



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005**

December 15, 2004

Charles R. Bomberger
General Manager, Nuclear
Asset Management
Northern States Power Company
dba Xcel Energy
414 Nicollet Mall (Ren. Sq. 8)
Minneapolis, MN 55401

SUBJECT: NRC INSPECTION REPORT 030-05004/04-001

Dear Mr. Bomberger:

An NRC inspection was conducted on October 12, 2004, at your Pathfinder Generating Plant near Sioux Falls, South Dakota. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspection consisted of collection of ground and surface water samples to ascertain whether licensed material may be present in the environs of the site. The inspection results were presented to Mr. Joel Beres, Pathfinder Decommissioning Project Manager, telephonically on November 24, 2004, by Mr. Robert Evans, Senior Health Physicist, of my staff.

In summary, the ground and surface water sample results revealed only naturally occurring radioactive materials. No licensed material was identified in the water samples. The inspection also determined that your staff conducted the water sampling in conformance with U.S. Environmental Protection Agency and American Society for Testing & Materials (ASTM) technical guidance documents.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

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Should you have any questions concerning this inspection, please contact the undersigned at (817) 860-8191 or Mr. Robert J. Evans, Senior Health Physicist, at (817) 860-8234.

Sincerely,

/RA/

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 030-05004
License No.: 22-08799-02

Enclosure:
NRC Inspection Report
030-05004/04-001

cc w/enclosure:
Steve Pirner, Secretary
Dept. of Environment & Natural Resources
Joe Foss Building
523 East Capitol Street
Pierre, SD 57501-3182

Rick Lancaster, Environmental Project Scientist
Dept. of Environment & Natural Resources
Ground Water Quality Program
Joe Foss Building
523 East Capitol Street
Pierre, SD 57501-3182

Robert J. Stahl
Medical Facilities Engineer Supervisor
Office of Health Care Facilities
Licensure & Certification
South Dakota Department of Health
615 East 4th Street
Pierre, SD 57501-1434

Joel E. Beres, P.E.
Project Manager
Utility Engineering
901 Marquette Ave., Suite 2900
Minneapolis, MN 55402

bcc w/enclosure (via ADAMS distrib):
 MASatorius
 CJGlenn, NMSS/DWMEP/DD/MDS
 KAGruss, NMSS/DWMEP/DD/MDS
 JMPeckenpaugh, NMSS/DWMEP/EPAD/PAS
 CLCain
 DBSpitzberg
 RJEvans
 BASchlapper
 KEGardin
 FCDB File

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 030-05004

License No.: 22-08799-02

Report No.: 030-05004/04-001

Licensee: Northern States Power Company dba Xcel Energy

Facility: Pathfinder Generating Station

Location: Angus Anson Site
7100 East Rice Road
Sioux Falls, South Dakota 57110

Date: October 12 through November 24, 2004

Inspector: Robert J. Evans, P.E., C.H.P., Senior Health Physicist
Fuel Cycle & Decommissioning Branch

Accompanied By: Beth A. Schlapper, Inspector-in-Training
Fuel Cycle & Decommissioning Branch

Approved By: D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle & Decommissioning Branch

Attachments: Supplemental Inspection Information
ORISE's Water Sample Results
Licensee's Water Sample Results (Eberline Services)

EXECUTIVE SUMMARY

Pathfinder Generating Plant
NRC Inspection Report 030-05004/04-001

The purpose of the inspection was to obtain surface and groundwater samples for measurement of any residual radioactive material which could exist from past operations.

Closeout Inspection and Survey

- The inspector and the licensee collected water samples from 13 locations to confirm whether the ground and surface water contained radioactive material from previous plant operations. The sample results revealed only naturally occurring radioactive materials. None of the samples contained licensed material above minimum detectable concentrations or background levels (Section 1).
- The water samples were analyzed by both the NRC's and the licensee's contract laboratories. The individual sample results were statistically comparable with few exceptions, and none of the results were erroneous outliers. The sample results for duplicate samples were also statistically comparable (Section 1).
- The licensee collected the ground and surface water samples in accordance with its procedures that were compatible with technical guidance provided in U.S. Environmental Protection Agency and ASTM documents. The NRC inspector collected the water samples using the licensee's sampling equipment, procedures and protocols (Section 1).

Report Details

Summary of Plant Status

Northern States Power, currently doing business as Xcel Energy, obtained an operating license in 1964 from the U.S. Atomic Energy Commission, predecessor to the NRC, for a 66-megawatt facility. The Pathfinder plant conducted low-power testing from March 1964 until September 1967, after which the company permanently shut the plant down for economic and other reasons. The nuclear fuel was transferred offsite, and the operating license was terminated. License 22-08799-02 was issued in August 1972 for possession of the residual radioactive material. In 1992, the license was amended to allow for decommissioning of the reactor building and fuel handling building.

NRC Materials License 22-08799-02 currently allows Northern States Power Company to possess 41 millicuries of byproduct material in materials and corrosion products previously activated by Pathfinder nuclear reactor operations. The amount of licensed material was based on a calculation which concluded that the residual radioactivity consisted of 40 millicuries of cobalt-60 and 1 millicurie of zinc-65 within the turbine and boiler buildings. Xcel Energy now plans to complete the decommissioning of the site so that it can be released for unrestricted use. The licensee submitted a decommissioning plan to the NRC in February 2004. The licensee plans to complete the remediation of the remaining contamination and conduct final status surveys during calendar year 2005.

1 Closeout Inspection and Survey (IP 83890)

1.1 Inspection Scope

The purpose of the inspection was to obtain surface and groundwater samples for measurement of any residual radioactive material which could exist from past operations.

1.2 Observations and Findings

On February 17, 2004, Xcel Energy submitted the Pathfinder Decommissioning Plan (DP) for NRC review, approval, and incorporation into the license. The DP indicated that the ground and surface water was not contaminated with licensed material from past operations. Section 2.6, Surface Water and Groundwater Contamination, of the DP states, "Based on recent characterization surveys, there is presently no indication of radioactive contamination of surface or groundwater from licensed activities ... No remediation activities of surface or groundwater will occur." Appendix D to the DP (Page 17) states, "Environmental samples were collected for off site analysis at numerous locations surrounding the plant. Sampling locations included...nine groundwater wells labeled Wells P1 through P9." Appendix D further states (Page 36) that, "The environmental samples collected in the environs surrounding the Pathfinder Plant did not identify any residual radioactivity attributable to licensed radionuclides in excess of [instrument] minimum detectable activity."

The inspector collected 14 samples from 13 locations, including the 2 aquifers and the Big Sioux River. The samples were collected to confirm whether the groundwater and surface water contained radioactive materials from previous plant operations.

According to Section 3.3, Hydrology, of the DP, there are two principle aquifers beneath the Pathfinder site, the shallow Big Sioux Aquifer and the deeper Split Rock Creek Aquifer. Precipitation and surface runoff that infiltrates the soils along the flood plain and lower terrace of the Big Sioux River recharges the Big Sioux Aquifer. Groundwater is encountered at a depth of about 7 feet below the surface in the Big Sioux Aquifer. Groundwater velocities in the Big Sioux Aquifer are estimated to range from 400 to 700 feet per year. Infiltration of water from the land surface to the Split Rock Creek Aquifer is unlikely because of the overlying shale and clay deposits.

The primary surface water source in the vicinity of the site is the Big Sioux River. The Big Sioux Aquifer and the Big Sioux River are not used as municipal water supplies, but the deeper Split Rock Creek Aquifer was used by the licensee as a source of plant process water.

Located onsite are four settling basins. These settling basins were once used for the Pathfinder facility but are now being used to handle water treatment system discharges. Per Section 5.3 of the DP, the licensee intends to sample these settling basins as part of the final status survey. Accordingly, these basins were not sampled during this inspection.

The inspector collected 14 water samples from 13 locations simultaneously with the licensee's routine sampling of site wells. The samples included the nine shallow aquifer wells (Wells P-1 through P-9), three deep aquifer wells (Deep Well A, Domestic Well B, and Test Well 2), and the Big Sioux River. According to the licensee, Deep Well A is 225 feet deep, Domestic Well B is 170 feet deep, and Test Well 2 is 98 feet deep.

The water samples were filtered with a 45-micron filter, with the exceptions of the Domestic Well B and Deep Well A. These two samples were collected at a sample collection point in the plant's water treatment system. The collection of filtered water samples was determined to be unnecessary for these two samples because the samples were not collected at the well head. The inspector also collected one quality control sample (P-10), a duplicate sample from shallow aquifer Well P-9.

The inspector observed the licensee collecting field data, including water level measurements, water samples, pH, conductivity, and temperature. The licensee calculated the purge volume for each well that required purging before sampling. Three well casing volumes were purged to ensure that the sample was representative of local groundwater conditions.

The inspector compared the licensee's sampling protocols to the methodologies discussed in the U.S. Environmental Protection Agency's "Groundwater Monitoring," Document SW846, Chapter 11. Also, the inspector compared the licensee's sampling protocols with the "Standard Guide for Sampling Groundwater Monitoring Wells," American Society for Testing & Materials (ASTM) Standard D-4448-01. The inspector

concluded that the licensee's sampling protocols were in agreement with these technical reference documents. The inspector also collected the samples using the licensee's sampling equipment, procedures, and collection protocols.

Two samples were collected from each sample point, an unpreserved sample and a preserved sample. Preservation consisted of the addition of nitric acid to the samples to reduce sample pH to less than two. The preserved samples were analyzed for gross alpha and beta activity, as well as gamma-emitting radionuclides by gamma spectroscopy. The unpreserved samples were analyzed for tritium (hydrogen-3) activity.

The inspector shipped the samples to the NRC's contract laboratory, Oak Ridge Institute for Science and Education (ORISE) at Oak Ridge, Tennessee. The licensee's contractor, Duratek, also collected samples for analysis by a third-party laboratory (Eberline Services). The sample results are included as Attachments 2 and 3 to this inspection report.

In summary, the sample results were representative of background values. No plant-derived radioactive material was clearly identified in any of the sample results including cesium-137 and zinc-65. Further, the quality control sample (labeled as P-10) was determined to be statistically similar to the sample results of Well P-9. The split sample results confirmed the statements contained in the DP that ground and surface water sources are not contaminated with licensed radioactive material.

The inspector compared the sample results from ORISE with the sample results from the licensee's third-party laboratory. With few exceptions, the individual sample results were noted to be statistically comparable. None of the sample results were considered erroneous outliers. Further, the sample results for duplicate samples (samples P-9 and P-10 for ORISE and samples P-9 and duplicate P-9 for the licensee's third-party laboratory) were also statistically comparable.

Although none of the ground or surface water sampling points were used as drinking water supplies, the inspector compared the sample results to the National Primary Drinking Water Regulations of 40 CFR 141.66 which became effective on December 8, 2003. The regulated radioactive drinking water contaminants include gross alpha and beta particle/photon radioactivity. Combined radium-226/228, uranium, and strontium-90 are also listed in the drinking water standards but were not compared to the sample results because they were not radionuclides of concern.

The maximum contaminant level (MCL) for gross alpha is 15 picocuries per liter, while the MCL for beta particle/photon radioactivity is 4 millirems per year. Table A in 40 CFR 141.66 lists the average annual concentration for tritium (hydrogen-3) as 20,000 picocuries per liter of tritium (the amount of radioactivity to produce 4 millirems per year).

The inspector compared the gross alpha and tritium sample results for the 14 water samples to the drinking water standards. One sample exceeded the drinking water standards, the gross alpha activities in the two Deep Well A samples (25.5 and 28.2 picocuries per liter). These sample results were determined to be the

result of naturally occurring radionuclides because this well is a deep aquifer well that could not have been impacted by previous plant operations. None of the shallow wells or the river water, locations that may have been impacted by licensed activities, contained radioactivity in concentrations greater than the MCLs provided in the National Primary Drinking Water Regulations.

1.3 Conclusions

The inspector and the licensee collected water samples from 13 locations to confirm whether the ground and surface water contained radioactive material from previous plant operations. The sample results revealed only naturally occurring radioactive materials. None of the samples contained licensed material above minimum detectable concentrations or background levels.

The water samples were analyzed by both the NRC's and the licensee's contract laboratories. The individual sample results were statistically comparable with few exceptions, and none of the results were erroneous outliers. The sample results for duplicate samples were also statistically comparable.

The licensee collected the ground and surface water samples in accordance with its procedures that were compatible with technical guidance provided in U.S. Environmental Protection Agency and ASTM documents. The NRC inspector collected the water samples using the licensee's sampling equipment, procedures and protocols.

2 Exit Meeting Summary

The inspector presented the inspection results to members of licensee staff at the conclusion of the onsite inspection on October 12, 2004. The final inspection findings were presented to the licensee telephonically on November 24, 2004. The licensee did not identify as proprietary any information provided to, or reviewed by, the inspector.

ATTACHMENT 1

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

C. Donkers, Senior Environmental Analyst, Northern States Power
H. Giorgio, Radiation Safety Officer, Northern States Power
D. Schult, Health Physicist, Duratek
G. Haag, Hydrologist, Department of Natural Resources, State of South Dakota

INSPECTION PROCEDURES USED

IP 83890 Closeout Inspection and Survey

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None.

Discussed

None.

Closed

None.

LIST OF ACRONYMS

ASTM	American Society for Testing & Materials
DP	Decommissioning Plan
MCL	maximum contaminant level
ORISE	Oak Ridge Institute for Science and Education