

March 12, 2002

Mr. Oliver D. Kingsley, President  
Exelon Nuclear  
Exelon Generation Company, LLC  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: NRC INSPECTION REPORT 05000295/20002-002(DNMS) - ZION

Dear Mr. Kingsley:

On February 22, 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 February 22, 2002, with Mr. D. Bump 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, and spent fuel 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/  
Bruce L. Jorgensen, Chief  
Decommissioning Branch

Docket No. 05000295  
License No. DPR-39

Enclosure: Inspection Report 05000295/2002-002(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.	05000295
License No.	DPR-39
Report No.	05000295/2002-002(DNMS)
Licensee:	Exelon Generation Company, LLC
Facility:	Zion Nuclear Station
Location:	101 Shiloh Boulevard Zion, IL 60099
Dates:	January 28, 2002 - February 22, 2002
Inspectors:	Roy J. Leemon, Decommissioning Branch, DNMS
Approved by:	Bruce L. Jorgensen, Chief Decommissioning Branch Division of Nuclear Materials Safety

## **EXECUTIVE SUMMARY**

### **Zion Nuclear Station NRC Inspection Report 05000295/2002-002(DNMS)**

This routine decommissioning inspection covered aspects of licensee facility management and control, decommissioning support activities, and spent fuel 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. The licensee physically verified the presence of all special nuclear material in the spent fuel pool; this included fuel assemblies, fuel rodlets, and primary sources.

#### Facility Management and Control

- Decommissioning activities were conducted in accordance with license requirements and docketed commitments.
- The material integrity of structures, systems, and components necessary for the safe storage of spent fuel and for the conduct of safe decommissioning activities was being monitored and maintained. Plant housekeeping was good during this inspection period. Control room staffing met regulatory requirements.
- The licensee was tracking and documenting the equipment that was removed from the plant or plant systems.

#### Decommissioning Support Activities

- Regulatory requirements were being met for the maintenance activities observed, contributing to the safe storage of spent fuel.
- The licensee's scheduling and documentation of activities were adequate. The licensee physically accounted for all special nuclear materials including fuel rodlets.

#### Spent Fuel Safety

- The safety of the stored spent fuel was being maintained by the spent fuel pool cooling and ventilation systems. The Shift Manager's Logs entries had detailed entries for the spent fuel nuclear island and other plant activities.

## **Report Details<sup>1</sup>**

### **Summary of Plant Activities**

During the period covered by this inspection, the plant remained in SAFSTOR with no major decommissioning work activities in progress. The licensee physically verified the presence of all special nuclear material in the spent fuel pool; this included fuel assemblies, fuel rodlets, and primary sources.

#### **1.0 Facility Management and Control**

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

The status of decommissioning activities and the licensee's conduct of decommissioning activities, in accordance with licensed requirements and commitments, were evaluated. Control and conduct of facility decommissioning activities were examined to verify that NRC requirements were being met including the 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.

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

###### **b. Observations and Findings**

The activities observed were conducted in accordance with license requirements and docketed commitments as stated in Title 10 of the Code of Federal Regulations, DTSS, PSDAR, Regulatory Guide 1.33, and station procedures.

###### **c. Conclusions**

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

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**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

#### a. Inspection Scope (IP 71801)

The inspectors performed plant tours of the control room and the Spent Fuel Pool to evaluate the material condition of Structures, Systems, and Components (SSC) necessary for the safe storage of spent fuel. Plant 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 Spent Fuel Pool which contain SSCs for the safe storage of spent nuclear fuel. Continued cooling of the spent fuel pool was not challenged and observed housekeeping was good. 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 and control room staffing met regulatory requirements.

### 1.4 Safety Reviews, Design Changes, and Modifications (37801)

#### a. Inspection Scope

The inspectors reviewed a list of equipment removed from the plant or plant systems and discussed the list with the regulatory engineer and the Plant Manager.

#### b. Observations and Findings

The equipment listed below has been removed from the plant or plant systems.

#### **Unit O**

- Security Equipment (selected E-field, personal search equipment, and card-readers);
- Primary Sample Room Heating Ventilation and Air Conditioning (HVAC);
- About 2/3 of Emergency Lights and Fire Extinguisher;
- Fire Brigade Equipment;
- Simulator (gutted);
- Whole Body Counter;
- Charcoal Filter Systems;
- High Range Sample System Instruments;
- Containment Air Sampling Panel and Piping;
- Various Dampers and Fans in the Auxiliary Building Ventilation System;

- Entire Rad Monitoring System;
- Various recorders

### **Unit 1**

- Main Turbine Stop Valves;
- Numerous 4 kv and 480 Volt Breakers;
- Several Motor Operated Valves (MOV's);
- Numerous Instruments and Relays;
- Incore Thimbles Inserted;
- Feedwater Stop Valve Servos;
- All Conoseals;
- Rod Control Comparator;
- Anticipated Transient without Scram (ATWS) Power Supply;
- Both Charging Pumps;
- 1B Service Air Compressor;

### **Unit 2**

- Main Turbine Auto Stop Trip Mechanism;
- Numerous 4 kv and 480 Volt Breakers;
- Several MOV's;
- Numerous Instruments and Relays;
- Feedwater Stop Valve Servos;
- All Conoseals;
- Rod Control Comparator;
- ATWS Power Supply;
- Nuclear Instrumentation System Drawers;
- Pressurizer Spray Valves;
- Process Computer Room HVAC;
- Process Computer Bypass Transformer

#### **c. Conclusions**

The licensee was tracking and documenting the equipment that was removed from the plant or plant systems.

#### **1.5 Follow-up On Previously Identified Items**

Closed IFI (050-295/2001-01; 050-301/2001-01) Internal and External Communication Issues Following Loss of Site Power to the Spent Fuel Nuclear Island (SFNI):

An "Unusual Event" was declared at the permanently shut down Zion Nuclear Station at 8:15 a.m. (CST) on January 26, 2001, due to loss of both sources of electrical power and loss of cooling to the SFNI for a period of greater than one hour. (Discussed in report 295/2001-001 paragraphs 1.3.4 and 1.4)

The licensee's response to the Unusual Event was correct, and no violations were identified. However, apart from the immediate response, the licensee was pursuing corrective actions it had identified relating to timely notifications about the event within

and outside the licensee's organization. These corrective actions were subject to further review during future inspections.

A root cause evaluation was completed and submitted to station and corporate management. This evaluation identified deficiencies in three separate organizations: Zion Station, Nuclear Generating Group (NGG) projects management, and Transmission & Distribution (T&D). Corrective actions specific to Zion were added to Work Order 99253934 as follow-up items. Projects management and T&D tracked their respective corrective actions.

Corrective actions were as follows.

- A single point of contact was established for all overhead work on-site, similar to sub-station interfaces, such that all work shows up in the station schedule, allowing for a multi-discipline review. On February 9, 2001, a meeting was held at Northeast (NE) Region Offices to establish a Specific Point Of Contract (SPOC) for work at Zion Station. At this meeting, it was agreed that the work planner for NE Region and the Operations Manager for Zion Station would be the SPOC. The Operations Manager was assigned responsibility to ensure that all work identified by the NE Region was included into the station schedule. This agreement was e-mailed to all Zion management.
- An interface agreement was established with T&D Joliet Dispatch Center for communication, control and concurrence related to activities that may affect SFNI. On February 19, 2001, a meeting was held between the Joliet Distribution Dispatch Center (DDC) operations manager and Zion Station Operations Manager. At this meeting, it was agreed that all activities that have the possibility to affect the SFNI power feeds would be communicated to the station prior to the activity taking place. It was agreed that onsite activities would require site concurrence prior to the actions taking place. Also, offsite activities which have the ability to potentially affect the SFNI would be limited. For example, cross tying lines A 151 and A 8215 offsite, such that only a single feeder feeds both lines, would be limited in time. The Joliet DDC shift manager and the Zion Station shift supervisors would be the single point of contact for emergent activities. For scheduled items the station point of contact would be the Operations Manager. This agreement was e-mailed to all Zion management.
- The Decommissioning Plant Manager communicated the implications of this event to all Zion personnel, reinforcing the expectations to use processes in place (i.e., action request (AR), problem identification form, scheduling, communication and change management checklist) and stressing the importance of attention to detail and self-checking. The immediate action was addressed by having department supervisors discuss the event with their personnel. The Plant Manager covered this in various department meetings.
- The Management Action Response Checklist (MARC) process was used as appropriate for individual deficiencies and failures. This corrective action was handled by the Plant Manager and documented in appropriate personnel files. No additional follow up in the action request system was required.



- During events, which materially affect SFNI, synch condenser operation, safety, or an event of radiological or environmental significance, the Decommissioning Plant Manager will dispatch the appropriate manager to the station to provide overview. The Station Manager set this expectation and communicated it to his backup.
- Emergency action level (EAL) changes were explored. The review was completed on June 28, 2001. The EAL for declaring an unusual event on loss of all site power for one hour was changed to loss of power for 24 hours before declaring an unusual event.
- A process was established for a formal review of information provided off-site for projects affecting Zion station. Zion Admin Procedure ZAP 510-18, Revision 0, "Transmittal of Design Information," has been issued to control the process of transmitting information to an off-site party.
- An effectiveness review was conducted of all corrective actions associated with this event. The reviews were completed and entered in the station's master file.
- On October 8, 2001, all T&D corrective actions were completed.

All outstanding corrective actions for this event have been completed. This inspector follow-up item is closed.

## **2.0 Decommissioning Support Activities**

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

#### **a. Inspection Scope**

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

#### **b. Observations and Findings**

The inspectors attended briefings and observed discussions of maintenance activities, focusing on schedules and whether activities were keeping pace with plant shutdown activities. The work activities were effectively discussed and prioritized at work status meetings. The plant manager provided extra focus on items being discussed when they related to the spent fuel pool nuclear island, and ensured that they had priority in the work schedule.

#### **c. Conclusions**

Regulatory requirements were being met for the maintenance activities inspected, contributing to the safe storage of spent fuel.

## 2.2 Maintenance Procedures and Documentation (IP 62801)

### a. Inspection Scope

The documentation for selective surveillance and maintenance activities was examined.

### b. Observations and Findings

The inspectors reviewed the following documentation for maintenance activities.

- Zion Station Schedule, dated January 25, 2002.
- Work Order Task 00382430 01 PM Quarterly Inspect/Clean SFNI (A) Cooling South Tower South Pan/Strainer.
- Zion Station Special Nuclear Material Annual Piece Count Completed January 25, 2002. This activity verified that 2226 fuel assemblies, 28 fuel rodlets, the Unit 1 Pu-Be Primary Source and the Unit 2 Pu-Be Primary Source, were all stored in the SFP.
- Physical Verification of 28 Fuel Rodlets Outside their Original Assemblies Stored in Zion SFP. During this activity, all 28 rodlets were verified as present in the SFP.
  - Fuel Assembly C64P guide tubes house 4 rodlets
  - Fuel Assembly C15R guides tubes house 11 rodlets
  - Zion Failed Rod Storage Basket ZFRSB1 houses 13 rodlets

### c. Conclusions

The licensee's scheduling and documentation of activities were adequate. The licensee physically accounted for all special nuclear materials including fuel rodlets.

## 3.0 **Spent Fuel Safety (60801)**

### 3.1 Cooling the Spent Fuel Pool

#### a. Inspection Scope

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.

The inspectors conducted plant tours of the control room and SFP to evaluate the material conditions of Structures, Systems, and Components (SSCs) necessary for the safe storage of spent fuel; held discussions with plant management; and reviewed station logs.

The inspectors also reviewed a sample of Zion Station Shift Manager Logs.

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 February 22, 2002, the SFP temperature was being controlled at about 87°F with a heat up rate of 0.8°F per hour, and the time to boil the SFP (with no cooling) was 156 hours. The spent fuel pool level was 614' 7". The SFP boron concentration was 2047 parts per million (ppm) versus the TS limit of greater than 500 ppm. All the above parameters were within required limits.

In the control room, the operator was cognizant of plant status and equipment in service. The inspectors walked down all accessible areas associated with the SFP, which contained SSCs for the safe storage of spent fuel. No deficiencies were identified.

The inspectors reviewed a Shift Manager's Logs for 08/12-14/2001, 09/08-10/2002, 10/18-20/2002, 11/15-17/2002, 12/11-13/2002, and 01/09/2002. These logs contained accurate, detailed entries on the SFNI and other station activities.

c. Conclusions

The safety of the stored spent fuel was being maintained by the SFP cooling and ventilation systems. The Shift Manager's Logs had accurate, detailed entries for the spent fuel nuclear island and other plant activities.

#### **4.0 Exit Meeting Summary**

The inspectors presented the inspection results to members of licensee management during a meeting on February 22, 2002. 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/Engineering Manager  
B. Leydens, Security Manager  
R. Schuster, Rad/Chem Supervisor

## **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 62801:	Maintenance and Surveillance at Permanently Shut Down Reactors
IP 71801:	Decommissioning Performance and Status Review at Permanently Shut Down Reactors

## **ITEMS OPENED, CLOSED AND DISCUSSED**

### Opened

None

### Closed

50-295/2001-01 and 50-301/2001-01	IFI	Internal and External Communication Issues Following Loss of Site Power to SFNI
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### Discussed

None

## **DOCUMENTS REVIEWED<sup>2</sup>**

DSAR, "Defueled Safety Analysis Report"

DSEP, "Defueled Station Emergency Plan"

DTS, "Defueled Technical Specifications"

PSAR, "Post Shut-Down Activities Report"

Shift Manger's Logs

Zion Station Work Activities Schedule

Zion Daily Plant Status Sheet

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

## **LIST OF ACRONYMS USED**

ALARA	As-Low-As-Reasonably-Achievable
DSAR	Defueled Safety Analyses Report
DTS	Defueled Technical Specifications
IFI	Inspector Follow-up Items
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
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 & Distribution
TS	Technical Specification