

Appendix E

Microbiological Correspondence

Byron Station Environmental Report

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January 23, 2013

David W. Culp, Ph.D., Deputy Director
Illinois Department of Public Health
Office of Health Protection
525 W. Jefferson St., 2nd Floor
Springfield, Illinois 62761-0001

**SUBJECT: Exelon Generation, LLC – Byron Station Units 1 and 2 License Renewal Project.
Request for information on Thermophilic Pathogens – Ogle County**

Dear Dr. Culp:

In May 2013, Exelon Generation Company, LLC (Exelon Generation; a subsidiary of Exelon Corporation) plans to apply to the Nuclear Regulatory Commission (NRC) for renewal of the operating licenses for Byron Station (Byron), Units 1 and 2. The Byron Units began commercial operation in 1985 and 1987, respectively. The existing operating license for Byron Unit 1 expires October 31, 2024, and the existing operating license for Byron Unit 2 expires November 6, 2026. License renewal will extend the license terms to October 31, 2044 and November 6, 2046, respectively.

The NRC requires that the license renewal application include an environmental report assessing potential impacts from license renewal activities, including continued operations. One such impact is the "impact of the proposed action [license renewal] on public health from thermophilic organisms in the affected water" (10 CFR 51.53(c)(3)(ii)(G)). Accordingly, we are contacting you to obtain input regarding potential public health concerns associated with the enteric pathogens *Salmonella* spp and *Shigella* spp as well as *Pseudomonas aeruginosa* bacterium, thermophilic fungi, *Legionella* spp in unusually high concentrations, and the free-living amoeba of the genera *Naegleria* and *Acanthamoeba*. Of greatest concern is the genus *Naegleria*, comprising four species. To date only one species, *N. fowleri*, has been determined to be pathogenic in humans.

Project Features

Byron is located in northern Illinois near the center of Ogle County, approximately 90 miles (mi) west-northwest of Chicago, 17 mi southwest of Rockford, and 3.7 mi south-southwest of the City of Byron. The Rock River is approximately 2 mi west of the western site boundary.

The following paragraphs provide background information on the Byron cooling system, and Exelon Generation's assessment of potential effects on the public. We are requesting your help to identify issues regarding thermophilic organisms that we may have overlooked, but that should be addressed in the Byron license renewal environmental report. We are particularly interested in learning of any information your staff believes could expedite the NRC's review of the Byron license renewal application.

Cooling System

Each of Byron's two units has a closed-cycle recirculating cooling water system with a natural draft cooling tower. An open cooling water basin and intake flume is located between the two natural draft cooling towers. Makeup water for the cooling towers to replace water lost to evaporation, drift, and blowdown comes from the Rock River. Blowdown water is returned to the Rock River through an NPDES-permitted (IL0048313) outfall (Outfall 001) for the purpose of reducing dissolved solids that build up in the circulating water system as the condenser cooling water recycles through the natural draft cooling towers. Byron operates an onsite package sewage treatment plant. The effluent from the sewage treatment plant mixes with the blowdown water discharge before both are released through Outfall 001. The outfall structure discharges through a 275-ft-long rip-rapped channel into the east side of the river approximately 200 feet downstream of the intake structure.

The flow rate of blowdown discharged to Rock River ranges between 29 and 38 cubic feet per second (cfs), depending on water chemistry (concentrations of mineral solids) in the cooling tower basins. Results of thermal modeling prior to construction of the station predicted that the blowdown would create a thermal plume with a surface area ranging from 0.45 to 2.8 acres between May and August and that discharge temperatures would meet water quality standards.

Under Illinois Administrative Code (IAC) Title 35, Section 302.102(b)(8), "a [temperature] mixing zone must not contain more than 25 percent of the cross-sectional area or volume of flow of a stream." In Special Condition 3 of NPDES permit IL0048313, the Illinois EPA has determined that Byron's blowdown discharge meets this criterion as well as the thermal water quality standard in Title 35, Section 302.211. In addition, as specified in Special Condition 12 of NPDES permit IL0048313, Byron must explicitly demonstrate compliance with the thermal water quality standard on a daily basis during times when the Rock River flow is less than 2,400 cfs, or the temperature difference between the main river temperature and the water quality standard is less than 3°F.

Byron also has an agreement with the Illinois Department of Natural Resources (DNR) to limit consumption of water from the Rock River for makeup to the Byron cooling systems to no more than 9 percent of total river flow during times when the river flow rate drops below 679 cfs. To maintain compliance, Byron adjusts the circulating water system makeup and blowdown flows, and if necessary, would reduce the power output from the units.

Byron water systems that recirculate and blow down to the Rock River are treated with biocides, including sodium hypochlorite and sodium bromide, for biofouling control. Additionally, sulfuric acid, polyphosphate, potassium phosphonate, acrylic polymer, and triazole are used for scaling control; zinc for corrosion control; and polyacrylate for silt dispersal. Makeup from the river is treated with a low concentration of copper ions to prevent zebra mussel infestation.

An Environmental Protection Plan is incorporated in the NRC operating licenses for Byron. The Environmental Protection Plan incorporates the NPDES permit by reference. Blowdown flow and temperature are monitored and reported to the Illinois EPA in monthly NPDES Discharge Monitoring Reports.

The stream segment (IL_P-20) of the Rock River receiving the discharge from Byron Outfall 001 is identified in the December 2012 *Illinois Integrated Water Quality Report and Section 303(d) List* as fully supporting primary (and secondary) contact. These designations are based on fecal

coliform measurements only. Primary contact is "any recreational or other water use in which there is prolonged and intimate contact with the water involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard such as swimming and water skiing" (IAC Title 35, Section 301.355).

Conclusions

The temperature of the blowdown water discharged from Byron's circulating water system to the Rock River is monitored and reported to the Illinois EPA to verify compliance with the Station's NPDES permit. The size of the discharge thermal plume (mixing zone) is consistent with Illinois EPA regulatory requirements. The circulating water system is treated with biocides, and the sewage treatment plant effluent mixes with the circulating water system blowdown prior to discharge. For these reasons, Exelon Generation concludes that blowdown water discharges from Byron are having little effect on the small risk to public health posed by exposure to thermophilic pathogens possibly present in stream segment IL_P-20 of the Rock River.

Furthermore, because renewal of the Byron Units 1 and 2 operating licenses by NRC will authorize no new construction, refurbishment or operational changes to the circulating water system that would affect thermal characteristics of the discharge, Exelon Generation concludes that the proposed license renewals would not contribute to any increase in adverse effects on public health from exposure to *N. fowleri* or any other thermophilic pathogen in the Rock River.

In closing, we would appreciate receiving a response from you detailing issues or information that we may have overlooked and that your staff believes could expedite NRC's review of the Byron License Renewal Application. We would also welcome your confirmation of our conclusions that renewing the Byron operating licenses would not increase adverse effects on public health from exposure to thermophilic pathogens in the Rock River.

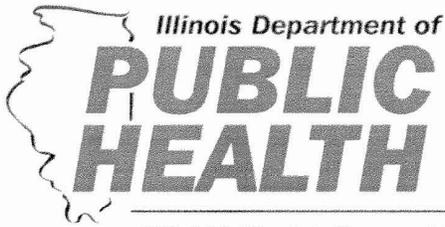
Because Exelon Generation will incorporate a copy of your response, as well as this letter, into the environmental report that will be submitted to the NRC as part of the Byron License Renewal Application, your response will be most helpful if we receive it by February 13, 2013.

Please call Nancy Ranek (610) 765-5369, Exelon Generation's License Renewal Environmental Lead, if you have questions or require additional information. Thank you in advance for your assistance.

Respectfully,



Michael P. Gallagher
Vice President – License Renewal
Exelon Generation, LLC



*MPG
3.13.13*

Applies to Both
Byron & Braidwood

Pat Quinn, Governor
LaMar Hasbrouck, MD, MPH, Director

525-535 West Jefferson Street • Springfield, Illinois 62761-0001 • www.idph.state.il.us

March 3, 2013

Mr. Michael P Gallagher
Vice President, License Renewal Exelon Nuclear
200 Exelon Way
Kennett Square, PA 19348

Dear Mr. Gallagher:

The Illinois Department of Public Health (IDPH) has received your letter requesting that the Office of Health Protection review part of your application for license renewal for Byron Station Units 1 and 2. The Division of Environmental Health has determined that evaluating and commenting on this license renewal application is outside the scope of our mission and that staff do not have the expertise necessary to adequately evaluate the application.

If you have additional health-related questions, please contact Tiffanie Denny, Environmental Toxicologist, at 217-782-5830 or TTY (for hearing impaired use only) 800-547-0466.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken McCann".

Ken McCann, MA, LEHP
Chief, Division of Environmental Health

JLP

Improving public health, one community at a time

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