

July 12, 2002

Mr. John L. Skolds
President and Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: NRC INSPECTION REPORT 05000295/20002-004(DNMS) - ZION

Dear Mr. Skolds:

On June 25, 2002 the NRC completed an inspection at the Zion reactor facility which examined decommissioning activities. The enclosed report documents the inspection findings which were discussed on June 25, 2002, with Mr. R. Landrum and other members of your staff.

The inspection consisted of an examination of activities at the Zion facility as they related to safety and to compliance with the Commission's rules and regulations. Activities in the areas of facility management and control, decommissioning support, spent fuel safety, and radiological safety were examined. Within these areas, the inspection consisted of selective examinations of procedures and representative records, field observations and interviews with personnel.

No violations of NRC requirements were identified.

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We will gladly discuss any questions you may have regarding this inspection.

Sincerely,

/RA by B. Jorgensen acting for/

Christopher G. Miller, Chief
Decommissioning Branch

Docket No. 05000295
License No. DPR-39

Enclosure: Inspection Report 05000295/2002-004(DNMS)

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cc w/encl: Zion Nuclear Power Station Decommissioning Plant Manager
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Chief Operating Officer
Senior Vice President - Nuclear Services
Senior Vice President - Mid-West Regional Operating Group
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.	05000295
License No.	DPR-39
Report No.	05000295/2002-004(DNMS)
Licensee:	Exelon Generation Company, LLC
Facility:	Zion Nuclear Station
Location:	101 Shiloh Boulevard Zion, IL 60099
Dates:	May 15 through June 25, 2002
Inspectors:	Roy J. Leemon, Decommissioning Inspector Decommissioning Branch, DNMS Peter J. Lee, Ph.D., CHP, Radiation Specialist Decommissioning Branch, DNMS Jeffrey L. Roman, Inspector Illinois Department of Nuclear Safety
Approved by:	Christopher G. Miller, Chief Decommissioning Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Zion Nuclear Station NRC Inspection Report 05000295/2002-004(DNMS)

This routine decommissioning inspection covered aspects of licensee facility management and control, decommissioning support activities including surveillance procedures status, spent fuel safety, and radiological safety. During the inspection, the plant was being maintained in a SAFSTOR [safe storage of the spent fuel] condition, with no major decommissioning work activities in progress.

Decommissioning Performance and Status Review at Permanently Shut Down Reactors

- The material integrity of structures, systems, and components necessary for SAFSTOR and for the conduct of safe decommissioning activities was being monitored and maintained. Plant housekeeping was good. Control room staffing met regulatory requirements, and the operation personnel were performing their duties as required.
- The operations manager was delegated the plant manager's responsibilities for day to day operation of Zion Station

Decommissioning Support Activities

- Loss of electrical power to the spent fuel nuclear island bus 2 had no effect on cooling of the spent fuel pool. The Zion Fire Department responded to the resulting fire alarms as required.

Spent Fuel Safety

- The safety of the stored spent fuel was being maintained by the spent fuel pool cooling and ventilation systems.

Radiological Safety

- The licensee was effectively implementing radiation control programs and processes. Personnel exposures were low, commensurate with decommissioning activities, and ALARA practices. The licensee continued to be effective in controlling personal exposures and preventing the spread of contamination.

Report Details¹

Summary of Plant Activities

During the period covered by this inspection, the plant remained in SAFSTOR with no major decommissioning work activities in progress.

1.0 Facility Management and Control

1.1 Decommissioning Performance and Status Review at Permanently Shut Down Reactors (71801)

The inspectors evaluated the progress of decommissioning activities and the licensee's conduct of decommissioning activities, in accordance with licensed requirements and commitments. Control and conduct of facility decommissioning activities were examined to verify that NRC requirements were being met. These requirements included Defueled Technical Specifications (DTS) and requirements and commitments described in the Defueled Safety Analysis Report (DSAR), the Post Shutdown Decommissioning Activities Report (PSDAR) and the Emergency Plan.

1.2 Monitored Decommissioning Activities

a. Inspection Scope

The inspectors attended the following licensee meetings involving the planning, review, assessment, and scheduling of decommissioning activities, to determine whether they were conducted in accordance with license requirements and docketed commitments as stated in 10 CFR Part 50, DTSs, PSDAR, Regulatory Guide 1.33, "Quality Assurance Program Requirements, " and station procedures.

- Zion Station Schedule Meeting
- Zion Station Priority Meeting
- Health Physics Individual Department Meeting

b. Observations and Findings

The meetings which the inspectors observed were conducted in accordance with station procedures and quality assurance program requirements.

c. Conclusions

Decommissioning oversight activities were conducted in accordance with license requirements and docketed commitments.

Note: A list of acronyms used in these "Details" is provided at the end of the report.

1.3 Plant Tours to Evaluate Material Conditions and Housekeeping (IP 71801)

1.3.1 Spent Fuel Pool and Control Room Tour

a. Inspection Scope

The inspectors performed plant tours of the control room and the Spent Fuel Pool Nuclear Island (SFNI) to evaluate the material condition of Structures, Systems, and Components (SSC) necessary for the safe storage of spent fuel. The auxiliary building areas were also inspected for housekeeping and fire protection.

b. Observations and Findings

In the control room, the operator was cognizant of plant status and equipment in service. Control room alarms were acknowledged and silenced in a timely manner.

The inspectors walked down all accessible areas associated with the SFNI which contain SSCs for the safe storage of spent nuclear fuel. Continued cooling of the spent fuel pool was not challenged. Observed housekeeping was good. No deficiencies were identified.

Through observations and discussions with operating personnel, the inspectors determined the operators were cognizant of plant status and what equipment was in service. The inspectors observed a shift turnover of the operators. The operators reviewed computer screens and walked down the controls boards together, along with discussing relevant matters. Also the inspectors determined that the control room was staffed as required by technical specifications. No deficiencies were identified.

c. Conclusions

The material integrity of structures, systems, and components necessary for SAFSTOR and for the conduct of safe decommissioning activities was being monitored and maintained. Plant housekeeping was good. Control room staffing met regulatory requirements, and the operation personnel were performing their duties as required.

1.4 Zion Station Issues Tracking Meetings

a. Inspection Scope

The inspectors observed the Zion Station Issues Tracking Meetings.

b. Observations and Findings

The licensee held Zion Station Issues Tracking Meetings weekly. First line supervisors attended the meeting, which the Decommissioned Plant Manager chaired. The inspectors observed that the licensee was tracking Zion Station issues on an issue tracking spreadsheet with scheduled completion dates. Issues discussed were appropriate for a decommissioned plant.

c. Conclusions

Issues were being adequately tracked and communicated to management personnel using an issue tracking spreadsheet.

1.5 Change in the Plant Manager's Duties

As of June 3, the Zion Station Manager was assigned daily duties external to the Zion Station. The operations manager was delegated the plant manager's responsibilities. The plant manager was present at the plant one day a week to conduct plant management meetings and perform plant manager's functions.

2.0 Decommissioning Support Activities

2.1 Maintenance and Surveillance at Permanently Shut Down Reactors (62801)

The inspectors evaluated maintenance and surveillance activities on structures, systems, and components that could affect the safe storage of spent fuel and reliable operation of radiation monitoring equipment. Reviews, and interviews of licensee personnel were conducted to assess whether maintenance and surveillance activities were being performed in accordance with regulatory requirements.

The inspectors attended briefings and observed discussions of maintenance activities, focusing on schedules and whether activities were keeping pace with plant SAFSTOR activities. The inspectors found that work activities were effectively discussed and prioritized at work status meetings.

The inspectors determined that regulatory requirements were being met for the maintenance activities inspected, contributing to the safe storage of spent fuel.

2.2 Operator Logs and Surveillance Check Sheets

a. Inspection Scope

The inspectors reviewed plant operator logs.

b. Observations and Findings

The quality and detail of the plant operator logs reviewed for June 3, 21, 22, 23, and 24. were acceptable.

c. Conclusions

Plant operations logs were being adequately completed.

2.3 Loss of Electrical Power and Resulting Fire Alarms

a. Inspection Scope

The inspectors reviewed logs and a work order and held discussions with plant staff related to the lost of electrical power to the spent fuel nuclear island and the fire alarms caused by this loss of power.

b. Observations and Findings

On June 3, electrical power was lost to the Spent Fuel Nuclear Island (SFNI) Bus 2. During a storm, a tree contacted the 12 kilovolts North feeder line A-8215, causing faulting of this line. Cooling to the SFP was not interrupted since the equipment cooling the spent fuel pool was being powered from SFNI Bus 1 at the time.

On loss of electrical power, the local fire detectors alarmed. These alarms go to the control room and Alarm Detection System Company (ADS). The ADS company called the Zion Fire Department which sent trucks to the Zion Station. The shift supervisor called ADS and informed them that the fire alarms were from the loss of electrical power and not a fire. When the fire trucks arrived at the north gate, the drivers were told the alarms were from the loss of electrical power and not a fire. The drivers then returned the trucks to the fire station. The fire trucks responded as expected for a fire at the Zion Station.

As a result of the event, the licensee identified some communication enhancements that are needed between ADS and the fire trucks en route to the fire, and the need for periodic operability checks of the radio on the fire trucks used to communicate with the control room. During this event, the ADS company did not notify the fire trucks en route to the Zion Station that the fire alarms were due to loss of electrical power and not a fire. Also, the radio on the fire truck used to communicate with the control room had dead batteries. The licensee wrote a work order to resolve the communication issues.

c. Conclusions

Loss of electrical power to the Spent Fuel Nuclear Island Bus 2 had no effect on cooling of the spent fuel pool. The Zion Fire Department responded to the resulting fire alarms as required.

3.0 **Spent Fuel Safety (60801)**

3.1 Cooling the Spent Fuel Pool

a. Inspection Scope

The inspectors verified the safe wet storage of spent fuel. The inspection included an evaluation of the spent fuel pool (SFP) and fuel pool safety. Factors considered in the evaluation included: siphon and drain protection; SFP instrumentation, alarms and leakage detection; SFP chemistry and cleanliness control; criticality controls; and SFP operation and power supplies. The inspectors also evaluated fuel pool safety as it related to the SFP cooling and ventilation. The inspectors reviewed plant documents to determine the requirements and evaluations for SFP temperature and level.

b. Observations and Findings

The inspectors reviewed the Defueled Technical Specifications (DTS); Defueled Safety Analysis Report (DSAR); local spent fuel pool area instrumentation; and portions of local electrical breaker positions and local valve line-ups. On June 24 the SFP temperature was being controlled at 93°F with a heat up rate of 0.8°F per hour, and the time to start boiling the water in the SFP (with no SFP cooling) was 149 hours. The spent fuel pool level was at elevation 615 feet. The SFP boron concentration was 2011 parts per million (ppm) versus the technical specifications limit of greater than 500 ppm. The inspectors evaluated SFP criticality controls monitoring by observing the local SFP radiation monitors which were normal (less than 1 millirem per hour). After reviewing SFP chemistry sample results from April through May 2002, the inspectors determined that the chemistry of the SFP was being maintained within limits. All the above parameters were being maintained within required limits.

The inspectors walked down accessible areas associated with the spent fuel pool, which contained systems, structures, and components for the safe storage of spent nuclear fuel. The inspectors found no paths for siphoning or draining the SFP. The clarity of the water in the SFP was good. Housekeeping and contamination control were adequate. The inspectors identified no deficiencies.

c. Conclusions

The safety of the stored spent fuel was being maintained by the spent fuel pool cooling and ventilation systems.

4.0 Radiological Safety

4.1 Occupational Radiation Exposure (83750)

a. Scope

The inspectors performed a balanced but limited examination and evaluation of the area of occupational radiation safety. Elements of the program which were examined included: external and internal dose controls; practices to maintain exposures as-low-as-reasonably-achievable (ALARA); equipment calibration; contamination controls; air monitoring; and surveys, posting and radiation work permit (RWP) activities.

b. Observations and Findings

The licensee's internal and external dose control program limited total exposure for all of the staff for May 2002 to 18 millirem. The licensee's staff total exposure for June as of June 18 was 6 millirem. These exposures were below the ALARA goals.

The general air sampling in the fuel and auxiliary buildings did not indicate any positive results. The inspectors reviewed the calibration procedures and records for the facility's continuous air monitors, and found them acceptable.

The inspectors reviewed the calibration procedures and records of the ionization chamber survey meters. The inspectors examined calibration results by observing the

health physics technician exposing the survey meters to known exposure rates in the calibration range.

A review of direct radiation survey and smear results from the fuel and auxiliary buildings for the first quarter of 2002 indicated that the spread of contamination had been contained and contamination levels within the facility had been kept to a minimum.

c. Conclusions

The licensee was effectively implementing radiation control programs and processes. Personnel exposures were low, commensurate with decommissioning activities, and ALARA practices.

4.2 Control of Radioactive Materials and Contamination, Surveys, and Monitoring (IP 83726)

a. Inspection Scope

The inspectors reviewed survey and monitoring activities at Zion Station.

b. Observations and Findings

During 2001, there was no reduction in the amount of contaminated square footage at the station. The amount of non-excluded contaminated area was 606 square feet. There were no plans to reduce the amount of contaminated area.

There were five personnel contamination events at the station in 2001. All five involved less than 5,000 disintegrations per minute. Surveys were performed routinely at the station. On a routine day a floor elevation in the Auxiliary or Fuel Building was selected for a check of contamination. Technicians checked the areas for contamination and cleaned up any small amounts of contamination discovered.

c. Conclusions

The licensee continued to be effective in controlling personal exposures and preventing the spread of contamination.

4.3 RadWaste Treatment, and Effluent and Environmental Monitoring (84750)

a. Inspection Scope

The licensee's activities to effectively control, monitor, and quantify releases of radioactive materials in liquid, gaseous, and particulate forms to the environment were examined. The inspectors reviewed the 2001 Effluent and Environmental monitoring reports, and Offsite Dose Calculation Manual (ODCM).

The inspectors reviewed a self-assessment report for 2001 that included radioactive releases. The inspectors also reviewed the monthly report on the Meteorological Monitoring Program for the station.

b. Observations and Findings

The ODCM was comprehensive and contained the requirements listed in the Technical Specifications. The effluent release data demonstrated that the concentrations of released effluent conformed to 10 CFR 20, Appendix B, Table 2 and the doses to the general public were in conformance with Appendix I of 10 CFR 50. The inspectors reviewed the environmental sampling results and determined all samples contained only background radiation levels with no distinct contribution from the shutdown Zion Station.

The inspectors reviewed the calibration records and procedures for analytical instruments including the liquid scintillation counter, gas proportional counter, and high purity germanium detector. All the analytical instruments were within calibration frequency and operable, and the detection limits were well below limits specified in the ODCM.

The self-assessment report found that all the gaseous and liquid releases from the site during 2001 were far below regulatory limits.

The licensee has contracted with an outside company to keep the meteorological monitoring equipment operating properly. The monthly report includes any problems found with the equipment during the month and the resolution to the problem.

c. Conclusions

The licensee was effectively implementing radiological effluent control programs and processes.

5.0 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management during a meeting on June 25. The licensee acknowledged the findings presented. The licensee did not identify any of the documents or processes reviewed by the inspectors as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

- J. Ashley, Design Engineering
- D. Bump, Plant Manager
- K. King, Maintenance Supervisor
- * R. Landrum, Operations and Engineering Manager
- * B. Leydens, Security Manager
- * M. Petersen, Administrative Manager
- * R. Schuster, Radiation Protection and Chemistry Supervisor
- * V. Voirt, Engineer

- * Present at the June 25 exit meeting.

INSPECTION PROCEDURES USED

IP 36801:	Organization, Management, and Cost Controls at Permanently Shut Down Reactors
IP 37801:	Safety Reviews, Design Changes, & Modifications
IP 60801:	Spent Fuel Pool Safety at Permanently Shut Down Reactors
IP 61726:	Surveillance Observation
IP 62801:	Maintenance and Surveillance at Permanently Shut Down Reactors
IP 71801:	Decommissioning Performance and Status Review at Permanently Shut Down Reactors
IP 83750:	Occupational Radiation Exposure
IP 83726	Control of Radioactive Materials and Contamination, Surveys, and Monitoring

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

DOCUMENTS REVIEWED²

DSAR, "Defueled Safety Analysis Report"

DSEP, "Defueled Station Emergency Plan"

DTS, "Defueled Technical Specifications"

PSAR, "Post Shut-Down Activities Report"

Shift Manager's Logs

Zion Station Work Activities Schedule

Zion Daily Plant Status Sheet

Calibration Documentation for Area Radiation Monitors

LIST OF ACRONYMS USED

ALARA	As-Low-As-Reasonably-Achievable
CAL	Confirmatory Action Letter
CFR	Code of Federal Regulations
CTEM	Changes, Tests, Experiments and Modifications
DSAR	Defueled Safety Analyses Report
DSEP	Defueled Station Emergency Plan
DTS	Defueled Technical Specifications
EAL	Emergency Action Level
ERO	Emergency Response Organization
IDNS	Illinois Dept. of Nuclear Safety
IFI	Inspector Follow-up Items
IP	Inspection Procedure
NARS	Nuclear Accident Reporting System
NRC	Nuclear Regulatory Commission
mrem	millirem
ODCM	Offsite Dose Calculation Manual
PSDAR	Post-Shutdown Decommissioning Activities Reports
SAFSTOR	Safe Storage of the Spent Fuel
SFNI	Spent Fuel Pool Nuclear Island
SFP	Spent Fuel Pool
SSC	Structures, Systems, Components
T&D	Transmission and Distribution
TS	Technical Specification
WR	Work Request
ZAP	Zion Administrative Procedure

²Other documents or records reviewed during this inspection are identified in the Report Details.