February 23, 2001

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

SUBJECT: NRC INSPECTION REPORT 50-295/20001-01(DNMS); 50-304/2001-01(DNMS)

Dear Mr. Kingsley:

On January 30, 2001, the NRC completed an inspection of the Zion 1 and 2 reactor facilities which focused on decommissioning activities. The enclosed report contains the results of this inspection. During the inspection, activities in the areas of facility management and control, decommissioning support, spent fuel safety, and radiological safety were examined.

This inspection included a review of the Unusual Event of January 25, 2001, involving the complete loss of power to the spent fuel nuclear island. Based on our review, we concluded that this event could have been avoided if existing modification control or corrective action processes had been implemented. The proper use of these programs is being tracked as an unresolved item.

Since the previous inspection, the NRC has concluded a lengthy and diverse review of actions taken and results achieved to ensure that a safety-conscious work environment is maintained at the Zion station. We are satisfied that such a work environment exists at the present time. Our routine inspection program will continue to monitor this important area in the future.

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 System (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 question you may have regarding this inspection.

Sincerely,
/RA by M. Dapas acting for/
Cynthia D. Pederson, Director
Division of Nuclear Materials Safety

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

Enclosure: Inspection Report 50-295/2001-01(DNMS); 50-304/2001-01(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:	50-295/2001-01(DNMS); 50-304/2001-01(DNMS)
Licensee:	Commonwealth Edison Company
Facility:	Zion Nuclear Plant, Units 1 and 2
Location:	101 Shiloh Boulevard Zion, IL 60099
Dates:	December 18, 2000 through January 30, 2001
Inspectors:	Roy J. Leemon, Decommissioning Inspector, DNMS Robert V. Ganser, 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 50-295/2001-01(DNMS); 50-304/2001-01(DNMS)

This routine decommissioning inspection covered aspects of licensee facility management and control, decommissioning support activities, spent fuel safety, and radiological safety.

The major decommissioning activity was maintaining the plant in SAFSTOR (safe storage of the spent fuel) with no major work activities. On November 16, 2000, spent fuel nuclear island (SFNI) cooling was lost when the screens in the operating cooling tower plugged. On January 25, 2001, the licensee lost electrical power to and the cooling for the SFNI and declared an Unusual Event.

Facility Management and Control

- Based on completion of a lengthy, diverse review over more than two years, the NRC has concluded that issues of maintaining a safety-conscious work environment at Zion have been resolved. (Paragraph 1.2.1)

- The material integrity of structures, systems, and components necessary for the safe storage of spent fuel and safe conduct of decommissioning activities has been maintained. Plant housekeeping was good and was being monitored by plant management. (Paragraph 1.3.3)

- A complete loss of power to the spent fuel nuclear island had no significant consequences; however, this event was avoidable. The proper use of the station's modification and corrective action programs related to the loss of power event is an unresolved item. (Paragraph 1.4.1)

- The licensee adequately maintained operational safety, the station winterization checklist was comprehensive, and the spent fuel nuclear island was adequately monitored. One example of lack of attention to administrative detail was noted. (Paragraph 1.5)

Decommissioning Support Activities

- The licensee did not have a preventive maintenance program to inspect the cooling towers for cleanliness periodically or after the tower was idle. This resulted in the plugging of the tower screens. The licensee has created a preventive maintenance program. (Paragraph 2.2)

- The licensee's process for evaluating and prioritizing work requests appeared appropriate. The licensee's maintenance program contained appropriate elements to assure proper maintenance of equipment essential to safety store nuclear fuel, except for preventive maintenance of the cleaning cooling towers. (Paragraph 2.3)

Spent Fuel Safety

- The safety of the stored spent fuel was being maintained by the new SFNI cooling and ventilation systems. Temperature was being controlled at about 91°F with a heat up rate of 0.86°F per hour. (Paragraph 3.1)

Radiological Safety

- Appropriate ALARA [As-Low-As-Is-Reasonably-Achievable] practices were being followed for the activities observed by the inspectors. (Paragraph 4.2)

Report Details

Summary of Plant Activities

Since the previous inspection, the plant remained in SAFESTOR with no major work activities. On November 16, 2000, spent fuel nuclear island (SFNI) cooling was lost when the screens in the operating cooling tower plugged. On January 25, 2001, the licensee lost electrical power to and the cooling for the SFNI and declared an Unusual Event.

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)

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). Also, the inspectors reviewed the licensee's decommissioning plans and schedules.

1.2.1 Safety-Conscious Work Environment

On October 2, 1997, the NRC met with Commonwealth Edison and Zion Station management to discuss issues being raised by station personnel regarding a "chilled" work environment. The NRC letter dated October 20, 1997, documented the meeting and the issue of establishing and maintaining a "Safety Conscious Work Environment at the Zion Station," and led to licensee commitments to complete a number of actions before plant restart. When the licensee made the decision in January 1998 that both Zion units would be permanently shut down, the restart commitments became moot. In April 1999, the licensee summarized actions to establish and maintain a safety-conscious work environment (SCWE) at the shutdown facility.

The decommissioning inspection program has included a variety of inspection activities since mid-1998 to evaluate this issue. These activities involved reviews of the licensee's corrective action program, the employee concerns program, and self-assessment and problem identification activities. Numerous employee interviews were conducted to support the NRC's assessment of the SCWE at Zion. This assessment effort lasted more than two years. Results of the NRC's assessment activities are contained in the following inspection reports: IR 50-295/98-010 addresses audits and self-assessments; IR 50-295/99-001 addresses utilization and effectiveness of the Employee Concerns Program; IR 50-295/99-003 addresses corrective action program changes and Nuclear

Oversight auditing; IR 50-295/2000-002 addresses staff utilization of the corrective action programs and auditing; and IR 50-295/2000-004 addresses the results of NRC interviews of employees regarding the use and effectiveness of the licensee's identification and corrective action process. Based on the inspection findings, the NRC concluded that as of the end of 2000, no issues remained unresolved which affected the SCWE issue.

Based on the NRC's diverse inspection activities, conducted as part of the decommissioning inspection program, the NRC has concluded that the licensee has established a SCWE at the Zion station, and that a SCWE is being maintained at the present time. The ongoing decommissioning inspection program will continue to monitor licensee performance in this area.

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 that the plant Defueled Technical Specifications (DTS) requirements, and commitments described in the Defueled Safety Analysis Report (DSAR), the Post Shutdown Decommissioning Activities Report (PSDAR) and the Emergency Plan 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 discussed. During this inspection period, the inspectors attended the Zion Station Schedule, Zion Station Priority, and Health Physics Individual Department meetings.

The inspectors determined that activities were conducted in accordance with licensed requirements and docketed commitments as stated in 10 CFR, DTSs, 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 safe conduct of decommissioning activities, and to evaluate plant housekeeping. The inspectors accompanied the operation manager on a tour of the SFNI.

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. Generally, the plant was maintained in good condition and all radiological areas were adequately

marked. Monitoring systems required to maintain the SFNI were in good working order and there were no issues of concern in this area.

c. Conclusions

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

1.3.4 Unusual Event Due to Loss of Both Sources of Electrical Power to Spent Fuel Pool Nuclear Island

a. Inspection Scope

The inspectors interviewed plant management staff and observed damage, including a burnt current transformer (CT), to assess the significance of an event involving the loss of both sources of electrical power to the Spent Fuel Nuclear Island (SFNI). The licensee declared an "Unusual Event" (the lowest level of an emergency classification) for this loss of power condition. The inspectors reviewed the requirements for declaring an "Unusual Event", and the licensee's response to the "Unusual Event" (NRC Event Number 37962).

b. Observations and Findings

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.

One source of electrical power (identified as the "South" line) was lost at 1:41 a.m. The cause of this loss of power was not known at the time. The licensee responded by entering the appropriate Abnormal Operating Procedure, AOP-8.6, Appendix B, "Loss of Power to SFNI Bus 1." There was no effect on the SFNI cooling due the loss of the South line, because the operating equipment was being powered off the North line.

At 7:15 a.m., during efforts to restore the South line, the North line was also de-energized. The exact cause of the loss of the North line was also not known at the time. When the North line was lost, SFNI cooling was also interrupted. The licensee responded by entering AOP 8.6, Appendix A, "Loss of Power to Both SFNI Buses." The spent fuel pool temperature at the time cooling was lost was about 91 degrees Fahrenheit (°F) and the anticipated heat up rate with no cooling in service, based on prior testing, was less than one degree per hour. When SFNI cooling was restored, the spent fuel pool (SFP) temperature had only increased 1°F, to 92°F.

In accordance with licensee requirements, when power had not been restored by 8:15 a.m., one hour after the initial loss of power occurred, the licensee declared an Unusual Event. The licensee determined that the loss of power was caused by the failure of in-line current transformers which were being used to meter power going through the lines (refer to Section 1.4.1). Power was successfully restored to the SFNI via the North line at 9:01 a.m. by installing jumper wires around the current transformer, which enabled restoration of SFP cooling at 9:23 a.m. The licensee terminated the

Unusual Event at 9:29 a.m. The South line was restored at 9:36 a.m. by installing jumper wires around the current transformer. The jumpers were still installed at the end of the inspection period.

There were no significant consequences to this event. Spent fuel pool level remained constant and SFP temperature increased only one degree, to 92°F. The licensee's abnormal response procedure for high SFP temperature requires actions once the temperature alarm level of 125°F is reached. Also, the electrical repair crew had an electrical generator with them that could have been wired into the SFNI electrical buses had that been deemed necessary.

The licensee's response to the Unusual Event was correct and no violations were identified. However, separate from the immediate response, the licensee was pursuing issues it had identified relating to timely notifications about the event within and outside the licensee's organization. The NRC had questions regarding the same issues. These issues will be subject to further review during future inspections. This is an inspector follow up item: **IFI (050-295/2001-01(DNMS))**.

c. Conclusions

There were no significant consequences to the complete loss of electrical power to the SFNI on January 25, 2001. Spent fuel pool level remained constant and temperature increased only one degree, to 92°F. The licensee's emergency response was correct with no problems identified by the inspectors.

1.4 Modifications and Self-Assessments, Auditing, and Corrective Actions (37801 & 40801)

1.4.1 Improperly Sized Revenue Metering Installation Resulted in Loss of Offsite Power

a. Inspection Scope

The inspectors reviewed the Preliminary Report, "Improperly Sized Revenue Metering Installation Resulted in Loss of Offsite Power," and held discussions with plant staff to determine the cause of the complete loss of electrical power to the SFNI on January 25, 2001.

b. Observations and Findings

As described in Section 1.3.4, at 8:15 a.m. on January 25, 2001, an Unusual Event was declared due to loss of power to the SFNI. The loss of power was due to a failure of in-line current transformers associated with metering installations that were installed in December 2000 on the feeder lines supplying power to the site. The fact that the current transformers were undersized for the total load required by the facility was identified by the transmission and distribution (T&D) department to the site engineer on January 19, 2001. The Operations Manager also became aware of this issue the same day.

The initiating event was removal from service of the un-metered line supplying the service building. This caused the service building load to be transferred to the South feeder line which contained the undersized metering installation. When notified that the

un-metered line was to be removed from service on January 24, 2001, the licensee did not recognize the impact of this action.

At 1:41 a.m. on January 25, 2001, the South Line de-energized due to the revenue metering current transformer burning open. The Joliet Dispatch Center dispatched a troubleshooter to investigate the problem. The troubleshooter discovered the metering current transformer on the South Line damaged beyond repair and opened the circuit at this meter installation. The troubleshooter was then instructed by Joliet Dispatch to crosstie to the North line. The South and North lines were crosstied at 7:05 a.m. Shortly thereafter, at 7:15 a.m., the North Line de-energized due to similar failure of its associated revenue metering current transformer. This caused a loss of all cooling for the SFNI.

The licensee's initial corrective actions were:

- delivering a diesel generator capable of supporting the SFNI to the site to verify compatibility;

- installing improved jumpers to replace temporary ones on the North and South lines; and

- instructing Joliet Dispatch not to cross the North and South Lines without the approval of licensee personnel at Zion Station.

Additional actions under development or consideration by the licensee were:

- reviewing all loads associated with the North and South Lines in order to adequately size the final current transformer installation;

- reviewing other metering installation locations in view of this event; and

- suspending any current revenue metering installation at other licensee nuclear facilities until further engineering staff review could be conducted.

During the licensee's initial investigation, the following contributing causes for the complete loss of power were identified:

- the initial specification for the metering erroneously considered the new service building as zero load;

- the specified current transformer ratio of 50:5 did not match the installed ratio of 10:5 (it appears that the incorrect size current transformers were ordered and installed);

- The T&D department previously identified the undersized current transformer, yet the un-metered line to the service building was removed, placing more load on the undersized current transformer;

- after failure of the South Line metering, there was no determination of the cause of the failure prior to the crosstie to the North Line; and

- the line removal evolution was not coordinated through a formally controlled process.

It appeared that use of the station modification process (for installation of the current transformers) and use of the station's corrective action program (when the current transformers were identified as undersized, and when the South line failed) would have prevented this event. Pending further review to determine proper application of these processes, this issue is being classified as an **Unresolved Item (URI 050 295\2001-02 (DNMS)).**

c. Conclusions

The complete loss of power at the SFNI was avoidable. The proper use of the station's modification and corrective action programs related to the loss of power event is an unresolved item.

1.5 Plant Operations (71707)

a. Inspection Scope

This inspection activity included a walk down inspection of the SFNI cooling towers to check for ice buildup or other adverse indications. The inspectors reviewed the licensee's winterization procedure, PT 35W, "Winter Operation Verification." The inspectors also reviewed the licensee's procedure for tagging equipment out-of-service, ZAP 300-06, and reviewed one completed out-of-service document. The inspectors also reviewed the operator rounds sheets to assess what equipment was monitored and how frequently it was checked. The inspectors interviewed the Operations Shift Manager on duty to discuss personnel safety and the conduct of Zion Station operating practices.

b. Observations and Findings

There were no deficiencies identified in the licensee's implementation of the winterization procedure, PT 35W. Discussions with the on-duty Shift Manger indicated that areas of susceptibility were sufficiently monitored to prevent damage due to a build-up of snow and ice. The inspectors did not identify any adverse conditions that could affect the operation of the SFNI cooling system. Frequency of equipment monitoring and surveillance testing were adequate to maintain proper operation of SFNI cooling systems and other plant functions. The winterization procedure specifically addressed all areas critical to adequately maintaining SFNI cooling systems and monitoring functions in an operating condition.

Due to a higher than normal occurrence of winter storms, the inspectors also focused on the licensee's electrical distribution and heating boiler systems, as applied to general areas of the station. The licensee's practice of maintaining lighting and heat in selected plant areas on an as-needed basis was a function of limited resources. No problems were identified by the inspectors.

The inspectors reviewed one completed out-of-service (990027811) and identified that a checklist for supervisor review was not properly completed. The checklist authorization for this out-of-service was voided because the operator did not have time to perform the

out-of-service on that shift. When this out-of-service was installed on the following day, the checklist was not properly completed to show that all of the checklist items were evaluated before installing the out-of-service. Since the out-of-service was installed only one day later (and by the same crew), the supervisor apparently overlooked the fact that the checklist had been voided. The inspectors concluded that this event was the result of a lack of attention to administrative detail. No adverse consequences resulted. The inspectors discussed this event with the Operations Manger who acknowledged that more attention to detail was appropriate to ensure proper documentation of procedure-controlled activities.

The operator round sheets indicated that the scope and frequency of rounds were adequate to assure SFNI operational safety. The on-duty Shift Manger was focused on operating activities and monitoring of the SFNI. No deficiencies were identified by the inspectors.

c. Conclusions

The licensee adequately maintained operational safety, the station winterization checklist was comprehensive, and the SFNI was adequately monitored. One example of lack of attention to administrative detail was noted.

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 testing of structures, systems, and components that could affect the safe storage of spent fuel and the reliable operation of radiation monitoring equipment. Direct observations, reviews, and interviews of licensee personnel were conducted. The reliable operation of radiation monitoring and effluent control equipment was verified.

2.1.2 Maintenance and Surveillance (62801)

The inspection evaluated the effectiveness of the maintenance program relative to safe storage and control of spent fuel. The NRC inspectors attended briefings to determine if maintenance activities were on schedule and were keeping pace with plant shutdown activities. The maintenance program was functioning well and work activities were effectively discussed and prioritized at work status meetings.

2.2 Tripping of A Spent Fuel Pool Nuclear Island Cooling Tower Pump

a. Inspection Scope

The inspectors reviewed the tripping of the “A” SFNI Cooling Tower Pump and the actions the license took to determine the cause of the trip and what action it took to prevent recurrence. The inspectors verified that the fuel in the SFP was safely cooled during the four hours that SFP cooling was not available.

b. Observations and Findings

On November 16, 2000 at 10:52 a.m., the “A” SFNI Cooling Tower Pump tripped. At 11:02 a.m., responding to information on the data acquisition system (DAS), operating personnel entered the fuel building and verified that the pump had tripped.

At 11:15 a.m., the operators entered abnormal operating procedure AOP 6.4, “Loss of SFP Cooling.” Operating personnel identified significant blockage at the suction screens of Cooling Tower “B”, which was in operation at the time. Additionally, DAS information indicated that there was a significant drop in flow just before the cooling pump tripped.

At the time of this event, the “A” Cooling Tower was drained. In order to restore cooling, the licensee cleaned the “A” Cooling Tower after finding a sand-paper-like flaky substance on the floor of the tower. The tower was then filled with water and aligned for operation. At 2:46 p.m., the “A” SFNI Cooling Tower Pump was started and aligned to Tower “A” per system operating instruction SOI-75S, “Placing A SFNI Cooling Tower Loop in Service.” This restored cooling to the spent fuel.

At 3:20 p.m., AOP 6.4, “Loss of SFP Cooling,” was exited. The SFP level was 615' 2" and the SFP temperature was 92°F, reflecting an increase of 2°F during the loss of cooling event. This temperature was well below the SFP high temperature alarm of 125°F.

The licensee determined that the “A” SFNI Cooling Pump tripped on low flow; the DAS showed that the pump flow had decreased to the low flow pump trip set point. The low flow condition was the result of foreign material that had blocked the operating tower suction screens. The licensee postulated that the foreign material had been in the cooling tower pan for some time but had not collected on the screens because it was adhering to the pan surface or had settled in pan areas away from the SFNI cooling tower suction screens. On October 15, 2000, flow had been interrupted to the tower for approximately 9 hours while performing a SFP heat-up rate test. The licensee surmised that this perturbation agitated the material in the pan, which allowed it to collect at the suction screens and resulted in the pump trip.

The licensee’s immediate corrective action in response to the November 16 event was to realign SFP cooling using the standby cooling tower. Once cooling was restored, the “B” Cooling Tower Pan was also cleaned. The foreign material was sent to Applied Water Technologies (AWT) for analysis. The results of the analysis were summarized in an “Exelon Zion Station Coating Analysis Report.” The information which follows was derived from the AWT reports.

Beginning in the Summer of 2000, a thin coating was observed on the metallic basins of the two cooling towers. This material was composed primarily of calcium carbonate based on the results of an independent laboratory analysis. The cooling water remained clear, but very small amounts of dissolved or sub-micron size suspended solid particles of calcium carbonate attached to the floor and vertical walls of the basin. In mid-December, the licensee discovered that the high efficiency filter was plugged, but exactly how long it had been in that state was unknown. The role of the plugged filter in the formation of the basin coating was not clear.

Typically, when a non-chemical system like the cooling tower system at Zion is operated without filtration, larger particles accumulate in low velocity zones (i.e., cooling tower

basins) as more of a non-adhering sludge or sand. However, calcium carbonate is much more likely to precipitate or deposit at the highest temperature locations within the system, rather than at the elevated cooling tower basin, which is the coldest location. Therefore, the formation of the coating on the tower basin was not expected. One hypothesis was that an electrostatic or electromagnetic effect of unknown origin attracted the minerals to the basin surface. This might explain the deposition on the vertical basin walls.

The possible solutions to this problem considered by the licensee included: elimination of coating formation and modification of operating procedures. The methods to eliminate coating formation depend on the understanding of the formation mechanism. A filtration performance anomaly, an electrostatic or electromagnetic effect, or some other undetermined condition may have caused this unexpected coating. The licensee recognized that even if the coating continues to form, certain procedural and maintenance modifications can be used to prevent it from becoming an operational concern. These include regular tower alternation with basin cleaning and mandatory basin cleaning after a cold weather shutdown. The cooling water system is currently operating at low (non-precipitate forming) cycles of concentration without filtration.

To prevent future events, the licensee initiated preventive maintenance (PM) tasks (PM numbers 176863 for the “A” Tower and 176865 for the “B” Tower) to clean the towers at three month intervals. Additionally, the licensee plans to inspect the operating tower pan on a monthly basis or following required cooling tower pump strainer cleaning. The inspection will be tracked and performed by the system engineer with operating department support as required. The licensee further informed the inspectors that cleaning on a more frequent basis will be done as needed based on the results of the inspections.

c. Conclusions

The licensee did not have a PM program to inspect the cooling towers for cleanliness periodically or after the tower was idle. This resulted in the plugging of the tower screens. The licensee has created a PM program.

2.3 Plant Maintenance (62801)

a. Inspection Scope

The inspectors interviewed the Zion Station Maintenance Manager and performed an overview assessment of the station maintenance program.

b. Observations and Findings

Based on a review of the licensee's work backlog and the rework history for the past 12 months, the inspectors did not identify any problems. The inspectors also determined through discussion of the licensee's process for implementation of the Maintenance Rule, that essential maintenance items were being addressed by the licensee.

As described in Section 2.2, the licensee did not have a PM program for cleaning the cooling towers. This resulted in the loss of SFNI cooling. The inspectors will continue to evaluate whether PM activities are prescribed at the appropriate scope and frequency.

c. Conclusions

The licensee's process for evaluating and prioritizing work requests appeared appropriate. The licensee's maintenance program contained appropriate elements to assure proper maintenance of equipment essential to safety store nuclear fuel, except for PM of the cleaning cooling towers.

3.0 Spent Fuel Safety (60801)

3.1 Cooling the Spent Fuel Pool

a. Inspection Scope

The inspectors evaluated the SFP condition and activities to maintain 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 for SFP temperature and level.

b. Observations and Findings

The inspectors reviewed the DTS, DSAR, shift supervisor’s office electronic status board, local SFP area instrumentation, and portions of local electrical breaker positions and local valve line-ups. On January 30, 2001, the SFP temperature was 91°F, the SFP level was 614' 11.5", and the time to boil was 134 hours. All of these parameters were within limits.

c. Conclusions

The safety of the stored spent fuel was being maintained by the new SFP cooling and ventilation systems. Temperature was being controlled at about 91°F with a heat up rate of 0.86°F per hour.

4.0 Radiological Safety

4.1 General

The inspectors reviewed exposure records for the year and observed ongoing activities in order to assess the overall radiation protection (RP) program. Specific findings are detailed in the section below.

4.2 Observed ALARA Practices (83750)

a. Inspection Scope

The inspectors reviewed station exposure records (predicted dose versus what dose was actually received) for the year and observed ALARA practices for decontaminating contaminated equipment at the decontamination pad.

b. Observations and Findings

The inspectors observed the decontamination of equipment which was covered under Radiation Work Permit (RWP) 015000, and also reviewed the radiation survey sheet for this area. Two workers were paired together for this work activity. One worker wore protective clothing including gloves and suit, while the other worker remained outside the decontamination area and assisted in setting up hoses, equipment, etc. and in counting smears on equipment that had been cleaned and was being verified as ready for unrestricted release. This worker wore gloves to handle the smears.

Work had initially progressed slowly because problems were experienced with water and power to the area. During this time, communications between the two workers were good; the problems were addressed, and at the same time, exposures were kept low. The Zion Station exposure records estimated a total dose of 4.458 person-rems for the year. The actual dose received was 3.185 person-rems.

c. Conclusions

Appropriate ALARA practices were being followed for the observed activities.

5.0 Exit Meetings Summary

The inspectors presented the inspection results to members of licensee management during a meeting on January 30, 2001. 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
T. Hill, Maintenance Supervisor
D. Bump, Plant Manager
R. Landrum, Operations/Engineering Manager
B. Leydens, Security Manager
M. Peterson, Administrating/Training Supervisor
R. Schuster, Rad/Chem Supervisor

INSPECTION PROCEDURES USED

IP 36801	Organization, Management, and Cost Controls at Permanently Shut Down Reactors
IP 71707	Plant Operations
IP 37801	Safety Reviews, Design Changes, & Modifications
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

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

50-295/2001-01	IFI	Internal and external communications issues following loss of offsite power to the SFNI
50-295/20001-02	URI	Proper use of the station modification and corrective action programs to control activities with potential impact on SFNI performance

Closed

None

Discussed

None

DOCUMENTS REVIEWED

DSAR,"Defueled Safety Analysis Report"

DSEP, "Defueled Station Emergency Plan"

DTS, "Defueled Technical Specifications"

Predefined work Request 990243886, "Cooling Tower A Pan and Strainer Cleaning"

Predefined work Request 990243885, "Cooling Tower B Pan and Strainer Cleaning"

PSAR, "Post Shut-Down Activities Report"

PT 35W, "Zion Station Winterization Checklist"

Zion Station Work Activities Schedule

Zion Daily Plant Status Sheet

ZAP 300-06, "Zion Admin Procedure for Tagging Equipment Out-of-Service"

Zion Out-of-Service, 990027811

LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
AOP	Abnormal Operating Procedure
AR	Action Request
CRG	Condition Review Group
DAS	Data Acquisition System
DSAR	Defueled Safety Analyses Report
DSEP	Defueled Station Emergency Plan
DTS	Defueled Technical Specifications
EAL	Emergency Action Level
ECCS	Emergency Core Cooling system
EDG	Emergency Diesel Generator
IFI	Inspector Follow-up Items
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OSR	Onsite Review
PC	Protective Clothing
PCE	Personal Contamination Events
PIF	Problem Identification Form
PM	Preventive Maintenance
PSDAR	Post-Shutdown Decommissioning Activities Reports
PT	Periodic Test
RCR	Root Cause Report
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
SOI	System Operating Instruction
SSC	Structures, Systems, Components
TS	Technical Specification
URI	Unresolved Item
ZAP	Zion Administrative Procedure