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RS-01-286

January 11, 2002

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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 *Naegleria 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 (*Legionella* sp.) and free-living amoeba of the genus *Naegleria* (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 thermophilic 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.

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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.

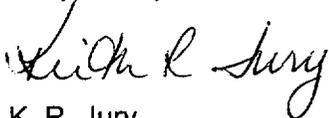
We do not expect DNPS operations and cooling systems to change significantly over the license renewal term, and there is no reason to believe that discharge temperatures will increase. However, we are requesting any information that the Illinois Environmental Protection Agency (IEPA) may have compiled 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,



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 m³/s (100,000 ft³/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 4×10^{-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.



Kendall

6-Mile Radius



Aux Sable Creek

Dresden Lock and Dam

DNPS

Du Page River

Des Plaines River



Collins Rd.

Illinois River

Heldecke Lake
State Fish and Wildlife Area

Collins Station

General
Electric
Morris
Facility

Dresden

Cooling Pond

Pine Bluff Rd

Dresden Rd.

County Line Rd.

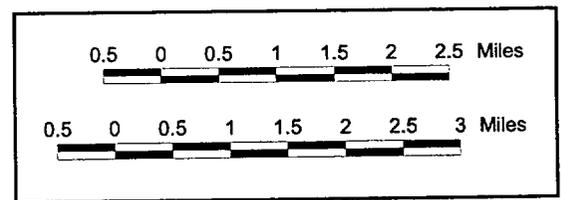
Will

Kankakee River

Grundy

LEGEND

- ★ Nuclear Power Plants
- ▨ Midwin National Tallgrass Prairie
- ▩ Goose Lake Prairie Natural Area
- ▤ Des Plaines Prairie Conservation Area
- Power Station
- Interstates
- County Boundary
- ▧ Lakes and Rivers



**FIGURE 2-2
6-Mile Vicinity Map**