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DATE: October 27, 2009

TO: William Glahn, Director *WJG*
Office of Energy Security

FROM: William Cole Storm, Energy Facility Permitting

RE: DOC Staff Recommendation for Determination on the Design of the ISFSI and Groundwater Protection Requirements of Minn. Stat. 116C.83, subdivision 6. PUC Docket No. E002/CN-08-510

The attached findings of fact, conclusions and order concerning the design of the Independent Spent Fuel Storage Installation (ISFSI) for the Prairie Island Nuclear Generating Plant (PINGP) and the groundwater protection provisions of Minn. Stat. 116C.83, are offered for your signature.

Background

On May 16, 2008, Xcel Energy filed a Certificate of Need (CON) application for additional dry cask storage at the existing ISFSI at the PINGP with the Public Utilities Commission (PUC Docket No. E002/CN-08-510). This filing was pursuant to Minn. Stat. 116C.83, Minn. Stat. 216B.243, and Minn. Rule 7855. On July 15, 2008, the Public Utilities Commission (Commission) accepted the application as complete (July 22, 2008 Order).

The PINGP currently has State authorization for enough dry casks (e.g., 29) to store the spent fuel generated until the end of the current operating licenses in 2013 and 2014; there are currently 24 dry casks at the PINGP ISFSI. In order for the reactors to continue operation through a federal (Nuclear Regulatory Commission) license renewal period to 2033 and 2034, up to an additional 35 dry casks would be needed to be added to the existing ISFSI.

Authorization of any additional dry cask storage or expansion or establishment of an independent spent-fuel storage facility at a nuclear generation facility in Minnesota is subject to approval of a certificate of need by the Commission pursuant to Minn. Stat. 216B.243. An environmental impact statement (EIS) is required for the construction and operation of a new or expanded independent spent-fuel storage installation (Minn. Stat. 116C.83). The Department of Commerce is the responsible governmental unit (RGU) for the environmental review. The commissioner must find that the applicant has demonstrated that the facility is designed to provide a reasonable expectation that the operation of the facility will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3).

Along with its May 16, 2008, filing, Xcel Energy also filed a CON for the proposed PINGP Extended Power Uprate (EPU) Project (PUC Docket No. E002/CN-08-509). Additionally, Xcel Energy submitted a large electric power generating plant (LEPGP) Site Permit application to the Commission

for the proposed EPU project (PUC No. E002/GS-08-690). Both dockets require the production of an environmental review document; an Environmental Report (ER) in the case of the CON and an Environmental Impact Statement in the case of the Site Permit. The Department of Commerce (Department) Office of Energy Security Energy Facility Permitting staff prepares the documents in either case.

Environmental Review

The three dockets relative to PINGP each requires an environmental review document.

Item	Docket No.	Review Document
CON for the EPU	E002/CN-08-509	Environmental Report
LEPGP Site Permit for the EPU	E002/GS-08-690	Environmental Impact Statement
CON for Additional Dry Casks	E002/CN-08-510	Environmental Impact Statement

The ER requirement of the EPU CON process and the EIS requirement of the LEPPG Siting process were combined into a single environmental review document pursuant to Minn. Rule 7849.7100. In addition, the Department in consultation with Commission staff determined that further process efficiencies would be achieved by incorporating the EIS requirements for the Additional Dry Cask Storage CON process with the environmental review requirements for the EPU CON and Site Permit.

Thus, the OES EFP staff prepared one document to fulfill:

- The Uprate CON and site permit environmental review requirements of 7849.7030 and 7849.5300, respectively, combined pursuant to 7849.7100.
- The Independent Spent Fuel Storage Installation EIS required pursuant to 116C.83, developed in accordance with 116D and Chapter 4410.

The commissioner must find that the applicant has demonstrated that the facility is designed to provide a reasonable expectation that the operation of the facility will not result in groundwater contamination in excess of the standards established in section 116C.76, subdivision 1, clauses (1) to (3).

I am available to discuss this matter and any specifics of the EIS process at your convenience.

Cc: Marya White

**STATE OF MINNESOTA
DEPARTMENT OF COMMERCE**

In the Matter of the Application by
Xcel Energy for a Certificate of Need for
Additional Dry Cask Storage at the
Independent Spent Fuel Storage
Installation at the Prairie Island Nuclear
Generating Plant in Goodhue County.

**FINDING OF FACT,
CONCLUSIONS AND ORDER
FACILITY DESIGN IS
PROTECTIVE OF
GROUNDWATER**

PUC Docket No. E002/CN-08-510

The above-captioned matter came before the Director of the Department of Commerce Office of Energy Security (OES) on October 23, 2009, pursuant to an application by Xcel Energy to expand the Independent Spent Fuel Storage Installation at the Prairie Island Nuclear Generating Plant in Goodhue County, Minnesota.

STATEMENT OF ISSUE

Does the design of the Independent Spent Fuel Storage Installation yield a reasonable expectation that the operation of the facility will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3)?

Based upon all of the proceedings herein, the Director of the Department of Commerce OES makes the following:

FINDINGS OF FACT

1. The commissioner must find {Minn. Stat. 116C.83, subdivision 6, cause (b)} that the applicant has demonstrated that the Independent Spent Fuel Storage Installation (ISFSI) is designed to provide a reasonable expectation that the operation of the facility will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3).
2. Minn. Stat. 116C.76, requires that radioactive waste management facilities for spent nuclear fuel or high-level radioactive wastes must be designed to provide a reasonable expectation that the undisturbed performance of the radioactive waste management facility will not cause the radionuclide concentrations, averaged over any year, in groundwater to exceed:
 - (1) five picocuries per liter of radium-226 and radium-228;
 - (2) 15 picocuries per liter of alpha-emitting radionuclides including radium-226 and radium-228, but excluding radon; or
 - (3) the combined concentrations of radionuclides that emit either beta or gamma radiation that would produce an annual dose equivalent to the total body of any

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internal organ greater than four millirems per year if an individual consumed two liters per day of drinking water from the groundwater.

Procedural History

3. On May 16, 2008, Xcel Energy submitted an Application for a Certificate of Need for Additional Dry Cask Storage at the existing ISFSI at the Prairie Island Plant.
4. On May 20, 2008, the Commission issued a notice requesting comments on the completeness of Xcel Energy's CN Application.
5. The Commission met on July 15, 2008, to consider the CON Application. In an Order dated July 22, 2008, the Commission accepted the CON Application as substantially complete pending supplemental filing. In a separate Order dated July 22, 2008, the Commission referred the CON Application for a contested case proceeding and public hearing.
6. The OES prepared an EIS on Xcel Energy's proposal to expand the dry cask at the PINGP ISFSI pursuant to Minn. Stat. 116C.83, subdivision 6.
7. The OES released the draft EIS (DEIS) on March 17, 2009, and the final EIS was released on July 31, 2009.

Proposed Project

8. Xcel forecasts that continuing operation of the PINGP reactors through a license renewal period to 2033 and 2034 will create a need for up to an additional 35 dry casks. Xcel proposes to add this storage to the existing ISFSI.
9. The ISFSI currently consists of a lighted area, approximately 720 feet long and 340 feet wide, located west of the Prairie Island Plant cooling towers on the 560-acre Xcel Energy property. Two fences surround the facility with a monitored clear zone between the two fences.
10. Currently, 24 casks are stored on two reinforced concrete pads, measuring 36' wide, 216' long, and 3' deep, within the storage area. Xcel proposes to store the additional casks on new 18' wide concrete pads to be located immediately south of the existing concrete pads within the ISFSI.
11. The approach to the pads consists of 14 inches of compacted MnDOT Class 5 aggregate with a 2% slope. A 30-foot by 50-foot steel frame equipment storage building approximately 30 feet high is located on the ISFSI site. The primary purpose of this building is to store the cask transport vehicle. A smaller block building within

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the ISFSI houses the security equipment. Another block building outside the ISFSI houses the pressure monitoring equipment. A 17-foot high earthen berm surrounds the ISFSI. The site is monitored with cameras and other security devices. An access road connects the ISFSI to the rest of the Prairie Island Plant.

12. The Prairie Island ISFSI is currently licensed by the NRC to store 48 TN-40 casks. In order to store an additional 16 casks, two new pads will be constructed. Construction of each new pad consists of pouring an 18-foot wide by 216-foot long by 3-foot thick slab. In addition, underground concrete ductbanks and associated electrical conduit will need to be installed from the monitoring building to the new pads. The work will include excavation of the pad area, trenching of the ductbank path, pouring the concrete pad and ductbank, and replacing the structural fill. The existing layout of the ISFSI can accommodate extensions of the concrete pads to the north and south with sufficient space to store up to 100 casks without changes to the security perimeter.
13. Xcel's cask loading plans would not result in a need for the additional capacity of the two concrete pads prior to 2022. Xcel proposed to install the two concrete pads in the ISFSI in 2020.
14. Xcel currently uses TN-40 casks for storage of spent nuclear assemblies. Xcel proposed use of an improved version, designated TN-40HT, to be authorized for storage in this proceeding. Both the TN-40 and TN-40HT casks are manufactured by Transnuclear, Inc. The TN-40 Dry Fuel Cask storage system currently in use at the Prairie Island Plant is licensed in accordance with federal regulations. On March 28, 2008, Xcel submitted a license amendment request to the NRC. This request seeks a finding of compliance of the TN-40HT casks with NRC's storage requirements. Xcel anticipates that the NRC will issue the amendment to the ISFSI license in October 2009.
15. The TN-40HT system consists of five main components: (1) TN-40HT Dry Fuel Cask, a steel container designed to hold 40 fuel assemblies and accommodate higher enriched and burned fuel assemblies; (2) lifting yoke, a steel-lifting device that interfaces with the crane to lift the cask; (3) transfer vehicle, a multi-wheel trailer used to safely support and move the cask from the Auxiliary Building to the concrete storage pads at the ISFSI; (4) certain ancillary devices used to dry and backfill the cask for storage; and (5) transport impact inhibitors, devices attached to the ends of the cask to lessen the forces on the cask in the event of an accident when the casks are removed from the ISFSI.
16. The TN-40HT Dry Fuel Cask is comprised of an internal basket, containment vessel, lid, outer shell, neutron radiation shields, and a weather cover. The internal basket consists of stainless steel boxes separated by heat conduction and neutron absorption plates. The containment vessel is the innermost cask shell and is a 1.5-inch thick

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carbon steel cylinder to which a 10-inch thick carbon steel lid is bolted. Two metallic O-rings are installed on the lid to ensure there is no leakage. The outer shell is a 7.25-inch thick steel cylinder, around which are arrayed resin-filled, neutron-absorbing containers to reduce neutron radiation levels. A torospherical weather cover is provided above the cask lid to keep it clean and to avoid the accumulation of water in its recesses.

17. Canister loading includes physically placing the spent fuel assemblies into the cask, draining, decontamination, securing the lid, and drying. The spent fuel assemblies are loaded into the cask and the lid is installed while the cask is in the spent fuel pool. The cask is lifted, drained, and moved to a decontamination area, where the lid is tightened and the cask is vacuum dried. The cask is backfilled with helium. The sealed cask is then transported to the ISFSI.
18. Xcel intends that the ISFSI (including the expansion requested in this matter) be used for temporary storage. Xcel Energy is not relying on the U.S. Department of Energy (DOE) to begin accepting waste at the Yucca Mountain Repository before 2020, but it does expect that the DOE will eventually be successful in removing spent fuel from commercial nuclear generating plants. The NRC has estimated that the federal government will begin removal between 2020 and 2025. Upon this basis, Xcel anticipates that spent fuel could be stored at the Prairie Island Plant for between 15 and 30 additional years.
19. On August 6, 2006, the designer of the TN-40 casks, Transnuclear, Inc., made a submittal to the NRC requesting a transportation license for the TN-40 casks. Transnuclear is expected to submit a license amendment request to license the TN-40HT cask design for transportation. Xcel anticipates that the NRC will approve that request in 2010. When approved, the license amendments will eliminate the need to transfer spent fuel between different casks. The new license provisions will allow the TN-40 HT casks to be loaded and shipped directly offsite without having to repackage the fuel assemblies in the spent fuel pool or transfer a cask. This approach will minimize the handling of spent fuel required for its transportation to a permanent repository.
20. There will be no radioactive wastes produced or released by operation of the ISFSI. The spent fuel is stored in metal casks (both TN-40 and TN-40HT) that are sealed and closed to ensure that no radioactive materials can escape. In addition, the casks are continually monitored to ensure that the inert helium gas inside the cask has not escaped. There is no liquid, solid, or gaseous radioactive waste associated with the ISFSI and no release to or contamination of the groundwater. There is no potential for the operation of the ISFSI to result in groundwater contamination.

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CONCLUSIONS

1. Any of the foregoing Findings that more properly should be designated as Conclusions are hereby adopted as such.
2. The Office of Energy Security must find that the applicant has demonstrated that ISFSI is designed to provide a reasonable expectation that the operation of the ISFSI will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3).
3. The Environmental Impact Statement and the record developed within this docket demonstrate that the design of the ISFSI is such that it can be reasonably expected that the operation of the ISFSI will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3).

Based on the Findings of Fact and Conclusions contained herein and the entire record of this proceeding, the Office of Energy Security hereby makes the following:

ORDER

The Director of the OES hereby determines that the design of the ISFSI is such that it can be reasonably expected that the operation of the ISFSI will not result in groundwater contamination in excess of the standards established in Minn. Stat. 116C.76, subdivision 1, clauses (1) to (3).

Dated this 27th day of October, 2009

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE
OFFICE of ENERGY SECURITY



William Glahn
Director

