

July 25, 2000

Mr. Oliver D. Kingsley  
President, Nuclear Generation Group  
Commonwealth Edison Company  
ATTN: Regulatory Services  
Executive Towers West III  
1400 Opus Place, Suite 500  
Downers Grove, IL 60515

SUBJECT: NRC INSPECTION REPORT 50-295/200002(DNMS); 50-304/200002(DNMS)

Dear Mr. Kingsley:

On July 14, 2000, the NRC completed an inspection at your Zion 1 and 2 reactor facilities which examined decommissioning activities. The enclosed report presents the results of that inspection.

During this inspection, activities in the areas of facility management and control, decommissioning support, spent fuel safety, and radiological safety were examined.

Overall performance in these areas was good. Routine activities were being conducted and verified to ensure that the condition of the plant and important systems were well maintained.

No violations or deviations were identified during this inspection.

"In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be 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/NRC/ADAMS/index.html> (the Public Electronic Reading Room).*"

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

Sincerely,

***/RA W. G. Snell for/***

Bruce L. Jorgensen, Chief  
Decommissioning Branch

Docket Nos. 50-295; 50-304  
License Nos. DPR-39; DPR-48

Enclosure: Inspection Report: 50-295/2000002(DNMS)  
50-304/2000002(DNMS)

See Attached Distribution

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Enclosure: Inspection Report 50-295/2000-02(DNMS)  
50-304/2000-02(DNMS)

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-295; 50-304  
License Nos: DPR-39; DPR-48

Report No: 50-295/2000002(DNMS); 50-304/2000002(DNMS)

Licensee: Commonwealth Edison Company

Facility: Zion Nuclear Plant, Units 1 and 2

Location: 101 Shiloh Boulevard  
Zion, IL 60099

Dates: May 18, 2000 - July 14, 2000

Inspectors: R. J. Leemon, Decommissioning Inspector, DNMS  
E.K. Kulzer, Decommissioning Inspector DNMS  
C.K. Thompson, Illinois Department of Nuclear Safety

Approved By: Bruce L. Jorgensen, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

## EXECUTIVE SUMMARY

Zion Nuclear Plant, Units 1 and 2  
NRC Inspection Report 50-295/2000002(DNMS); 50-304/2000002(DNMS)

This routine decommissioning inspection covered aspects of licensee facility management and control, decommissioning support activities, spent fuel safety, and radiological safety. Overall, the licensee performed well in these areas.

The major decommissioning activity was executing the Transition Plan/Turnovers and downsizing to the SAFESTOR staff size.

### Facility Management and Control

- The structure and staffing of the Long-term Zion Decommissioning Organization (LZDO), and the execution of the transition plan, were adequate to provide the necessary personnel to safely manage the safe storage of spent fuel.
- The material integrity of structures, systems, and components necessary for the safe storage of spent fuel and conduct of safe decommissioning was being maintained. Plant housekeeping was good and was monitored by plant management.
- Appropriate actions were being taken to address multiple action requests related to errors in omitted signatures or use of incorrect procedures.
- Station personnel were using the corrective action program, but potential enhancements to the corrective action program were identified. No examples of adverse consequences resulting from reporting concerns were identified.

### Decommissioning Support Activities

- The spent fuel pool chemistry monitoring results showed pool water quality is being maintained at a high level.
- The maintenance program is functioning well and work activities were effectively discussed and prioritized at work status meetings.
- Zion's Predefined Maintenance activities were performed on or before the scheduled date.

### Spent Fuel Safety

- The safety of the stored spent fuel was being maintained by the new spent fuel pool (SFP) cooling and ventilation systems. Temperature was being controlled at about 92°F.
- The Defueled Safety Analysis Report (DSAR) and fuel building crane procedure describe requirements, interlocks, and limit switch settings which help ensure safe storage of fuel in the SFP.

## Radiological Safety

- Cameras were installed in locked high radiation areas to reduce the need for personal entry thus reducing exposure.
- Liquid radioactive releases were controlled in accordance with the plant's design basis and regulatory guidelines.
- The Offsite Dose Calculation Manual (ODCM) was being maintained within regulatory guidelines.
- The radioactive waste shipment met Department of Transportation (DOT) and NRC regulatory requirements.
- The licensee has adequate instrumentation to monitor liquid radioactive releases and adequate calibration procedures for required instrumentation.
- The Zion Station, Units 1 and 2, 1999, Annual Radiological Environmental Monitoring Report demonstrated compliance with NRC regulations. The NRC inspectors have no concerns.

## Report Details

### Summary of Plant Activities

Since the previous inspection, the plant remained in SAFESTOR with no major work activities. The staff was executing the transition plan to transfer knowledge and practices so that the reduced staff could safely perform SAFESTOR activities.

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

##### 1.1 General

The inspectors conducted frequent reviews of ongoing plant activities and attended licensee meetings and reviews addressing these activities, in order to assess overall facility management and controls. Specific events and findings are detailed in the sections below.

##### 1.2 Organization, Management, and Cost Controls at Permanently Shutdown Reactors (36801)

###### a. Inspection Scope

The inspectors evaluated whether management systems maintained public health and safety through proper control, evaluations and management of reactor decommissioning activities. The inspectors reviewed the licensee's decommissioning organization, staffing, qualifications and training including that of contractors. The inspectors verified that NRC requirements were being met, including requirements detailed in the plant Defueled Technical Specifications (DTSS), Offsite Dose Calculation Manual (ODCM), and Defueled Safety Analysis Report (DSAR). The inspectors also observed or reviewed the licensee's decommissioning planning and scheduling.

###### b. Observations and Findings

###### Long Term Zion Decommissioning Organization (LZDO)

On July 1, 2000, Zion Station established the LZDO, which consists of a plant manager and five departments. The management and staffing of the departments are as follows:

###### Operations/Engineering Manager

Five Operations Supervisors  
Six Operators

###### Radiation Protection/Chemistry Supervisor

Two Radiation Protection/Chemistry Coordinators  
Three Chemistry Technicians  
Seven Radiation Protection Technicians

Maintenance Supervisor

Two Maintenance Coordinators  
Four Mechanical Maintenance Mechanics  
Three Electrical Maintenance Mechanics  
Two Instrument Mechanics  
One Material Handler

Administrator/Training Supervisor

Financial Analyst  
Three Clerks

Security Manager

Assistant Security Manager  
Security Guards

Transition Plan (71801)

The inspectors reviewed the site transition plan and attended transition meetings to monitor the action items, status, and completion dates for the transfer of vital information and practices from personnel leaving to personnel of the permanent staff. This transition plan was well planned, tracked and executed. At the final transition plan meeting all departments and the plant manager were confident that all vital information and practices had been transferred to the permanent plant staff.

c. Conclusion

The structure and staffing of the LDZO, and the execution of the transition plan were adequate to provide the necessary personnel to safely manage the storage of spent fuel.

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

1.3.1 General

The status of decommissioning 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 the license, DTS requirements, and commitments described in the DSAR and the Post-Shutdown Decommissioning Activities Reports (PSDAR) were being met.

1.3.2 Monitored Decommissioning Activities

The inspectors attended licensee meetings where the planning, reviewing, assessing, and scheduling of decommissioning activities were observed.

Meetings attended by the inspectors were as followed:

- Safety Review Group
- Condition Review Group
- Zion Station Schedule
- Zion Station Priority
- Operations Individual Department

The inspectors ascertained that activities were in accordance with licensed requirements and docketed commitments as stated in 10 CFR, DTSSs, PSDAR, Regulatory Guide 1.33, and Station Procedures.

### 1.3.3 Plant Tours to Evaluate Material Conditions and Housekeeping

#### a. Inspection Scope

Plant tours were performed to evaluate the material integrity of structures, systems, and components necessary for the safe storage of spent fuel and conduct of safe decommissioning, and to evaluate plant housekeeping.

#### b. Observations and Findings

The spent fuel pool area and support systems areas were clear and free of obstacles and hazards. No fire hazards were observed. No degradation of structures, systems, and components important to the defueled condition were observed.

Unused areas of the plant were locked down to reduce the need for radiation surveys as a good ALARA [As-Low-As-Reasonably-Achievable ] practice. Some of these areas were being monitored by remote TV cameras as operator aids.

#### c. Conclusions

The material integrity of structures, systems, and components necessary for the safe storage of spent fuel and conduct of safe decommissioning was being maintained. Plant housekeeping was good and was monitored by plant management.

### 1.4 Auditing and Corrective Actions (40801)

#### 1.4.1 Problem Identification/Corrective Action System - Multiple Items

##### a. Inspection Scope

The inspectors reviewed numerous Action Request (AR) items and identified multiple items in two general groups: Fire Watch Training and Errors in Signatures and Procedures.

b. Observations and Findings

The AR items addressing fire watch training were as follows: 990045001, 990089452, 990081731, 990086911, and 990082430. The site fire department had been responsible for training those individuals assigned to fire watch. Due to several turnovers this responsibility was lost. To address this problem, the Zion Training Coordinator contacted all department heads to identify those with similar specialized training as had been done by the fire department. He now will be responsible for tracking all site training in the future and will review training needs every six months. In order to maintain control over the training requirements, the training coordinator is developing a training matrix which is scheduled for completion in mid-August. Reviewing this training matrix is an inspector follow-up item (IFI 50-295/200002-01 (DNMS)).

The AR items addressing procedure and sign off errors were: 990089559, 990092394, 990092591, 99008557, 990085870, and 99009025. The followup corrective actions were to retrain staff on completing procedures and work packages with careful attention to details, using examples of procedures which were filled out poorly or with the use of outdated procedures. These errors were administrative in nature and did not contribute to improper maintenance or unsafe storage of spent fuel. The licensee is tracking any reoccurrence of the above problems.

c. Conclusion

Appropriate actions were taken to address multiple action requests related to errors in omitted signatures or use of incorrect procedures.

1.4.2 Problem Identification/Corrective Action System - Staff Utilization

a. Inspection Scope

The NRC inspectors reviewed the facility's Problem Identification System/Corrective Action System. In the process, the inspectors interviewed seventeen individuals.

b. Observations and Findings

*"Let Someone Know"* posters were found throughout the facility encouraging employees with concerns to write an Action Request (AR), tell their supervisor, other management, or the Employee Concerns Administrator. The concern would be analyzed, and resolved. Appropriate extensions and an "800 hot line " number for the Employee Concerns Program were posted.

The inspectors interviewed seventeen personnel (about an even number of workers and managers) and asked the following questions:

- Have you used the corrective action program within the last two years?
- Have you understood the criteria the Condition Report Review Group (CRG) used to screen your concern?
- Have you received feedback on the resolution of your concern?

- Have you experienced any negative statements or comments made to or about you for using the corrective action program?
- If you had negative feedback, did you feel that any adverse actions were taken against you for using the corrective action program?

The results of the interviews were discussed with plant management. In response, the licensee wrote Action Request No. 99009330, "Corrective Action Program Enhancements", to create actions to enhance the corrective action program.

The licensee created ARs as follows:

- There was a lack of understanding, within management and the bargaining unit, on the criteria used by the Condition Review Group (CRG) for screening and dispositioning of action requests.

Work Task No. 990178591 was assigned to develop a condition review group (CRG) presentation for plant personnel.

- Initiators of action requests are not always receiving feedback concerning the final disposition or actions taken pertaining to their individual action requests.

Work Task No. 990178591 was assigned to tailgate CRG information to all station departments.

- The CRG significance level criteria do not contain examples or guidance for dispositioning of administrative issues.

Work Task No. 990178591 05 was assigned for developing guidance for dispositioning of administrative issues.

The licensee entered the above items into their corrective action system for resolution. Of the personnel interviewed, 94 percent did not feel they were discouraged for using the corrective action program. The few personnel that felt they had received negative feedback stated that they had not received any adverse job actions or discrimination and they continued to use the corrective action program.

c. Conclusion

Station personnel were using the corrective action program, but potential enhancements to the corrective action program were identified. No examples of adverse consequences resulting from reporting concerns were identified.

1.5 Onsite Follow-up, Written Reports of Non-routine Events at Power Reactor Facilities (92700)

Closed: IFI 05000295/97023-11; 05000304/97023-11, "Failure to Document an Annual Pre-Fire Plan" The followup inspection was performed and reported in inspection report 50-295/304-2000001 paragraph 1.3.4 as follows:

Based on these interviews along with a review of ZAP 900-01, Station Fire Protection Program, Revision 5, and Zion Station Fire Protection Report, Amendment 6, July, 1999, the fire plan and procedures reflect the current status of the decommissioning facility and licensee condition. The current Zion Station fire protection program appears to have the capability to meet regulatory requirements of 10 CFR 50.48(f). This inspection followup item is closed.

## **2.0 Decommissioning Support Activities**

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

#### **2.1.1 General Inspection**

The inspection 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 were performed in accordance with regulatory requirements and resulted in the safe storage of spent fuel and reliable operation of radiation monitoring and effluent control equipment. This included the proper implementation of DTSs, DSAR, and 10 CFR 50, Appendix B requirements. The inspectors also evaluated SFP operations including SFP heat up rate, SFP instrumentation, alarms, and leakage detection, SFP chemistry and criticality controls.

#### **2.1.2 Spent Fuel Pool Chemistry Specifications Surveillance**

The inspectors discussed spent fuel pool chemistry requirements with plant management, reviewed the chemistry procedures, DTS chemistry sampling requirements, and SFP sampling results. The inspectors then compared the sampling results with the sample requirements. Details are discussed below.

#### **ZION SPENT FUEL POOL CHEMISTRY SPECIFICATIONS**

The Zion Defueled Technical Specifications (DTS) address only boric acid (DTS 3.1.2). The rest of the specification limits are documented in the ZAP 401, "CHEMISTRY-WORKSHEETS/DATA FORMS/LOGS", Revision 19, dated February 1, 2000, TABLE 26, SPENT FUEL POOL DATA FORM.

Samples were taken every Tuesday. The only DTS requirement is to take a boron sample within 31 days prior to movement of irradiated fuel assemblies and 31 days thereafter. The inspectors reviewed data taken every Tuesday from January 4, 2000, through May 16, 2000. The range of the results are listed below.

<b>SFP SAMPLE</b>	<b>LIMITS</b>	<b>RESULTS REVIEWED</b>
<b>BORON (ppm)</b>	<b>&gt;500</b>	<b>2049 to 2081</b>
<b>FLUORIDE (ppb)</b>	<b>&lt;150</b>	<b>&lt;.2 to &lt;2.0</b>
<b>CHLORIDE (ppb)</b>	<b>&lt;150</b>	<b>1 to 98.1</b>

**OTHER SFP CHEMISTRY PARAMETERS BEING MONITORED**

<b>SFP SAMPLE</b>	<b>RESULTS REVIEWED</b>
<b>pH</b>	<b>4.58 to 4.81</b>
<b>SILICA (ppb)</b>	<b>147 to 168</b>
<b>GROSS ALPHA (µci/cc)</b>	<b>&lt;LLD to 6.73E-08</b>
<b>CONDUCTIVITY (µS/cm)</b>	<b>4.65 to 6.64</b>
<b>SODIUM (ppb)</b>	<b>5.1 to 136.9</b>

LLD        Lowest Level Detectable

The results of the SFP chemistry monitoring program showed pool water quality is being maintained at a high level.

**2.1.3    Maintenance and Surveillance (62801)**

**a.    Inspection Scope**

The inspectors evaluated the effectiveness of the maintenance program relative to safe storage, maintenance, and control of spent fuel.

**b.    Observations and Findings**

The NRC inspectors attended maintenance briefings to determine if maintenance activities were on schedule and were keeping pace with plant shutdown activities.

**c.    Conclusion**

The maintenance program is functioning well and work activities were effectively discussed and prioritized at work status meetings.

**2.1.4    Zion's Predefined Maintenance (Preventative Maintenance)**

The inspectors reviewed Zion's Predefined Maintenance Data sheets and determined that none of the activities listed were past due, and the activities were performed on or before the scheduled date.

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

**3.1    Cooling the Spent Fuel Pool**

**a.    Inspection Scope**

The inspection evaluated the 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 modifications. The inspectors reviewed plant documents to determine the requirements and evaluations for SFP temperature and level.

b. Observations and Findings

The inspectors reviewed the DTS, DSAR, shift supervisor's office electronic status board, local spent fuel pool area instrumentation, and portions of local electrical breaker positions and local valve line-ups. On July 12, 2000, the spent fuel pool temperature was 92°F, the spent fuel pool level was 614' 6.5", the time to boil worst case was 81 hours, and the time to boil best case was 160 hours. All the above were within limits.

c. Conclusion

The safety of the stored spent fuel was being maintained by the new SFP cooling and ventilation systems. Temperature was being controlled at about 92°F.

3.2 Fuel Building Overhead Crane Procedure and Interlocks

a. Inspection Scope

The inspectors reviewed procedures, and the Defueled Safety Analysis Report, and held discussions with plant management about the requirements, limitations and interlocks to prevent carrying heavy loads over the fuel stored in the spent fuel pool. The results are documented below.

b. Observation and Findings

**Fuel Building Overhead Crane Procedure**

The inspectors reviewed FHI-22, "Fuel Building Overhead Crane Procedure" and concluded that the procedure contains the necessary precautions, limitations and notes to safely handle fuel. The procedure also contains the requirements to limit heavy loads over the fuel stored in the spent fuel pool. Step 5.0.1 states, "No load heavier than the weight of a single spent fuel assembly plus the tool for moving that assembly shall be carried over fuel stored in the spent fuel pool."

**Defueled Safety Analysis Report 3.9.2.2 (Spent Fuel Facility Description)**

Interlocks are provided to prevent cranes capable of carrying heavy loads from entering or passing over the area of the spent fuel pool where fuel is stored. These interlocks are described in detail in DSAR Section 3.9.3.

**Defueled Safety Analysis Report 3.9.3.2.3 ( Fuel Building Crane)**

The fuel building crane is a 125-ton electric overhead traveling crane, designed to allow for lifting and carrying a load 25 percent above the rated capacity. An additional design consideration allows for lifting and carrying a 230-ton load nine feet from the centerline on the north crane rail. This requirement resulted in crane and building runways being built capable of taking a load in excess of the rated capacity

at that particular location. The crane has been designed to withstand seismic conditions. The main hook is a "sister hook" type fitted with safety clamps. The hook is forged steel and has been radiographed and magnetic particle inspected. The lifting tackle and gearing was designed with a factor of safety not less than five. The loading capacity for the main hoist cable has a factor of safety of 6.2. Each of the 14 cables has a breaking strength of 48.3 tons.

The crane is provided with three brakes, an eddy current speed control brake and two motor brakes. Each motor brake is rated at 550 ft-lbs and is capable of holding the load. Electrical power is required to unload the motor brakes. Loss of power results in locking the load in position. The stall-out torque of the motor (275 percent of full running torque) is 750 ft-lbs. The two motor brakes together are capable of holding the load at the stall-out torque condition.

#### **Defueled Safety Analysis Report 3.9.3 2.4 ( Fuel Building Crane Interlocks)**

The fuel building crane has been designed with safety interlocks and limit switches which guard against any over-travel of both the bridge and trolley, and limit both the upper and lower travel of the hoist. These switches are activated whenever the crane apparatus goes beyond these limits and whenever a high radioactivity signal is transmitted by the radiation monitor. Further requirements for travel over the spent fuel storage pool are no load and fully raised main hoist. These restrictions ensure that no heavy loads will be carried over the pool. The interlocks provided are further described in DSAR 3.9.3.2.4.1 (Interlock/Limit Switch Function)

c. Conclusion

The Defueled Safety Analysis Report and fuel building crane procedure describe requirements, interlocks, and limit switch settings which help ensure safe storage of fuel in the spent fuel pool.

#### **4.0 Radiological Safety**

##### General

The inspectors conducted reviews of ongoing activities in order to assess the overall RP program. Specific findings are detailed in the sections below.

#### 4.1 Radiological Protection and Chemistry Procedures and Documentation (84750)

##### 4.1.1 Liquid Radioactive Releases to the Environment

a. Inspection Scope

The inspectors reviewed the licensee's radioactive liquid release program and authorization form to verify that the licensee effectively controls, monitors, and quantifies liquid releases to the environment. The inspectors reviewed the licensee liquid release form with respect to the station's Defueled Technical Specifications (DTS) and the ODCM.

b. Observations and Findings

The inspectors obtained a simplified diagram of the liquid processing system and performed a system walk down. Temporary filters and demineralizers are used as required to ensure that the amount of radioactivity discharged to the environment is (ALARA). System components, instrumentation, and effluent monitors were operable and used as designed.

The inspectors reviewed the licensee's radiochemistry analysis forms attached to the liquid release form. Liquid samples were analyzed for specific radioactive nuclides and gross radioactivity. The maximum concentrations for specific radioactive nuclides are listed in the procedures and the maximum limits are based on 10 CFR20 limits. Total gross radioactivity allowed to be discharged per release is listed and controlled by procedure limits. The procedure limits are based on 10CFR20 limits and consistent with the ALARA philosophy.

During a release, the radioactivity of the effluent is continuously monitored by a liquid effluent monitor. If higher than expected radioactivity is detected the liquid effluent monitor automatically isolates the release flow path. The procedure requires that prior to each release, that the liquid effluent monitor release set point is calculated and the trip value is reset. Also, the procedure requires that the trip function of the effluent monitor is tested prior to each release.

b. Conclusions

Liquid radioactive releases were controlled in accordance with the plant's design basis and regulatory guidelines.

4.1.2 Quality Assurance in Radiological Protection and Chemistry Activities (84750)  
(Changes to the Offsite Dose Calculations Manual)

a. Inspection Scope

The inspectors reviewed changes to the ODCM chapters 11 and 12 approved on March 7, 2000, and its associated Safety Evaluation, #2000-0068.

b. Observations and Findings

The changes to the ODCM were associated with the following activities:

- Revised the Radiological Environmental Monitoring Program (REMP) to reflect current and future site use.
- Eliminated installed radiation monitoring for the Technical Support Center and the Control Room.
- Changed applicability for ventilation stack monitoring.
- Miscellaneous editorial changes.
- Added new flow instrument for liquid radioactive releases due to lower dilution flows.

The inspectors reviewed the changes described in Safety Evaluation #2000-0068. The Safety Evaluation was compared to Defueled Technical Specifications and actual plant conditions. The licensee's documents were reviewed for obvious mistakes, anomalous measurements, observed biases, and trends in data. The changes did not create an Unreviewed Safety Question.

c. Conclusion

The ODCM was being maintained within regulatory guidelines.

4.1.3 Solid Radioactive Waste Management and Transportation of Radioactive Materials (86750)

a. Inspection Scope

The inspectors observed the licensee's activities for shipment of a low level radioactive waste cask for disposal. The inspectors reviewed the licensee's procedure to ensure public health hazards were identified and minimized. Packaging and identification of the radioactive waste was compared to DOT and Nuclear Regulatory Commission (NRC) regulatory requirements.

b. Observations and Findings

Radiation and contamination surveys of the shipping cask were performed in accordance with ZPR-5610-6, "Surveying Radioactive Materials Shipments," Revision 5. The inspectors observed radiation protection personnel perform Attachment D, Arrival Survey, for the truck, trailer, and cask.

The inspectors reviewed ZPR-5600-04, "Administrative Process for Radioactive Material/Waste Shipments," Revision 8. The procedure incorporates references to applicable DOT and NRC regulatory requirements.

The inspectors inspected the following items pertaining to the loading activities and the loaded trailer with the shipping cask for the following:

- Radiation and contamination surveys.
- Shipping paper documentation.
- Blocking and bracing of the cask.
- Vehicle placarding.

c. Conclusion

The radioactive waste shipment met DOT and NRC regulatory requirements.

4.1.4 Liquid Radioactive Effluent Monitoring (84750)

a. Inspection Scope

The inspectors reviewed the licensee's radioactive liquid release instrumentation to verify that the licensee effectively controls, monitors, and quantifies liquid releases to the environment. The inspectors reviewed the licensee's calibration program, the

Lake Discharge Tank level instrument calibration procedure, the Lake Discharge Tank level versus volume relationship, and the lake radiation monitor flow instrument. The inspectors referenced vendor manuals, station documents, NRC Safety Guide 30, and associated Institute of Electrical and Electronics Engineers (IEEE) Standard 336-1980, "IEEE Standard Installation, Inspection and Testing of Instrumentation and Electronic Equipment".

b. Observations and Findings

The licensee identified a discrepancy concerning the volume of low level liquid radioactive waste released to the lake from May 27, 2000 to June 5, 2000. The newly installed flow indicator, OFI-WD 005, indicated a total of 11,214 gallons and the total volume based on the Lake Discharge Tank level was approximately 14,000 gallons. Both figures are within 10 CFR Part 20 limits. The total volume used to calculate release rate and concentration of radioactive nuclides released to the environment was measured by the change of level in the Lake Discharge Tank.

The licensee believes that the problem was due to flow indicator OFI-WD 005. Flow indicator OFI-WD 005 was recently installed as part of a modification designed to accurately monitor and record low release flows due to the current level of decommissioning activity at the site. The instrumentation was calibrated to monitor a release flow of 2 to 15 gallons per minute (gpm). Actual release flow is about 0.9 gpm. The licensee will replace the flow instrument internals to provide an accurate flow indication from 0.75 to 7.5 gpm. The inspectors subsequently reviewed work task 99018181554-04 in which the internals of the newly installed flow indicator was being replaced to provide an accuracy level of +/- 0.5 percent for a flow range of 0.75 gpm to 7.5 gpm from the indicator.

The inspectors researched the licensee's calibration program and noted that none of the instrumentation associated with the newly installed modification has a defined calibration frequency.

The inspectors reviewed the Lake Discharge Tank and associated level instrumentation. The tank is a vertical cylinder with a conical top and flat base. In the normal operating range, the relationship of volume to level is linear. Therefore, a minor zero shift in the level instrument is self canceling. The inspectors reviewed the most recent level instrument calibration and concluded that the licensee has an adequate calibration procedure. However, the inspectors did note that the Lake Discharge Tank level instrument used to determine the volume and total amount of radioactive waste released to the environment has a 99-year calibration frequency. Following discussions with plant management, action request No. 990190903 was written to establish a five year calibration frequency.

c. Conclusion

The licensee has adequate instrumentation to monitor liquid radioactive releases and adequate calibration procedures for required instrumentation.

4.1.5 Zion Nuclear Power Station, Units 1 and 2, 1999, Annual Radiological Environmental Monitoring Report (IP 84750)

The NRC inspectors reviewed the Zion Nuclear Power Station, Units 1 and 2, 1999, Annual Radiological Environmental Monitoring Report and found no violations of NRC regulations. The NRC inspectors has no concerns.

4.2 Radioactive Waste Found Outside Controlled Access (83726)

While moving furniture a Radiation Technician and an Instrument Technician identified a drain bottle used during the calibration of primary equipment. The drain bottle was outside controlled access and contained radioactive liquid. The Radiation Technician had the bottle counted and verified that it contained radioactive waste. The licensee performed the following actions:

- The bottle was moved to the Auxiliary Building for proper disposal.
- The area where the bottle was found was surveyed and no contamination was found.
- Station management was notified.
- An Action Request was initiated and the station event free clock was reset.
- The incident was reviewed with all Radiation Technicians.

The inspectors reviewed the licensee's actions with the radiation protection supervisor and concluded that the licensee took prompt and timely actions.

**5.0 Exit Meetings Summary**

The inspectors presented the inspection results to members of licensee management during meeting on July 14, 2000. 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**

B. Adams, Engineering Manager  
K. Ainger, Licensing Director  
J. Ashley, Design Engineering  
M. Bittman, Operations  
D. Bump, Maintenance and Rad/Chem Manager  
R. LaBurn, Radiation Protection  
R. Landrum, Operations Manager  
T. Marini, Manager, Regulatory Assurance  
M. Peterson, Administrating  
M. Rode, Operations  
R. Schuster, Rad/Chem Supervisor  
P. Simpson, Regulatory Services  
R. Starkey, Plant Manager  
V. Voigt, Engineering  
M. Weis, Business Manager  
J. Zeszutek, Regulatory Assurance

## **INSPECTION PROCEDURES USED**

IP 36801	Organization, Management, and Cost Controls at Permanently Shut Down Reactors
IP 40801	Self-Assessment, Auditing, & Corrective Action
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
IP 83750	Occupational Radiation Exposure
IP 84750	Radwaste Treatment, Effluent & Environmental Monitoring
IP 86750	Solid Radwaste & Transportation of Radioactive Materials
IP 92700	Onsite Follow-up, Written Reports or Non-routine Events at Power Reactor Facilities

## ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

50-295/200002-01                      IFI      Training Matrix which is scheduled for completion in mid-August. Reviewing this training matrix is an inspectors follow-up item (

### Closed

050-295/97023-11/  
050-304/97023-11                      IFI      Failure to Document an Annual Pre- Fire Plan

### Discussed

None

## DOCUMENTS REVIEWED

Action Request 99009673500	Radioactive Material Found Outside the RPA.
Action Request 99018155404	Lake Discharge Tank Totalizer Indication Error.
Action Requests 990045001	Training Records
Action Requests 990089452	Fire Watch Training
Action Requests 990081731	Expired Fire Watch Training
Action Requests 990086911	Adverse Trend In Tracking Training
Action Requests 990082430	Training Not Documented
Action Requests 990089449	Record keeping
Action Requests 990089189	Missing Signatures and Procedures
Action Requests 990089559	Post Dating Missing Signatures
Action Requests 990092394	Errors In Work Requests Packages
Action Requests 990092591	Missing Signatures On Shift Supervisor Turnover Sheets
Action Requests 990085571	Missing Signatures On Cutting, Welding, And Grinding Permits
Action Requests 990085870	Use Of Outdated Procedures
Action Requests 990090025	Procedure Errors
Action Requests 990045001	Training Records
Action Requests 990089452	Fire Watch Training
Action Requests 990081731	Expired Fire Watch Training
Action Requests 990086911	Adverse Trend In Tracking Training
Action Requests 990082430	Training Not Documented
Action Requests 990089449	Record keeping
Action Requests 990089189	Missing Signatures and Procedures
Action Requests 990089559	Post Dating Missing Signatures
Action Requests 990092394	Errors In Work Requests Packages
Action Requests 990092591	Missing Signatures On Shift Supervisor Turnover Sheets
Action Requests 990085571	Missing Signatures On Cutting, Welding, And Grinding Permits
Action Requests 990085870	Use Of Outdated Procedures
Action Requests 990090025	Procedure Errors

DSAR, "Defueled Safety Analysis Report"

DSEP, "Defueled Station Emergency Plan"

DTS, "Defueled Technical Specifications"

Installation, Inspection and Testing of Instrumentation and Electronic Equipment".

Institute of Electrical and Electronics Engineers (IEEE) Standard 336-1980, "IEEE Standard

Lake Discharge Tank Volume Data Sheet

Long Term Zion Decommissioning Organization Chart

NRC Safety Guide 30, August 11, 1972.

Nuclear Work Request #97009753301, Calibrate Lake Tank Level Instrument.

ODCM, "Offsite Dose Calculation Manual"

PSAR, "Post Shut-Down Activities Report"

RWP No. 0051005

Zion Predefined Data Print Out for 05/018/00

Zion calibration procedure, OR-PR O5 revision 20, Calibration of Lake Discharge Radiation Monitoring Equipment.

Zion calibration procedure, OF-WD 005 revision 0, Calibration of Lake Discharge Flow Instrumentation.

#### **OTHER SYMBOLS USED**

ppb      parts per billion

ppm      parts per million

$\mu\text{Ci/cm}$       micro curie per cubic centimeter

$\mu\text{S/cc}$       micro Seimen per cubic centimeter

## LIST OF ACRONYMS USED

ALARA	As-Low-As-Reasonably-Achievable
AR	Action Request
CRG	Condition Review Group
DOT	Department of Transportation
DSAR	Defueled Safety Analyses Report
DSEP	Defueled Station Emergency Plan
DTS	Defueled Technical Specifications
FPR	Fire Protection Report
IEEE	Institute of Electrical and Electronics Engineers
IM	Instrument Maintenance
IP	Inspection Procedure
LZDO	Long-term Zion Decommissioning Organization
MOV	Motor Operated Valve
NRC	Nuclear Regulatory Commission
PSDAR	Post-Shutdown Decommissioning Activities Reports
ODCM	Offsite Dose Calculation Manual
REMP	Radiological Environmental Monitoring Program
RP	Radiation Protection
RPA	Radiologically Protected Area
RPT	Radiation Protection Technician
RWP	Radiation Work Permit
SDR	Shutdown Risk
SFNI	Spent Fuel Pool Nuclear Island
SFP	Spent Fuel Pool
SG	Steam Generator
SGLP	Steam Generator Low Pressure
SOI	System Operating Instruction
SSC	Structures, Systems, Components
STAR	Stop, Think, Act, Review
STM	Steam
TS	Technical Specification
ZAP	Zion Administrative Procedure
ZMFD	Zion Municipal Fire Department