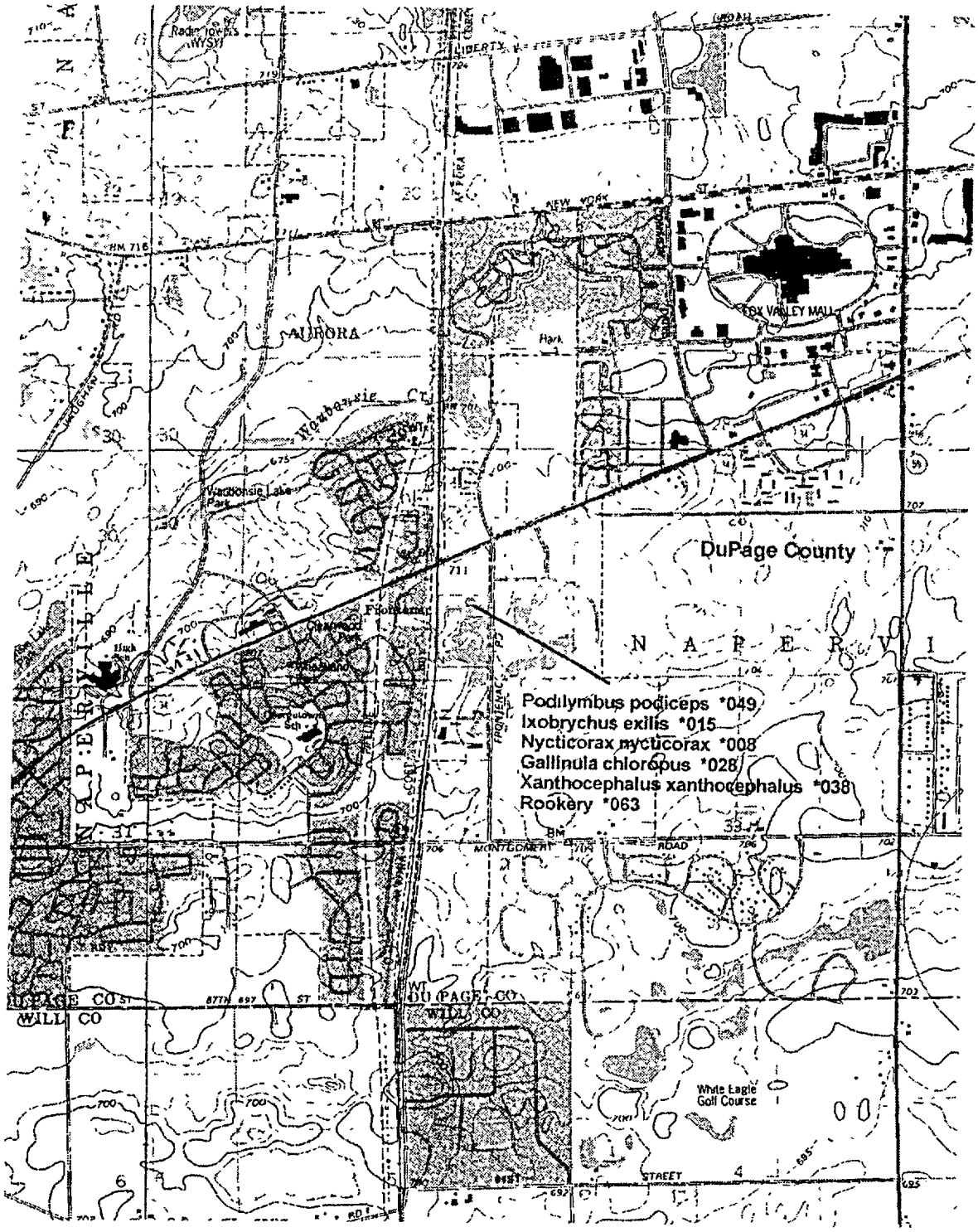
Agency/Municipality	Contact Person	Perform	Fund	Authorize

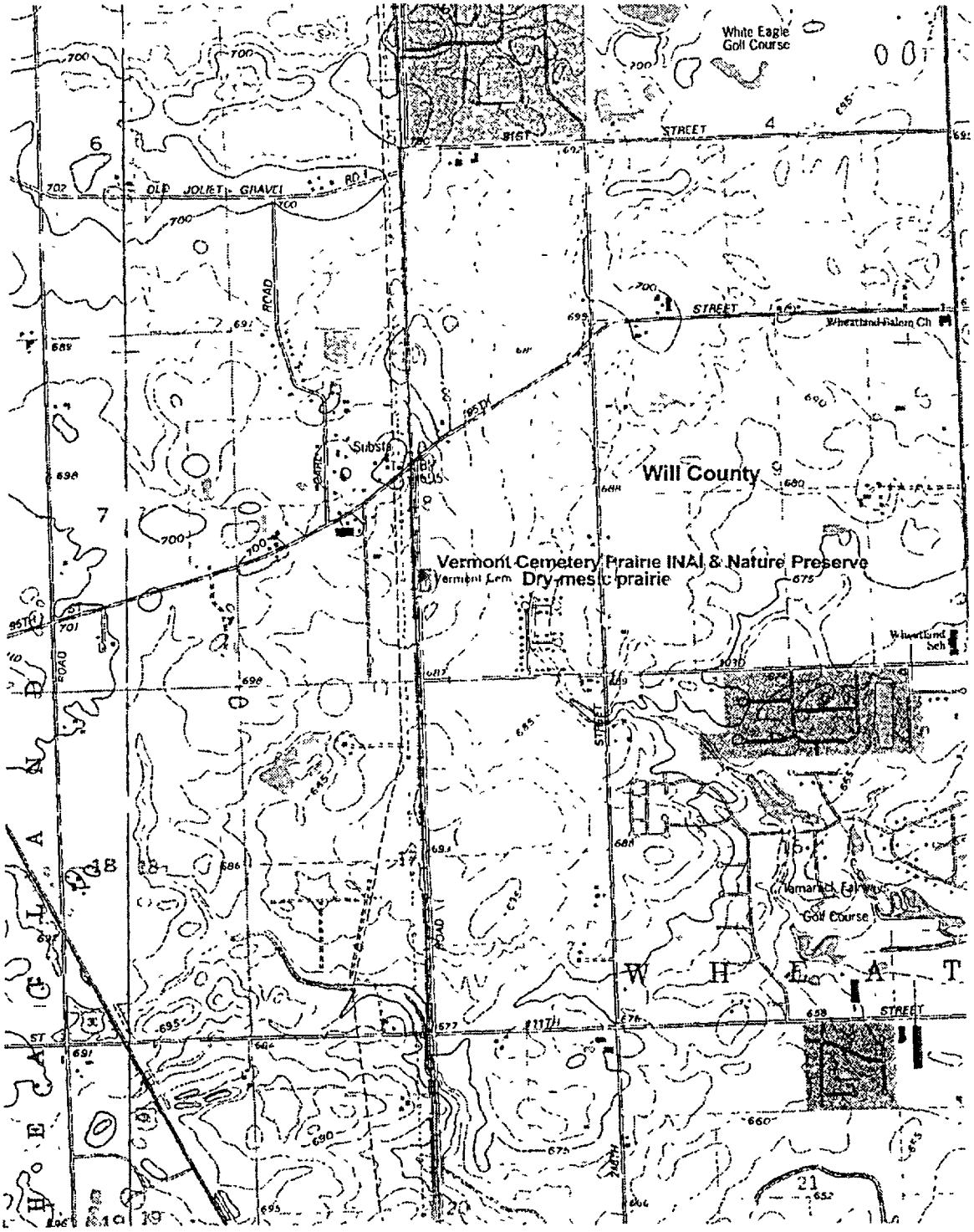
*Please send all materials to *

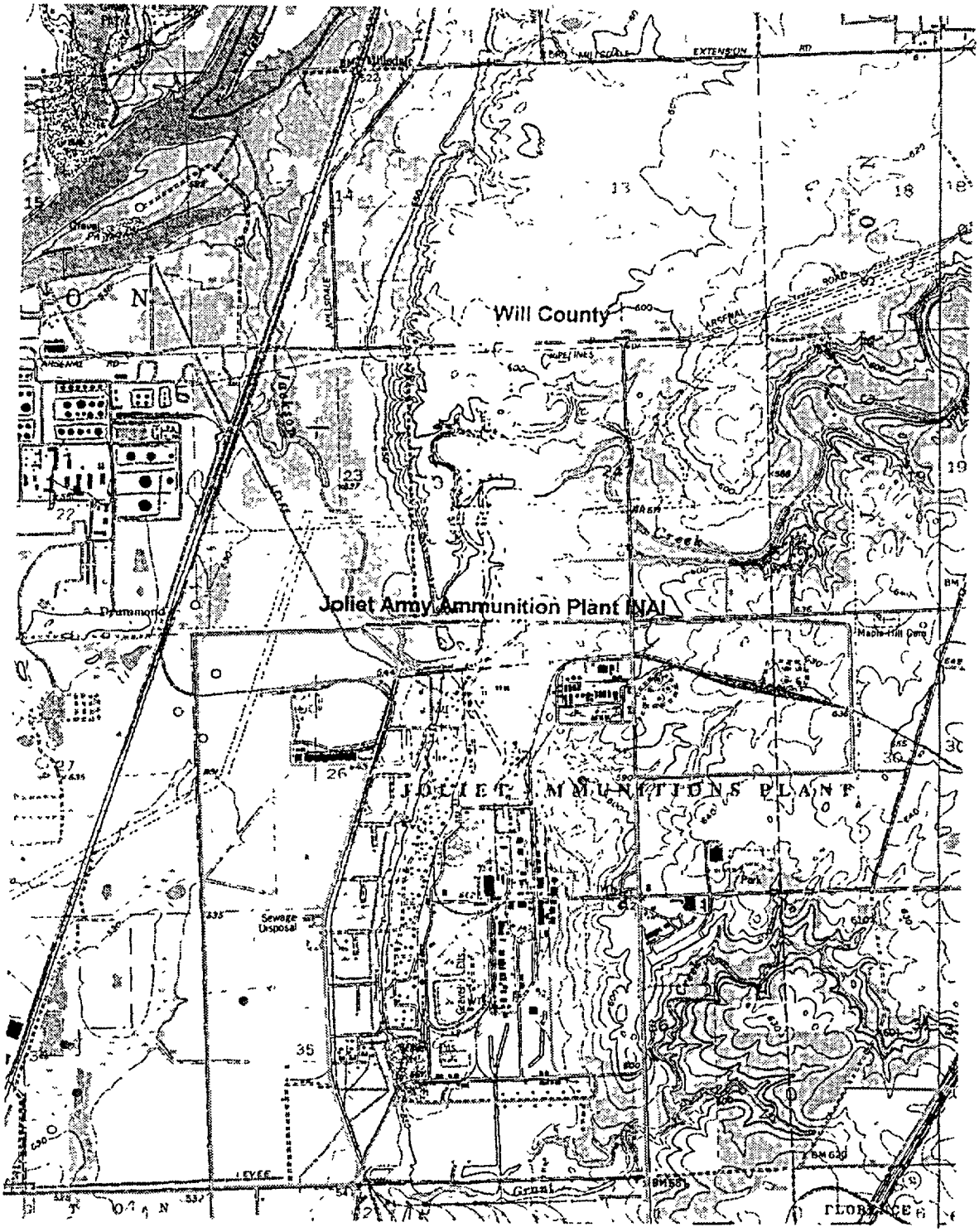
Endangered Species Consultation Program
Division of Natural Resource Review & Coordination
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

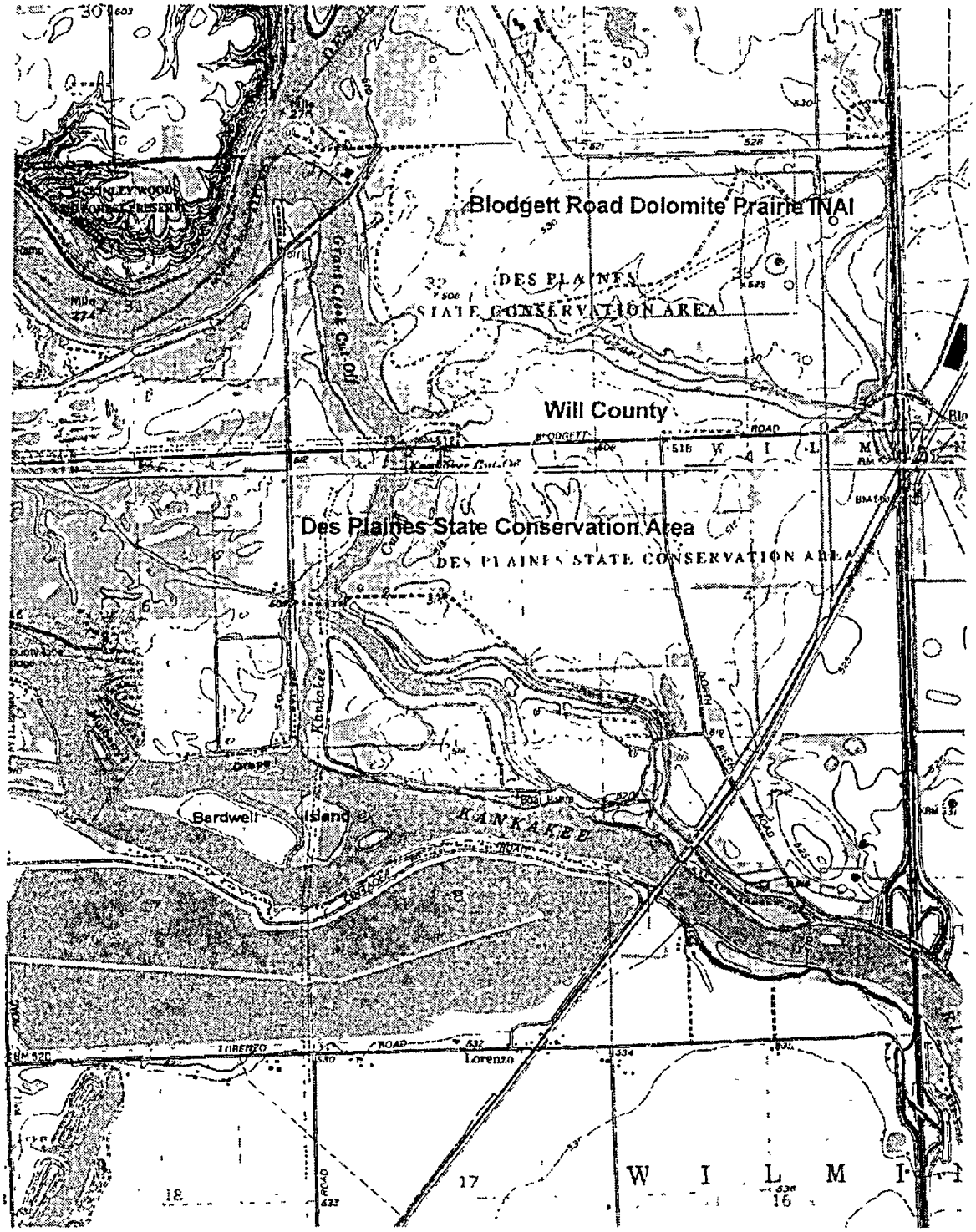
Exelon Nuclear Pipeline Review

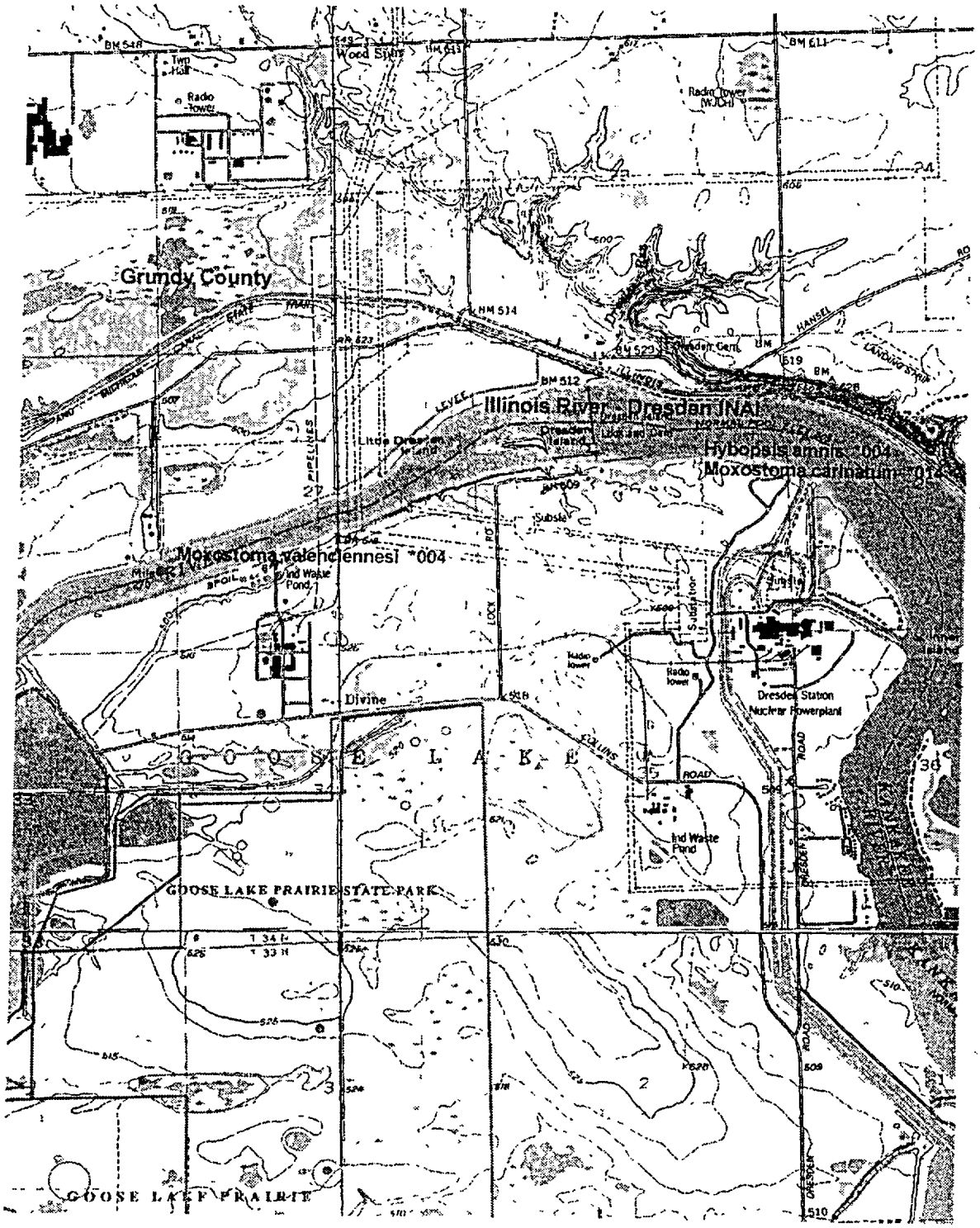
Quad Name	Hits/No Hits
Naperville	No Hits
Normantown	**Hits**
Plainfield	No Hits
Mokena	No Hits
Channahon	**Hits**
Elwood	No Hits
Manhattan	No Hits
Morris	No Hits
Coal City	No Hits
Wilmington	**Hits**
Kinsman	No Hits
Mazon	No Hits
Gardner	No Hits
Streator South	**Hits**
Dwight	No Hits
Minooka	**Hits**
Dana	No Hits
Flanagan North	No Hits
Northeast Pontiac	No Hits
Saunemin	No Hits
Roanoke	No Hits
Benson	**Hits**
Southeast Pontiac	No Hits
Eureka	**Hits**
Secor	No Hits
Pekin	No Hits
Marquette Heights	No Hits
Morton	No Hits
Washington	No Hits
Blackstone	No Hits
Minonk	No Hits

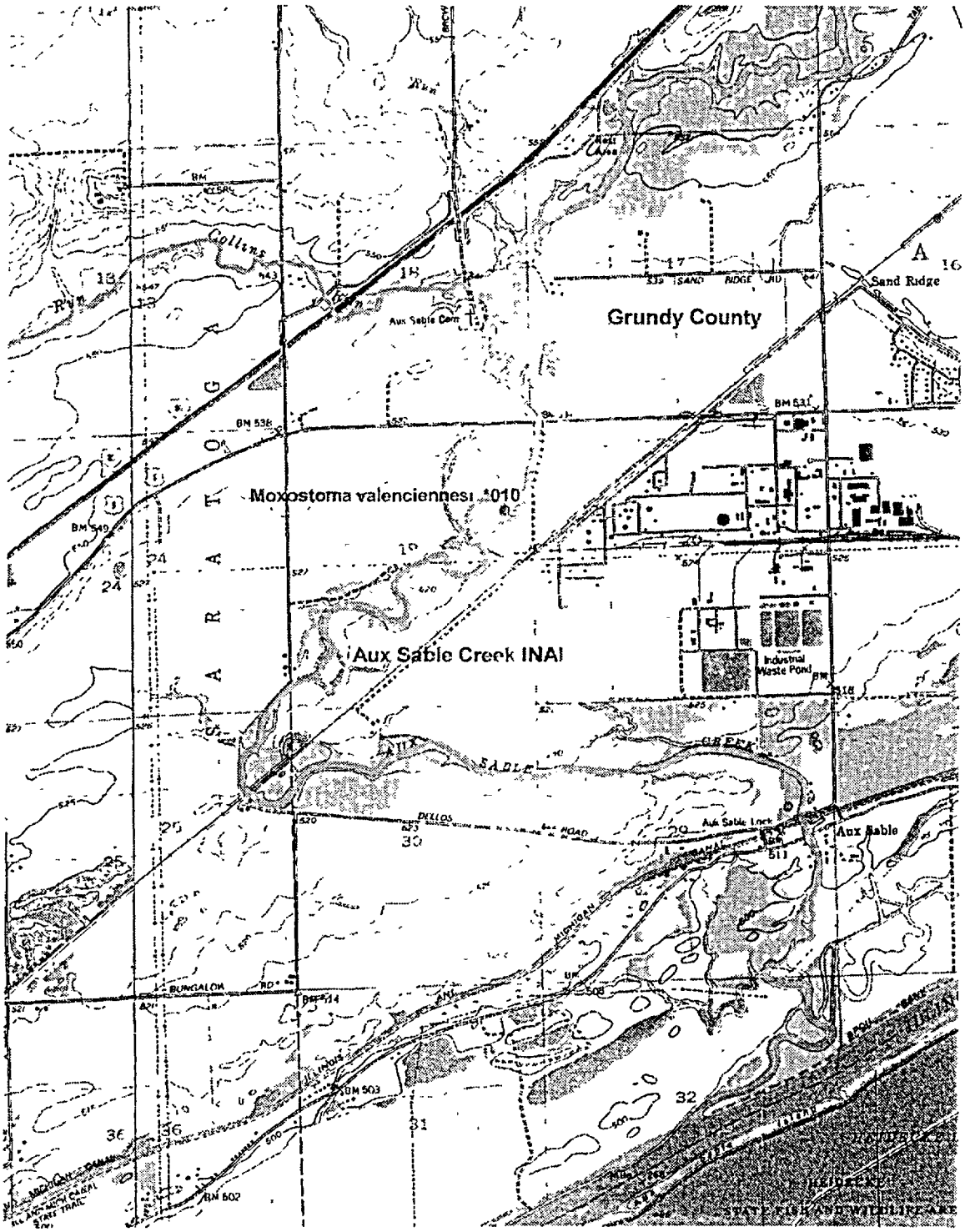

DuPage County
Podilymbus podiceps *049
Ixobrychus exilis *015
Nycticorax nycticorax *008
Gallinula chloropus *028
Xanthocephalus xanthocephalus *038
Rookery *063
AURORA
FOX VALLEY MALL
NAPERVILLE
WILL CO
DU PAGE CO
White Eagle Golf Course

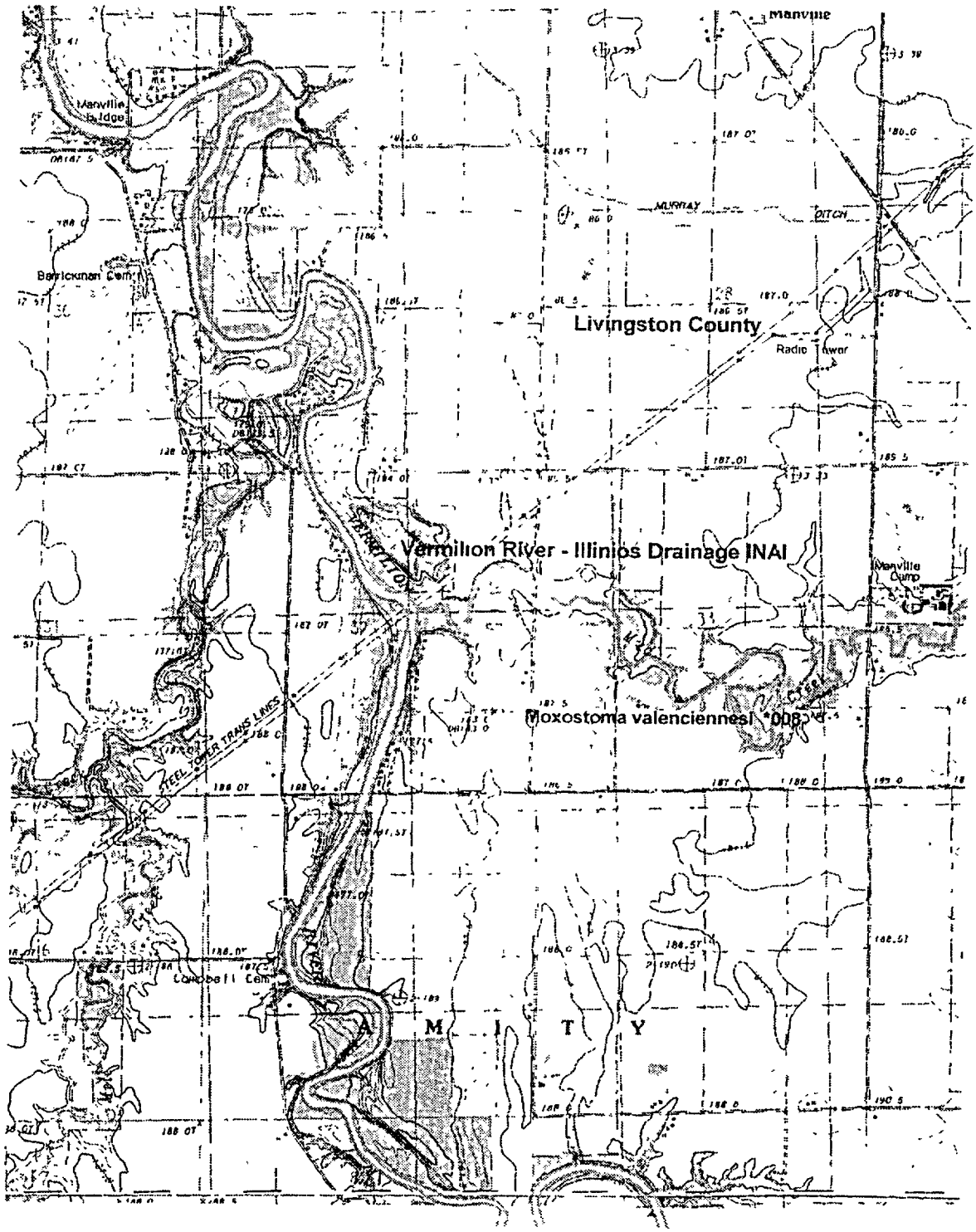

White Eagle
Golf Course
STREET
OLD JOLIET GRAVEL RD
ROAD
Wheatland-Salem Ch
Substa
Will County
Vermont Cemetery Prairie INAI & Nature Preserve
Dry-mesic prairie
Wheatland
Sch
Golf Course
W H E A T
STREET

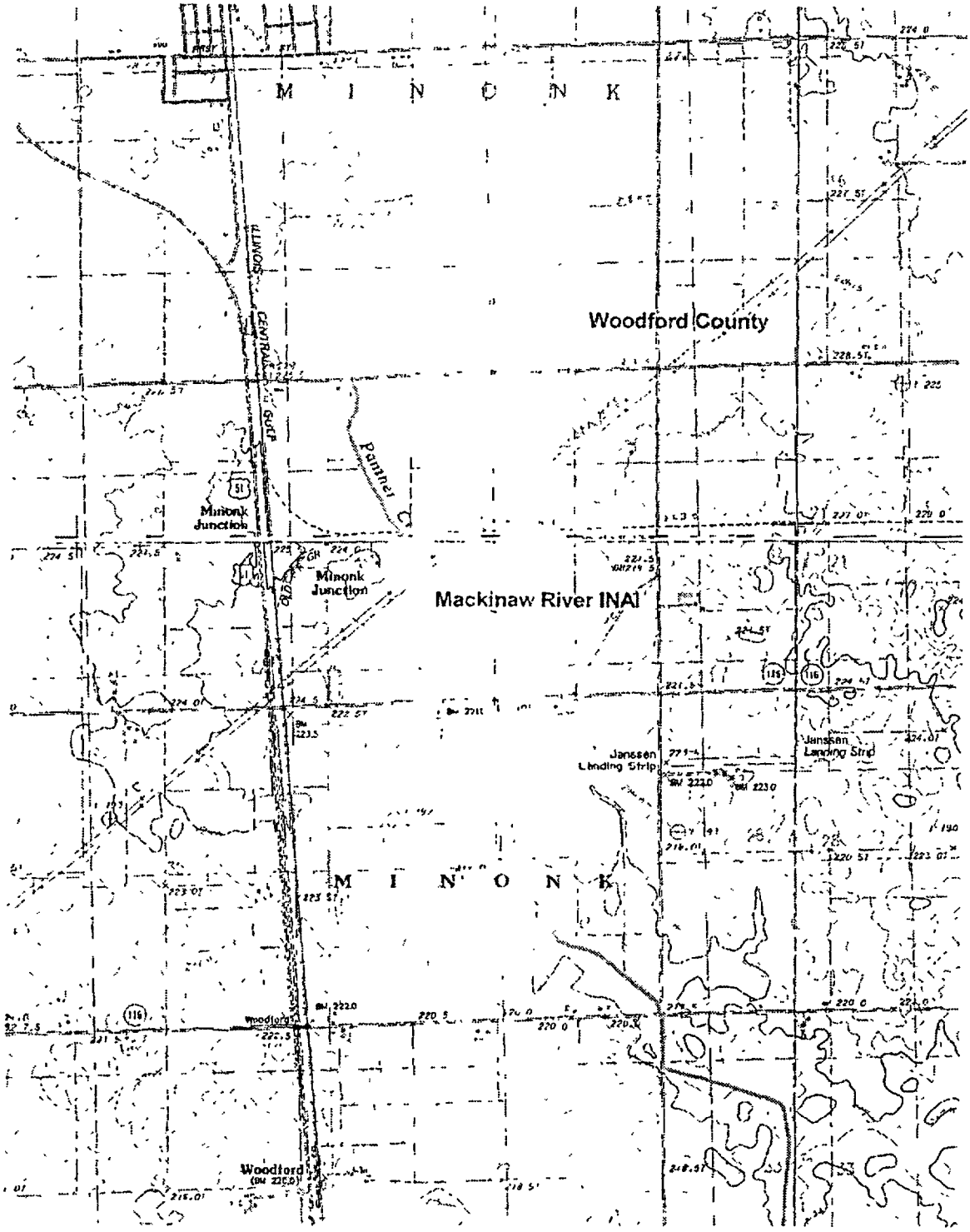

Will County
Joliet Army Ammunition Plant (NAI)
JOLIET AMMUNITIONS PLANT
Sewage Disposal
Drummond
Maple Hill Park
Pond
LEVEE
Grout
FLORA CREEK

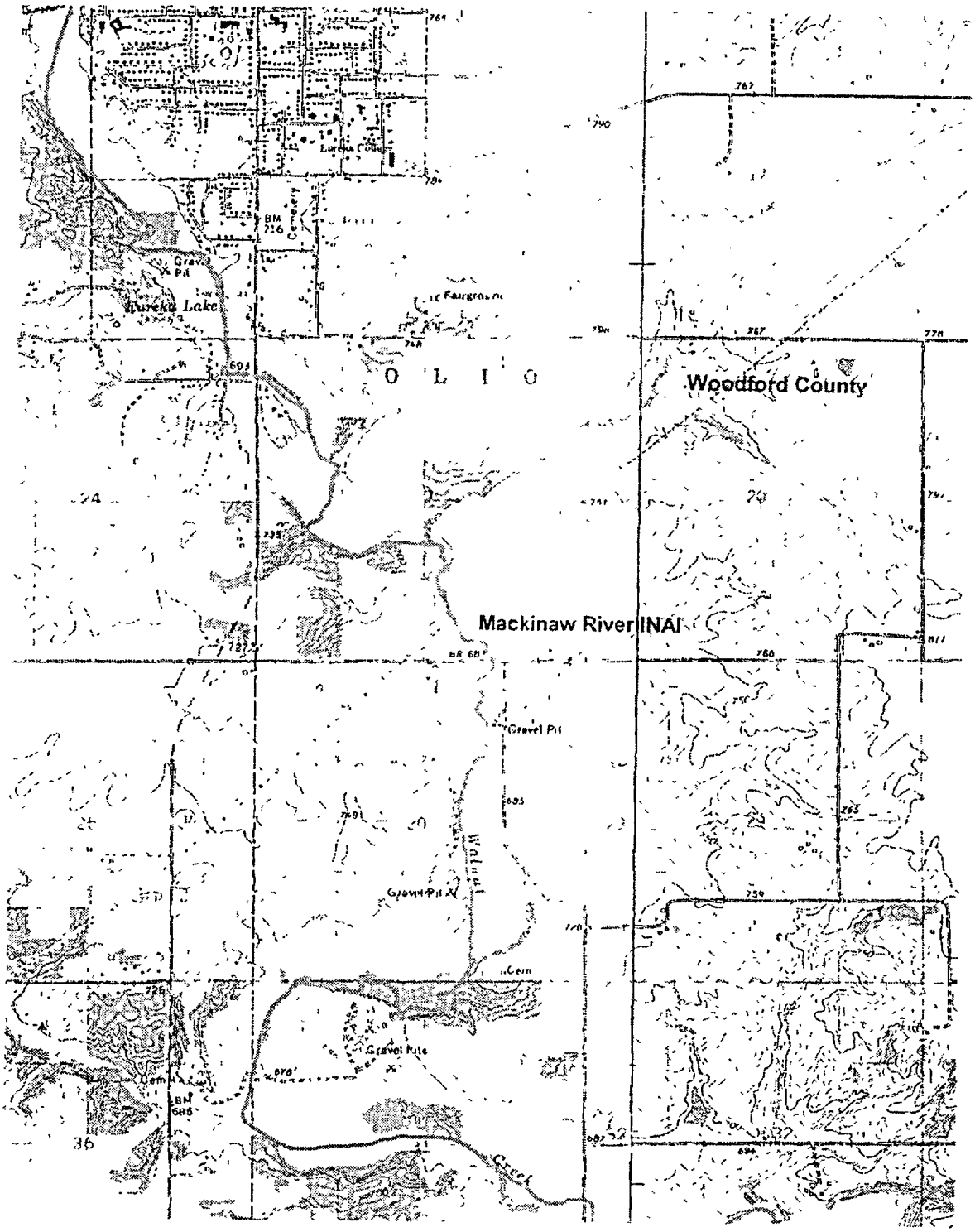

Blodgett Road Dolomite Prairie INAI
DES PLAINES
STATE CONSERVATION AREA
Will County
Des Plaines State Conservation Area
DES PLAINES STATE CONSERVATION AREA
Kankakee
Bardwell
Island
KANKAKEE
Lorenzo
W I L M I


Grundy County
Illinois River - Dresden INAI
Hybopsis amnis *004
Moxostoma carinatum *014
Moxostoma valenciennesi *004
Dresden Station
Nuclear Powerplant
GOOSE LAKE
GOOSE LAKE PRAIRIE STATE PARK
GOOSE LAKE PRAIRIE


Grundy County
Moxostoma valenciennesi 1010
Aux Sable Creek INAI
Industrial Waste Pond
Sand Ridge
Aux Sable
Aux Sable Lock
Collins Run
Aux Sable Cem
BUNGALOW RD
DEELOS ROAD
SAND RIDGE RD
STATE FISH AND WILDLIFE AREA


Manville
Manville Bridge
Barickman Cem
MURRAY
DITCH
Livingston County
Radio Tower
Vermilion River - Illinois Drainage INAI
Manville Camp
Moxostoma valenciennesi *008
STEEL TOWER TRANS LINES
Campbell Cem
A
M
I
T
Y


M I N O N K
Woodford County
Minonk Junction
Minonk Junction
Mackinaw River INAI
Janssen Landing Strip
Janssen Landing Strip
M I N O N K
Woodford
Woodford


Eureka Lake
O L I O
Woodford County
Mackinaw River INAI
Gravel Pit
Gravel Pit
Gravel Pit
Creek

Appendix D

Microbiological Organisms Correspondence

Table of Contents

Letter	Page
Jury (EGC) to McSwiggin (Illinois Environmental Protection Agency), January 11, 2002	E.D-1
Mosher (Illinois Environmental Protection Agency) to Jury (EGC) July 8, 2002	E.D-7
Jury (EGC) to Mudgett (Illinois Department of Public Health), January 11, 2002	E.D-8
Mudgett (Illinois Department of Public Health) to Jury (EGC) February 7, 2002	E.D-14

Exelon Nuclear

Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

RS-01-286

January 11, 2002

Mr. Tom McSwiggin
Manager, Permit Section
Bureau of Water
Illinois Environmental Protection Agency
Springfield, IL 62761-9276

Subject Dresden Nuclear Power Station, Units 2 and 3 License Renewal: Request For Information On Thermophilic Microorganisms

Exelon Generation Company (EGC), LLC (formerly Commonwealth Edison Company) is currently preparing an application to the U.S Nuclear Regulatory Commission (NRC) to renew the operating licenses for Dresden Nuclear Power Station (DNPS), Units 2 and 3. The current operating licenses for Unit 2 and 3 expire in 2009 and 2011, respectively. The renewal term would be for an additional 20 years beyond the original license expiration date.

NRC guidance directs license renewal applicants to consult with the state agency responsible for environmental health to determine if there is a concern about the presence of *Nagleria fowleri* in plant receiving waters. For your information, an excerpt from an NRC document on this topic is included as Attachment A. The NRC requires this assessment because certain microorganisms associated with cooling towers and thermal discharges are known to have deleterious impacts on human health. These microorganisms include the enteric pathogens *Salmonella* sp. and *Shigella* sp. as well as the *Pseudomonas aeruginosa* bacterium. Other less common aquatic microorganisms that sometimes occur in heated waters include the Legionnaire's disease bacteria (*Legionalla* sp) and free-living amoeba of the genus *Naeglena* (exp. *Naegleria fowleri*).

As shown on Attachment B, DNPS is located in Goose Lake Township, Grundy County, Illinois. The DNPS cooling system draws water from the Kankakee and Des Plaines Rivers and discharges to the Illinois River. Water heated by DNPS is cooled using a heat dissipation system consisting of a cooling pond, cooling canals, and mechanical draft cooling towers. The DNPS discharge temperatures, which, generally, do not exceed 93.6 °F (in July/August 2001, daily average temperatures in the discharge canal ranged from 84.8 °F to 90.7 °F), are below those known to be conducive to growth and survival of thermophillic pathogens. However, in October 2001, there was a one-time short-term discharge of 107.3 °F that was reported in accordance with DNPS procedures.

January 11, 2001
Illinois Environmental Protection Agency
Page 2

Further, disinfection of the DNPS sewage treatment plant effluent and the National Pollutant Discharge Elimination System (NPDES) required monitoring of fecal coliforms in the same effluent reduce the likelihood that a seed source or inoculant would be introduced to the Station's heated discharge

Discharge limits and monitoring requirements for DNPS are set forth in the National Pollutant Discharge Elimination System (NPDES) Permit No. IL0002224, issued by the State of Illinois on November 1, 2000, and effective through October 31, 2005

We do not expect DNPS operations and cooling systems to change significantly over the license renewal term, and there is no reason to believe that discharge temperatures will increase. However, we are requesting any information that the Illinois Environmental Protection Agency (IEPA) may have compiled on the presence of thermophillic microorganisms in the Illinois, Des Plaines, and Kankakee rivers in the vicinity of DNPS, including results of any monitoring or special studies that may have been conducted by IEPA or its subcontractors.

We also request your concurrence with the EGC conclusion that there is no significant threat to the public from thermophillic microorganisms attributable to DNPS operations.

After your review, we request receiving your input by March 29, 2002. In your response, please detail any concerns you may have on the presence of thermophillic microorganisms in the vicinity of DNPS, including the results of any monitoring or special studies that might have been conducted by IEPA or its subcontractors, or concurring with our conclusion that continued operation of DNPS would not affect the presence of thermophillic microorganisms in the vicinity of DNPS. This will enable us to meet our NRC application submittal schedule. EGC will include a copy of this letter and your response in the Environmental Report that will be submitted to the NRC as part of the DNPS license renewal application.

Should you have any questions concerning this letter, please contact Mr. Terry Steinert at (630) 657-3213.

Respectfully,

Keith R Jury

K R. Jury
Director – Licensing
Mid-West Regional Operating Group

Attachments: Attachment A: Cover page and section 4.3 6 of the Generic Environmental Impact Statement for License Renewal of Nuclear Plants
Attachment B: Figure 2-2, 6-Mile Vicinity Map

Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437 Vol. 1)

4.3.6 Human Health

Some microorganisms associated with cooling towers and thermal discharges can have deleterious impacts on human health. Their presence can be enhanced by thermal additions. These microorganisms include the enteric pathogens *Salmonella* sp. and *Shigella* sp. as well as *Pseudomonas aeruginosa* and the thermophilic fungi (Appendix D). Tests for these pathogens are well established, and factors germane to their presence in aquatic environs are known and in some cases controllable Other aquatic microorganisms normally present in surface waters have only recently been recognized as pathogenic for humans. Among these are Legionnaires' disease bacteria (*Legionella* sp.) and free-living amoebae of the genera *Naegleria* and *Acanthamoeba*, the causative agents of various, although rare, human infections. Factors affecting the distribution of *Legionella* sp. and pathogenic free-living amoebae are not well understood. Simple, rapid tests for their detection and procedures for their control are not yet available. The impacts of nuclear plant cooling towers and thermal discharges are considered of small significance if they do not enhance the presence of microorganisms that are detrimental to water and public health.

Potential adverse health effects on workers due to enhancement of microorganisms are an issue for steam-electric plants that use cooling towers Potential adverse health effects on the public from thermally enhanced microorganisms is an issue for the nuclear plants that use cooling ponds, lakes, or canals and that discharge to small rivers. These plants are all combined in the category of small river (average flow less than 2830 m^3/s (100,000 ft^3/s) in Tables 5.18 and 5.19. These issues were evaluated by reviewing what is known about the organisms that are potentially enhanced by operation of the steam-electric plants.

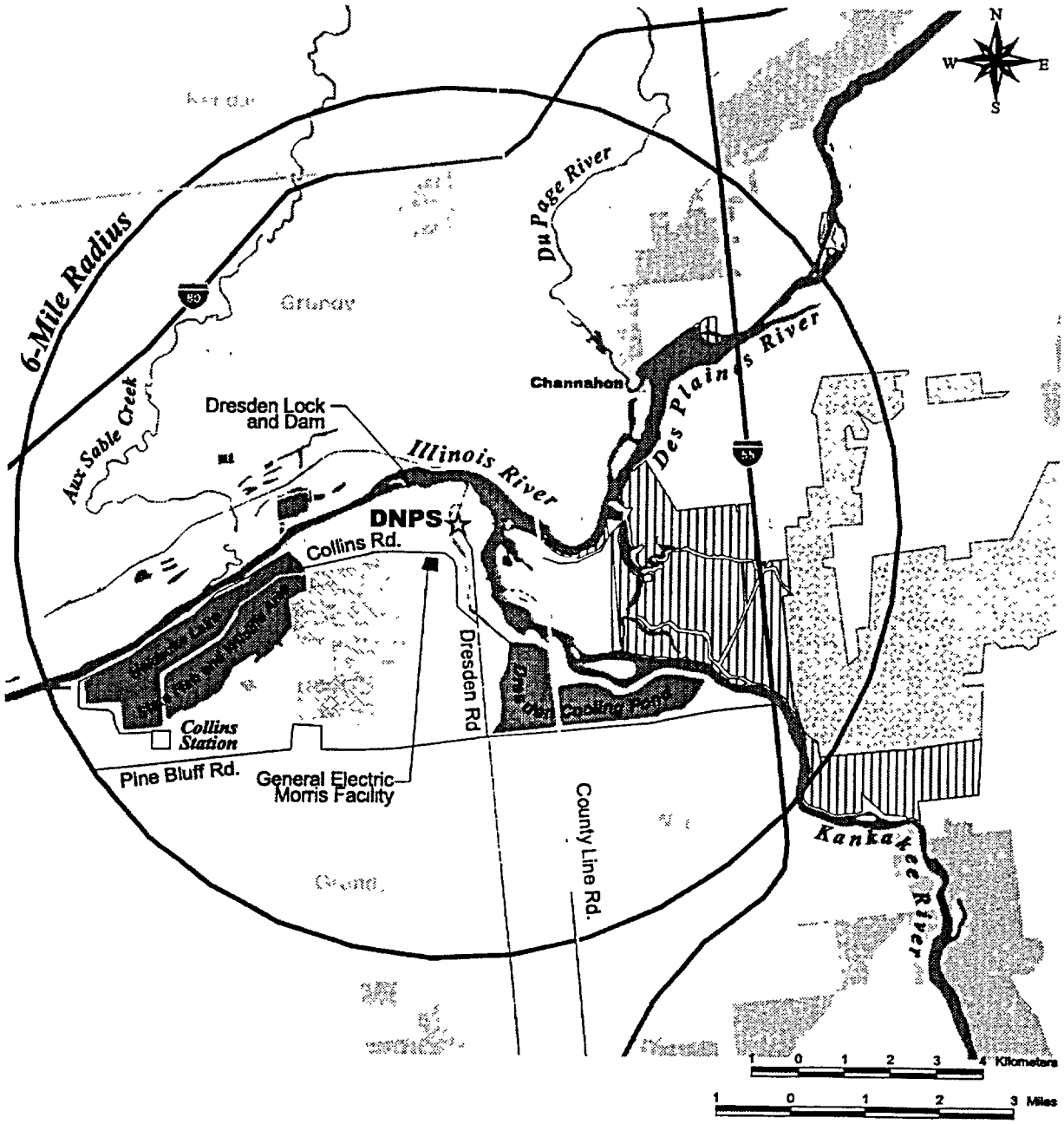
Because of the reported cases of fatal *Naegleria* infections associated with cooling towers, the distribution of these two pathogens in the power plant environs was studied in some detail (Tyndall et al. 1983; see also Appendix D). In response to these various studies (Appendix D), many electric utilities require respiratory protection for workers when cleaning cooling towers and condensers. However, no Occupational Safety and Health Administration (OSHA) or other legal standards for exposure to microorganisms exist at present. Also, for worker protection, one plant with high concentrations of *Naegleria fowleri* in the circulating water successfully controlled the pathogen through chlorination before its yearly downtime operation (Tyndall et al 1983).

Changes in the microbial population and in the use of bodies of water may occur after the operating license is issued and the application for license renewal is filed. Ancillary factors may also change, including average temperature of water resulting from climatic conditions. Finally, the long-term presence of a power plant may change the natural dynamics of harmful microorganisms within a body of water by raising the level of *N. fowleri*, which are indigenous to the soils. Increased populations of *N. fowleri* may have significant adverse impacts. On entry into the nasal passage of a susceptible individual, *N. fowleri* will penetrate the nasal mucosa. The ensuing infection results in a rapidly fatal form of encephalitis. Fortunately, humans in general are resistant to infection with *N. fowleri*. Hallenbeck and Brenniman (1989) have estimated individual annual risks for primary amebic meningoencephalitis caused by the free living *N. fowleri* to swimmers in

fresh water, to be approximately 4 x 10^{-6}. Heavily used lakes and other fresh bodies of water may merit special attention and possibly routine monitoring for *N. fowleri*.

Thermophilic organisms may or may not be influenced by the operation of nuclear power plants. The issue is largely unstudied However, NRC recognizes a potential health problem stemming from heated effluents. Occupational health questions are currently resolved using proven industrial hygiene principles to minimize worker exposures to these organisms in mists of cooling towers. NRC anticipates that all plants will continue to employ proven industrial hygiene principles so that adverse occupational health effects associated with microorganisms will be of small significance at all sites, and no mitigation measures beyond those implemented during the current term license would be warranted Aside from continued application of accepted industrial hygiene procedures, no additional mitigation measures are expected to be warranted as a result of license renewal. This is a Category 1 issue.

Public health questions require additional consideration for the 25 plants using cooling ponds, lakes, canals, or small rivers (all under the small river category in Tables 5.18 and 5.19) because the operation of these plants may significantly enhance the presence of thermophilic organisms. The data for these sites are not now at hand and it is impossible to predict the level of thermophilic organism enhancement at any given site with current knowledge. Thus the impacts are not known and are site-specific. Therefore, the magnitude of the potential public health impacts associated with thermal enhancement of *N. fowleri* cannot be determined generically. This is a Category 2 issue.



LEGEND

- County Boundaries
- Lakes and Rivers
- Des Plaines Conservation Area
- Goose Lake Prairie Natural Area
- Midewin National Tallgrass Prairie
- Urban Areas

FIGURE 2-2
6-Mile Vicinity Map

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

RECEIVED
JUL 16 2002
LICENSING

217-558-2012

July 8, 2002

Mr. Keith R. Jury
Mid-West Regional Operating Group
Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

RE: Thermophilic Organisms, Dresden Nuclear Power Station

Dear Mr. Jury:

With regard to your letter addressed to Thomas McSwiggin, Manager of the Division of Water Pollution Control Permit Section, dated January 11, 2002 requesting information on thermophilic microorganisms, I regret to inform you that the Illinois EPA does not monitor these types of organisms in any way. After having consulted with others here at the IEPA, we believe that such monitoring is out of our purview. We suggest that you inquire at the Illinois Department of Public Health or the Illinois Department of Nuclear Safety.

Sincerely,

Robert Mosher, Manager
Water Quality Standards Section
Bureau of Water

Exelon Nuclear

Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

www.exeloncorp.com

RS-01-285

January 11, 2002

Mr. Clint Mudgett
Division of Environmental Health
Illinois Department of Public Health
535 W. Jefferson St
Springfield, IL 62761

Subject: Dresden Nuclear Power Station Units 2 and 3, License Renewal: Request For Information On Thermophilic Microorganisms

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January 11, 2001
Illinois Environmental Protection Agency
Page 2

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Should you have any questions concerning this letter, please contact Mr. Terry Steinert at (630) 657-3213.

Respectfully,

K R. Jury
Director – Licensing
Mid-West Regional Operating Group

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Attachment B: Figure 2-2, 6-Mile Vicinity Map

Generic Environmental Impact Statement for License Renewal of Nuclear Plants (NUREG-1437 Vol. 1)

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Potential adverse health effects on workers due to enhancement of microorganisms are an issue for steam-electric plants that use cooling towers Potential adverse health effects on the public from thermally enhanced microorganisms is an issue for the nuclear plants that use cooling ponds, lakes, or canals and that discharge to small rivers. These plants are all combined in the category of small river (average flow less than 2830 m^3/s (100,000 ft^3/s) in Tables 5.18 and 5.19. These issues were evaluated by reviewing what is known about the organisms that are potentially enhanced by operation of the steam-electric plants

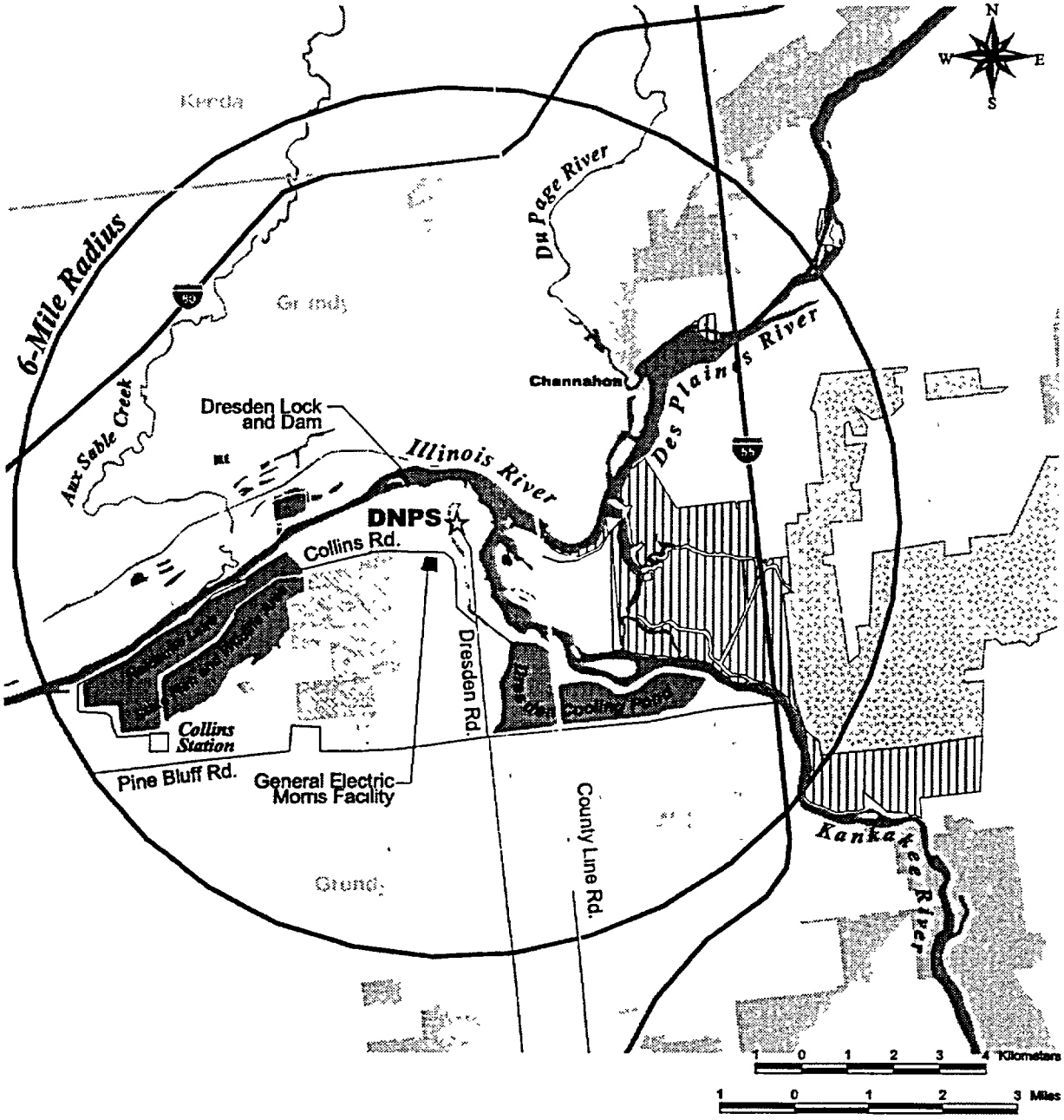
Because of the reported cases of fatal *Naegleria* infections associated with cooling towers, the distribution of these two pathogens in the power plant environs was studied in some detail (Tyndall et al. 1983; see also Appendix D) In response to these various studies (Appendix D), many electric utilities require respiratory protection for workers when cleaning cooling towers and condensers. However, no Occupational Safety and Health Administration (OSHA) or other legal standards for exposure to microorganisms exist at present. Also, for worker protection, one plant with high concentrations of *Naegleria fowleri* in the circulating water successfully controlled the pathogen through chlorination before its yearly downtime operation (Tyndall et al 1983)

Changes in the microbial population and in the use of bodies of water may occur after the operating license is issued and the application for license renewal is filed. Ancillary factors may also change, including average temperature of water resulting from climatic conditions. Finally, the long-term presence of a power plant may change the natural dynamics of harmful microorganisms within a body of water by raising the level of *N. fowleri*, which are indigenous to the soils. Increased populations of *N. fowleri* may have significant adverse impacts. On entry into the nasal passage of a susceptible individual, *N. fowleri* will penetrate the nasal mucosa. The ensuing infection results in a rapidly fatal form of encephalitis Fortunately, humans in general are resistant to infection with *N. fowleri*. Hallenbeck and Brenniman (1989) have estimated individual annual risks for primary amebic meningoencephalitis caused by the free living *N. fowleri* to swimmers in

fresh water, to be approximately 4 x 10^{-6}. Heavily used lakes and other fresh bodies of water may merit special attention and possibly routine monitoring for *N. fowleri*.

Thermophilic organisms may or may not be influenced by the operation of nuclear power plants. The issue is largely unstudied. However, NRC recognizes a potential health problem stemming from heated effluents. Occupational health questions are currently resolved using proven industrial hygiene principles to minimize worker exposures to these organisms in mists of cooling towers. NRC anticipates that all plants will continue to employ proven industrial hygiene principles so that adverse occupational health effects associated with microorganisms will be of small significance at all sites, and no mitigation measures beyond those implemented during the current term license would be warranted. Aside from continued application of accepted industrial hygiene procedures, no additional mitigation measures are expected to be warranted as a result of license renewal. This is a Category 1 issue.

Public health questions require additional consideration for the 25 plants using cooling ponds, lakes, canals, or small rivers (all under the small river category in Tables 5.18 and 5.19) because the operation of these plants may significantly enhance the presence of thermophilic organisms. The data for these sites are not now at hand and it is impossible to predict the level of thermophilic organism enhancement at any given site with current knowledge. Thus the impacts are not known and are site-specific. Therefore, the magnitude of the potential public health impacts associated with thermal enhancement of *N. fowleri* cannot be determined generically. This is a Category 2 issue.



LEGEND

- County Boundaries
- Lakes and Rivers
- Des Plaines Conservation Area
- Goose Lake Prairie Natural Area
- Midewin National Tallgrass Prairie
- Urban Areas

FIGURE 2-2
6-Mile Vicinity Map

Illinois Department of
Public Health

[illegible]

[illegible]

February 7, 2003

Keith R. Jury
Licensing Director
Mid-West Regional Operating Group
Exelon Generation
4300 Winfield Road
Warrenville, IL 60555

Dear Mr. Jury.

This letter is in response to your January 11, 2003 letter regarding the license renewal of the Dresden Nuclear Power Station, Units 2 and 3

This Department has not conducted any sampling of the discharge area related to the presence of thermophilic microorganisms. There are no public bathing beaches regulated by this Department in the discharge area. It is our understanding that fishing and boating, including water skiing and other body contact activities, are allowed downstream of the discharge Based on the average daily temperature in the discharge canal as reported in your letter, we would not expect any appreciable public health risk due to thermophilic microorganisms to persons who contact the water

If you have any further questions, please contact me at 217/782-5830

Sincerely,

Clinton C Mudgett, Chief
Division of Environmental Health

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