May 11, 2000

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

SUBJECT: NRC INSPECTION REPORT 50-295/2000-01(DNMS); 50-304/2000-01(DNMS)

Dear Mr. Kingsley:

On April 27, 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 will be placed in the NRC Public Electronic Reading Room (PERR) link at the NRC home page, namely >http://www.nrc.gov/NRC/ADAMS/index.html.

Sincerely,

/RA/

Bruce L. Jorgensen, Chief
Decommissioning Branch

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

Enclosure: Inspection Report 50-295/2000-01(DNMS);
50-304/2000-01(DNMS)

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REGION III

Docket Nos:	50-295; 50-304
License Nos:	DPR-39; DPR-48
Report No:	50-295/2000-01(DNMS); 50-304/2000-01(DNMS)
Licensee:	Commonwealth Edison Company
Facility:	Zion Nuclear Plant, Units 1 and 2
Location:	101 Shiloh Boulevard Zion, IL 60099
Dates:	March 21, 2000 - April 27, 2000
Inspectors:	R. J. Leemon, Decommissioning Inspector, DNMS R. B. Landsman, Project Engineer, DNMS J. C. Yesinowski, 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 50-295/2000-01(DNMS); 50-304/2000-01(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 activities included:

1. Tank and sump cleaning.

2. Fire protection changes.

3. Post-Shutdown Decommissioning Activities Report public meeting on April 26, 2000.

Facility Management and Control

- The NRC's public Post-shutdown Decommissioning Activities Report meeting was conducted in the city of Zion on April 26, 2000. The NRC report on this meeting will be published separately.

- 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.

- The fire plan and procedures reflect the current status of the decommissioning facility and license conditions.

Decommissioning Support Activities

- Maintenance and surveillance were being properly done to support safe spent fuel storage.

- Work activities were effectively discussed and prioritized at daily work status meetings.

- Selected equipment and components were removed from the site since the plant shutdown, with no adverse effect on safety.

- Surveillance activities were being performed as required and a conservative approach was being used by the licensee to determine the time to boil if spent fuel pool cooling was lost.

- The shift briefing was conducted professionally. The focus was on shift priorities and goals with an emphasis on safety.

Spent Fuel Safety

- The systems that monitor and cool the SFP can accommodate conditions that would challenge fuel pool level or cooling and thus protect fuel integrity.

- The safety of the stored spent fuel was being maintained by the new SFP cooling and ventilation systems. Temperature was being controlled at about 88°F.

Radiological Safety

- Plant staff were monitoring and trending worker occupational radiation dose on a daily bases and the number of personnel contamination events on a monthly bases. The trended items were within the established goals.

- Controls to achieve, As-Low-As Reasonable (ALARA) radiation exposures were being followed.

- As-Low-As-Reasonably-Achievable (ALARA) planning was demonstrated during the tank and sump cleaning project. The project was well-thought out and executed. Good radiological controls kept project dose within the ALARA Plan's goal. The cleaning of the tanks and sumps project, as completed under the ALARA Plan, resulted in no personnel contaminations, no over exposures, no onsite or offsite airborne releases, and no offsite dose to the public. Overall, onsite radiological hazards continue to be eliminated.

Report Details

Summary of Plant Activities

Since the previous inspection, tanks and sumps were cleaned and contents were transferred to two high integrity containers in the Rad Waste Annex area until shipment offsite. The fire protection program has been amended and the Zion Municipal Fire Department is the primary responder. The Post-Shutdown Decommissioning Activities Report public meeting was held on April 26, 2000, in Zion, Illinois.

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.

On April 26, 2000, the NRC staff and ComEd management held a required Post-Shutdown Decommissioning Activity Report public meeting in the city of Zion, Illinois. The meeting addressed licensee activities and plans, current plant conditions and NRC regulatory oversight and inspection. The meeting was transcribed and the transcript will be available under separate cover.

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

The inspector verified that NRC requirements were being met, including requirements detailed in the plan Defueled Technical Specifications (DTSs), Offsite Dose Calculation Manual (ODCM), and Post Shutdown Decommissioning Activities Report (PSDAR). The inspector's reviews also included the Emergency Preparedness (EP) and Fire Protection (FP) plans (section 1.3.4 of this report). No problems were identified.

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 Defueled Safety Analysis Report (DSAR) and the 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. The inspector ascertained that activities were in accordance with licensed requirements and docketed commitments as stated in 10 CFR and DTSs and PSAR, Regulatory Guide 1.33, and station procedures.

The inspector reviewed the above documents to determine if the SFP was being operated in accordance with requirements. The results of this review are discussed in section 3.0 of this report. The inspector concluded that the licensee does have requirements discussed in the above documents to maintain SFP temperature and level at all times thus ensuring the safe storage of nuclear fuel.

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 material integrity of plant systems and housekeeping were good. 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.

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.

1.3.4 Fire Protection (71801)

a. Inspection Scope

The inspector evaluated the fire protection program for compliance with regulatory requirements including 10 CFR 50.48(f). Reviews of the program and interviews of licensee personnel were conducted to assess the licensee's fire protection strategy and ascertain whether the amended Fire Protection Report and procedures reflect the current status of the decommissioned facility and license conditions.

b. Observations and Findings

The inspector had previously reviewed Zion Station Fire Protection Report (FPR), Amendment 6, July 1999, and found that the amended report reflected the changed regulatory requirements for a shutdown plant and decreased fire loads. Changes to the FPR were made that eliminated the onsite four member fire brigade as the primary responder in the event of a fire, and replaced it with the Zion Municipal Fire Department (ZMFD) as the primary responder. The licensee also has an onsite incipient responder. Safety Evaluation No. 99-0435, dated January 20, 2000, adequately documented the bases for no unreviewed safety question as a result of the change. Also, Fire Protection Administrative Technical Requirements (ATR) were revised to reflect these changes. On-Site Review No. OSR/021/99, dated January 24, 2000, approved the new emergency response capability in the event of a fire at Zion Station. Finally, a procedure change referencing Safety Evaluation No. 99-0435, moved the Fire Protection Administrative Technical Requirements (ATR) to ZAP 900-01, Appendix A, Revision 5.

Interviews with the Operations Manager, Fire Marshall, and the Hazards Specialist were conducted concerning the fire protection program including its implementation. A follow-up phone interview was made with the Engineering Manager. The ZMFD is to be utilized in all cases involving a fire at Zion Station. In the event of a fire detection or suppression actuation or alarm at Zion Station, a direct fire alarm will be annunciated at the ZMFD. The ZMFD will then respond and proceed to the site unless station personnel call the ZMFD and direct them not to respond. ZMFD personnel have toured onsite. At present, a Radiation Protection Technician along with the onsite incipient fire responder will assist the ZMFD in the event of a fire in a radiologically controlled area. The revised Pre-Fire Plans will be available as a reference for the ZMFD personnel.

c. Conclusions

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).

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

Closed: LER 05000295/1996010-01 "Reactor Trip Due to Equipment Failure" On March 16, 1996, Unit 1 was returning to service. At approximately 20% reactor power, the steam generator feed water (FW) control was being transferred from FW bypass regulating values to the main FW regulating valves. After the transfer, the IC steam generator level continued to increase despite efforts by the operator to close the IC Main FW regulation valve. The reactor subsequently tripped on 1C S/G Level High although the closed valve indication was observed prior to reaching the trip set point of 70% level. The turbine and reactor tripped as designed.

The cause of this event was a new but defective pneumatic volume booster on the 1C S/G main FW regulating valve.

The booster spring seat was found to be stuck in a position that would prevent the venting function. This would cause a slow responding valve. The 1C main FW regulating valve was tested. It took approximately 3 minutes for the valve to begin to respond to a change in demand. Typical response time was expected to be 3 to 10 seconds.

The failed component, which was new and had been installed prior to the startup, was found with the proper surface finish and lubrication. Bench testing was able to duplicate the failed condition several times. However, after some "break in" time, the valve performed properly at subsequent tests. Therefore, though the valve was within the manufacturer's tolerances, the cause of the sticking appeared to be related to the need to exercise the components to remove any final surface irregularities.

Corrective actions were: the pneumatic volume booster for the 1C main FW regulating valve was replaced, and the volume booster installation practices now include performing a bench testing break-in period prior to issuing the component for use.

The unit (plant) responded as expected to a SG High Level Radiation with a turbine trip and reactor trip. Therefore, this event had no impact on the health and safety of the public.

Unit 1 and 2 are permanently shutdown; therefore; this equipment will no longer be required for use at Zion station. This LER is closed.

Closed: LER 05000295/1996003-01, "Loss of Auxiliary Building Ventilation Resulting from Inadequate Design" On January 29, 1996, during normal plant operations, all auxiliary building supply and exhaust fans tripped due to a high negative auxiliary building differential pressure while experiencing wind speeds between 25 to 30 mph. During the two hours when no auxiliary building exhaust fans were available, the auxiliary building ventilation was outside its design basis. A one hour ENS notification was made at 1800 hours on January 29, 1996.

The auxiliary building supply and exhaust fans tripped due to an excessive negative auxiliary building differential pressure signal

The immediate corrective action was to disable the differential protection trips of the auxiliary building supply and exhaust fans and to restart the fans.

On January 17, 1996, a fuse was re-installed in the auxiliary building pressure protection circuit. The fuse was re-installed after having been found missing in order to restore the system to its original design configuration. The duration for which it was missing is unknown since its removal was not properly controlled or documented. Without the fuse installed, the auxiliary building pressure protection circuit was not functional. The function of the circuit is to trip all auxiliary building supply and exhaust fans simultaneously when the auxiliary building to atmosphere differential pressure exceeds +/-1.25" of water.

The building pressure control system compensates for building wake effects caused by winds. It does this by selecting the lowest atmospheric pressure sensed at any one of four locations on the building roof (North, South, East, and West), and then maintaining the building at a 0.25" of water pressure lower than atmospheric pressure. The atmospheric pressure sensed is not a barometric pressure, therefore velocity pressures induced on the building as a result of winds are an input to the building pressure control system and to the two building pressure protection switches.

The velocity pressures experienced during wind speeds between 25 to 30 mph caused the building pressure control system to compensate and as a result, the building pressure protection system caused all supply and exhaust fans to trip.

The building pressure protection system design cannot ensure the design basis of the system. Auxiliary building exhaust fans are required to operate to maintain pressure gradients within the building to ensure air flow direction from cleaner areas to those of higher contamination potential.

The safety significance of this event was minimal. The auxiliary building ventilation supply and exhaust fans were unavailable during the event. Therefore, the auxiliary building was not being maintained at negative pressure relative to atmosphere. This also resulted in the inability to remove potentially contaminated gases from the various areas in the auxiliary building. Long-term post-LOCA and Emergency Core Cooling System leakage into the auxiliary building would not have been filtered prior

to its release offsite. Additionally, any fuel handling accident would have had the same results, but there was no fuel handling ongoing time of the event.

The effect on offsite dose and Control Room dose during a LOCA, during which the auxiliary building ventilation system is not operating for a short time, is minimal. The offsite and control room dose is primarily driven by the containment source contribution. Calculation for the control room dose analysis used similar methodology to that used for the offsite dose analysis which showed that the ECCS source contribution (exiting from the Auxiliary Building) was on the order of 1/20th of the containment contribution. Engineering judgment leads to the conclusion that the added impact of an unfiltered (instead of filtered) ECCS release on the total offsite dose and control room dose was minimal. This results in an offsite dose that is still significantly below 10 CFR 100 allowable limits and a control room dose that is still below allowable General Design Criteria (GDC)-19 limits. This is primarily because there is no driving force or normally open path to expel the unfiltered auxiliary building air. The auxiliary building air is left to leak out of the auxiliary building atmosphere. However, should the auxiliary building become slightly positive due to outside wind effects, the differential pressure would still be much lower than could be caused by a mechanical driving force (i.e., fans) resulting in a much lower air flow rate out of the building than with fans. This lower air flow rate (Auxiliary Building out-leakage) would then proportionately have a lower impact on the offsite dose and control room dose.

The differential protection trips of the auxiliary building supply and exhaust fans remain out of service and the auxiliary building exhaust will operate to main train pressure gradients within the building to ensure air flow direction from cleaner areas to those of higher contamination potential. This LER is closed.

Closed: LER 05000295/1997023-00 "Auxiliary Building Ventilation does not Conform to the UFSAR due to an Analysis Deficiency" Certain dampers did not change positions to send the release through charcoal filters until after a time delay. This resulted in an assumed puff of activity to the control room and the environment. The corrective actions were to perform calculations and modify a switch. The calculations showed that the puff of activity was not above 10 CFR 100 limits for offsite dose and the control room habitability limits per general design criteria-19. A planned modification to the switch to support plant restart was canceled, since the plant was never restarted. This LER is closed.

Closed: LER 05000295/1997022-00,"Non-Safety System Affects Control Room Habitability" A supplemental LER was submitted to the NRC on August 28, 1998, documenting that conditions originally reported have been determined not to constitute a reportable occurrence. Also, testing has since been performed to verify that the control room would remain habitable. Therefore, no condition existed which would have prevented the fulfillment of a safety function. This LER is closed.

Closed: LER 050000295/1997016-00," Failure to Recognize 125 VDC Busses Inoperable" The system engineer did not inform Operations before the battery test that when 125 VDC buses are cross-tied and a battery removed (for testing), the associated DC buses are inoperable. The safety significance of this event was minimal since unit 1 was defueled and unit 2 was in Mode 5 (reactor power 0%, temperature < 200 degrees F and 0 PSIG) at the time.

If a dual unit loss of offsite power (DLOOP) occurred during this period of time, the 2C SW pump would be the only available SW pump for restart powered by the diesel generator. With this cooling, it would have taken more than 17 hours before boiling

would occur in the Unit 2 Reactor Cooling System and more than 50 hours before unit 2 fuel would become uncovered. This would allow more than enough time to reestablish operation of one or more SW pumps and time to realign the SW system configuration, as required to obtain adequate cooling to the RCS. Although both units were outside of their design basis for 90 hours and 32 minutes, the 2C SW pump was operable and the IB, IC, 2A and 2B SW pumps were available. In addition, based on PRA (Probilistic Risk Assessment) analysis, the probability of a dual unit lost of offsite power (DLOOP) occurring during this short period of time was minimal.

Both units are defueled and permanently shutdown. The Spent Fuel nuclear Island does not rely on batteries nor on SW pumps to ensure safe storage of nuclear fuel. This LER is closed.

Closed LER 5000295/1997018-00, "Failure to Recognize 125 VDC Buses Inoperable" This LER is similar to LER 1997016-00 discussed above. The procedures associated with station battery testing have been revised to prohibit both cross-tying DC Busses and removing a battery from service at the same time. Station batteries are no longer required for safe storage of nuclear fuel stored in the Spent Fuel Nuclear Island.

On February 13, 1998, Commonwealth Edison announced shutdown of the two reactors at Zion Station. On March 9, 1998, Commonwealth Edison certified to the NRC that both Zion units would remain permanently defueled. This LER is closed.

Closed IFI 05000295/97019-06; 500-300/97019-06, "Review Licensee's Investigation and Corrective Actions for Zebra Mussels:

The inspector reviewed the PIF Z1997-01552, "Potential Adverse Trend Identified-Zebra Mussels Intrusion." The root causes were:

1) The failure of the chlorination system to deliver chlorine to the 1B service water strainer, for at least one year, was due to a stuck check valve or to an obstruction in the line or in the quill to the strainer. The line was cleared and the check valve was repaired.

2) The failure of the chlorination system to deliver chlorine to the 2A Service Water strainer was a mispositioned chemical injection valve. The valve was repositioned and all other chemical injection valves' positions were verified for the correct positions.

3) The failure of the chlorine monitoring program to detect the lack of chlorination in some service water strainers. The chlorine monitoring program was modified to sample these strainers.

The safety significance of this event was minimal. At the time Unit 1 was defueled and Unit 2 was in Mode 5 (Cold Shutdown). The 1B and IC SW pumps were available and in operation (although not administratively operable - a battery did not have all its specific gravities taken). More than one Unit 2 SW Pumps were operable. The operability of the Unit 2 SW Pumps provided cooling water flow to the component cooling system and Units 1 and 2 RHR systems, as well as other loads, throughout this event.

Presently, the service water system is not used to cool the spent Fuel Pool Nuclear Island, nor for the safe storage of nuclear fuel. This unresolved item is closed and did not result in a violation.

Closed IFI 500-295/98008-01; 500-300/98008-02, "Review of the License's Final Assessment of the Maintenance Rule Program" The inspector reviewed the maintenance rule final assessment and found no deficiencies. This open item is closed.

2.0 Decommissioning Support Activities

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

2.1.1 General Inspection

a. Inspection Scope

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.

b. Observations and Findings

The inspectors reviewed SFP surveillance parameters including boron concentration, temperature, water level, and radioactivity levels, and verified that no leakage was coming from the SFP and the SFP area radiation monitor was functioning. Water chemistry and cleanliness controls were excellent. Water chemistry was maintained by keeping a SFP demineralizer train operating at all times. The surface was kept clean by means of a floating skimmer.

Foreign material controls were in use in and around the SFP. The SFP area was a foreign material exclusion area; nothing loose is allowed in the area. This was further assured by having a waist-high clear plastic fence around most of the pool area.

The SFP heat up rate was reviewed with the operations manager. Operations used the time to boil graphs to obtain the time to boil. The July curve is used. The time to boil as of last July was 74 hours after spent fuel cooling and the SFP ventilation system were lost. At present, if only SFP cooling were lost it would be greater than 160 hours for the time to boil.

c. Conclusions

The inspectors concluded that the SFP surveillance activities were being performed as required and that a conservative approach, by using last years July graph, was being used by the licensee to determine the time to boil if spent fuel pool cooling was lost.

2.1.2 Maintenance Daily Work Status Meetings

a. Inspection Scope

The inspector attended two daily work status meetings. The inspector also interviewed licensee personnel.

b. Observations and Findings

At the daily work status meetings, work was prioritized considering resources and significance to spent fuel pool (SFP) and spent fuel pool nuclear island (SFNI) systems. Work was scheduled by departments, with good discussion between workers concerning coordination of work tasks. Work was scheduled on the SFNI ventilation system exhaust radiation monitor ORT-PR30B, which had failed its weekly source check. An instrument maintenance (IM) worker initiated a good discussion on returning the monitor to operable status. Though compensatory weekly samples of the ventilation effluent were in place, the worker showed an awareness of the importance of the monitor's function.

The Zion Station Schedule was updated at the daily work status meeting. Maintenance and surveillance of equipment and components important to the safe storage of spent fuel were assessed, identified and scheduled as indicated by the discussions and documents. During inspector plant walkdowns of the SFP and SFNI, no adverse structures, systems, or components (SSC) maintenance conditions were identified.

Expected SFP shutdown risk (SDR) was assessed in the Zion Station Schedule for the current work date. A daily SFP SDR evaluation was done by operations personnel.

c. Conclusion

Work activities were discussed and prioritized at the daily work status meetings. The current licensee maintenance program was effective in maintaining adequate material and structural integrity of structures, systems, and components important to the safe storage of spent fuel. Proper compensatory actions were taken for the inoperable SFNI ventilation system exhaust radiation monitor and its restoration to operable status was a station priority.

2.1.3 Equipment and Components Removed form Site Since Plant Shutdown

The list of equipment removed from the site since the plant shutdown includes the following:

Unit1

Unit 1 High pressure turbine control valves (4)
Unit 1 MOV motors from 1MOV-CD003 and 1MOV-CD004
Unit 1 1B EDG Woodward governor control modules

Unit 2
Unit 2 Pressurizer loop spray valves
Unit 2 1B EDG Woodward governor control module and digital reference voltage unit

Unit1 and 2
Unit 1 and 2 Reactor vessel conoseals
Unit 1 and 2 SGLP STM DP cells (8)
Unit 1 and 2 Rod control Hagan modules

Unit 1 and 2 miscellaneous heater level controllers (19)
Unit 1 and 2 ATWS AMS power supplies

Miscellaneous items were shipped to other ComEd sites. Other components have been relocated in the plant based on need. In addition, a large quantity of Zion Station fire protection equipment including scuba tanks, masks, and air fill compressor were recently donated to the city of Zion, Illinois.

At the time of this inspection, the Units 1 and 2 reactor vessels were filled, the Unit 1 reactor coolant loops were drained, and the Unit 2 reactor coolant loops were filled. The differences were based on unit configuration and activities at the time of the plant shutdown.

2.2 Operational Safety Verification (71707)

a. Inspection Scope

The inspector observed control room staffing and one shift briefing. The inspector also discussed plant status with operators qualified to stand watch in the control room.

b. Observations and Findings

In the control room, the inspector observed that the Shift Supervisor maintained command and control of the plant and conducted a detailed shift briefing that included participation of crew members, an emphasis on safety in the plant, staying focused during the transition to the Zion Decommissioning Organization, and using the STAR principles – stop, think, act, and review.

During discussions with two operators, the issue was raised as to whether spent fuel pool area radiation monitors are considered criticality monitors. Subsequently, in additional discussions with licensee personnel, the inspector confirmed that spent fuel pool area radiation monitors will measure excessive radiation levels in the spent fuel pool area in the event of a criticality accident.

c. Conclusions

The shift briefing was conducted professionally. The focus was on shift priorities and goals with emphasis on safety.

3.0 Spent Fuel Safety (60801)

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 inspector also evaluated fuel pool safety as it related to the SFP cooling and ventilation modifications. The inspector reviewed plant documents to determine the requirements and evaluations for SFP temperature and level.

b. Observations and Findings

The inspector reviewed the DTS, DSAR, Regulatory Guide 1.33 Revision 2 dated February 1978 (Quality Assurance Program Requirements), and plant procedures. Specify normal operating requirements for SFP temperature, level and accidental criticality monitoring are not contained in the DTS; however, they are contained in the ODCM, DSAR, Zion Station Operating and Surveillance Procedures.

Listed below are the requirements for SFP temperature and level and the document the requirement is discussed in:

Spent Fuel Pool Level Elevations

Elevation	Comment	Reference(s)
615' 6"	Top of SFP over flow to auxiliary building drain tank	SOI-75
615' 4"	High level alarm	Alarm Response Sheet
615' 2" to 614' 6"	normal operating bond	PT-O APPD REV 30
614' 4"	low level alarm	Alarm Response Sheet
613' 1.5"	DTS limit 23 feet above the fuel	DTS
611' 8"	SFP pump suction line	DSAR 3.9.4.2; 5.1.2
598'	SFP Cooling return line	DTS 4.2.2 DSAR 5.1.2
592' 4"	Weir Gates	DSAR 3.9.4.2 DSAR 5.1.2
590' 1.5"	Top of fuel	DSAR 5.1.2
589' 11"	Top of fuel	DSAR 3.9.4.2
576' 7.5"	Bottom of fuel	Holtec Report
576' 7"	Bottom of rack base plate	Holtec Report
576'	Bottom of Spent Fuel Pool	Print M264

Temperature Monitoring of SFP

Temperature	Comment	References
≥ 210°F	Time to Saturation	Calculation No: 22N-0-11OM-0058 Note 1, Note 2, Note 3, Note 4, Note 5
≥ 210°F	Time to Saturation; Graph of time to Saturation versus time (age of fuel???)	AOP-6.4 Rev. 7 Loss of SFP cooling
≥ 210°	After loss of SFP cooling and SFP ventilation, and with no makeup, after April 1, 1999 - greater than 60 hours	AOP-6.4 Rev. 7
125°F	Spent Fuel Pit Temperature High	Alarm response sheet -go to AOP-6.4
40-120°F	Normal temperature bond	Recorded shiftly per PT-O, Appendix D
< 50°F	Notify shift supervisor for actions	PT-O Appendix D

Calculation No: 22N-0-11OM-0058, "Zion Decommissioning Spent Fuel Pool Heat Load and Time to Saturation Calculation"

Note 1: The maximum SFP water level is only at 614'-4" elevation associated with the Zion Low limit annunciation set points.

Note 2: The initial spent Fuel Pool water Temperature is assumed to be 125°F associated with the Zion High Temperature annunciation set point.

Note 3: Attachment C, "Spent Fuel Pool Time to Saturation"

Note 4: As of April 15, 200, the time to saturation under these conditions was greater than 50 hours.

Note 5: Level decrease versus time after initiation of boiling: graph shows the time to reduce level to lowest design bases level of 598-feet elevation would take 208 hours.

c. Conclusion

The DTS, DSAR, Regulatory Guide 1.33, and plant procedure provide requirements for maintaining SFP temperature and level at all times.

4.0 Radiological Safety

4.1 General

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

4.2 Occupational Radiation Exposure (83750)

a. Inspection Scope

The inspector selectively examined licensee processes to minimize occupational radiation exposures to evaluate overall radiation safety and provisions for early identification of potential problems. Areas examined included licensee self assessments, personnel contamination events (PCEs) identification and trending, personnel dose monitoring, and maintaining occupational exposure as-low-as reasonably-achievable (ALARA).

b. Observations and Findings

For the previous four month period, the inspector found no deficiencies or weaknesses in the area of radiation events documented using the Action Request (AR) process. (In July, 1999, the Action Request system was initiated as a means to identify problems and the previous Problem Identification Form system was retired.) The inspector reviewed the March 2000 RadChem Parameters data sheets and determined that all dose performance indicators were within established goals for the site. Action Request No. 990084171 documented the number of PCE contaminations for the month of March that were less than 5000 DPM for trending purposes. The inspector also reviewed the daily report for Zion Station exposure and determined that the actual doses were within the established monthly estimates. Top three dose contributors were indicated as RadChem routines, Maintenance General, and Operating Rounds. Monthly and yearly dose sums were within established goals.

In addition, the inspector reviewed the Zion Station Nuclear Oversight Audit Report (Number 22-00-002), Radioactive Waste shipping, dated March 20, 2000, and thirteen Quality Assurance Field Monitor Reports written during the previous four months. A number of the Field Monitor Reports documented proper RP worker practices including proper worker knowledge of their Radiation Work Permit (RWP), proper dosimetry and protective clothing (PC), and proper use of step-off pads for contaminated areas. One Field Monitor Report, No. 22-00-0019, dated April 13, 2000, documented good contamination controls during the removal of ropes from hardware in the spent fuel pool. A second Field monitor Report, No. 22-00-0021 dated April 14, 2000, documented that the SFP chemistry surveillance were within Technical Specification (TS) and regulatory requirements for the period of January 2, 2000, through March 28, 2000. From the inspector's review of the reports, no problems or trends were identified.

In the Corrective Actions 1999 year-end report dated February 2, 2000, no adverse trends were identified.

At present, the 1999 Radiation Protection Program Review to be performed by the licensee for 10 CFR 20.1101(c) was not completed. The report of this review will be examined during a later inspection period.

c. Conclusion

Plant RP staff were monitoring and trending occupational radiation dose on a daily basis and personnel contamination events (PCEs) on a monthly basis. The trended items were within established goals.

4.3 Observed ALARA Practices (83750)

a. Inspection Scope

The inspector observed plant activities and interviewed radiation protection technicians to determine if ALARA practices were followed.

b. Observation and Findings

The inspector observed that access to the radiologically protected area (RPA) required prior RPT review and approval. The duty RPT would be contacted before workers were administratively allowed to enter the RPA. The RPT questioned the reason for access including any radiological boundaries that needed to be crossed. The duty RPT would survey articles prior to their removal from the RPA.

Zion Rad Procedure, ZAP 6021-29, Routine Radiological Surveys, Revision 7, step 3.1 required performance of a daily (Monday through Friday) large area indirect contamination survey of the major RPA exits and areas used to stage protective clothing. Step 3.2 provides for other "Random investigational large area indirect contamination surveys". For both of these, documentation was not required. The inspector verified through interviews that these tasks were being performed.

All equipment, components, material, and articles that were in the RPA or potentially contaminated continued to be assessed and surveyed prior to release from the site. An unconditional release tag would be attached if the surveyed item was approved for uncontional release from the site.

c. Conclusion

Controls to achieve, As-Low-As Reasonable (ALARA) radiation exposures were being followed.

4.4 RadWaste Treatment, Effluent and Environmental Monitoring (84750)

a Inspection Scope

The inspectors reviewed the As-Low-As-Reasonably-Achievable (ALARA) Plan for the tank and sump cleaning project and discussed the project with the Decontamination Coordinator.

b Observations and Findings

The tank and sump cleaning project was started on February 7, 2000, and completed in late March 2000. Six tanks and two sumps were completely cleaned. One tank, the chemical drain tank, was not completely cleaned due to a degraded rubber lining that contributed to repeated filter basket screen clogging upstream of the sludge transfer pumps. This tank will be evaluated for cleaning at some later date. The total ALARA planned dose for the project was 2.0 person-rem. The accumulated dose during the cleaning phase was 1.8 person-rem which allowed 0.2 person-rem for the future high integrity container handling and shipment phase. Based on the interviews with the

Decontamination Coordinator and review of the ALARA Plan, good As-Low-As-Reasonably-Achievable (ALARA) principles were followed during the project. Radiation levels were continuously assessed during the cleaning phase.

Daily briefs were held at about 7:30 am and 12:30 p.m. These briefs included input from those involved in the work and lessons from the previous day's work. These briefs were an indicator of good project management. The ALARA Plan Radiological Performance Measures were met during the cleaning phase as there were no Personal Contamination Events (PCEs), no personnel errors, no spread of contamination outside posted boundaries, no airborne radioactivity, no unplanned radiological dose, and no Action Requests (ARs) items were associated with radiation worker field performance. The tank and sump cleaning project, which was done under the ALARA Plan, was effectively implemented and did not result in any offsite dose to the public. The project final report will be issued subsequent to the handling and shipment of the high integrity containers. One container with 180 cubic feet and the second with 100 cubic feet of RadWaste remain in the Rad Waste Annex area until transfer to Barnwell, S.C., at some future date.

c. Conclusions

As-Low-As-Reasonably-Achievable (ALARA) planning was demonstrated during the tank and sump cleaning project. The project was well-thought out and executed. Good radiological controls kept project dose within the ALARA Plan's goal. Overall, onsite radiological hazards continue to be eliminated.

5.0 Exit Meetings Summary

The inspectors presented the inspection results to members of licensee management during meeting on April 27, 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. Rode, Operations
R. Schuster, Rad/Chem Supervisor
P. Simpson, Regulatory Services
R. Starkey, Plant Manager
V. Voigt
M. Weis, Business Manager
J. Zeszutek, Regulatory Assurance

INSPECTION PROCEDURES USED

IP 36801:	Organization, Management, and Cost Controls at Permanently Shut Down Reactors
IP 37801:	Safety Review, Design Changes, and Modifications at Permanently Shut Down Reactors
IP 60801:	Spent Fuel Pool Safety at Permanently Shut Down Reactors
IP 62707	Maintenance Observation
IP 62801:	Maintenance and Surveillance at Permanently Shut Down Reactors
IP 71707:	Operational Safety Verification
IP 71801:	Decommissioning Performance and Status Review at Permanently Shut Down Reactors
IP 83750:	Occupational Radiation Exposure
IP 92700:	Onsite Follow-up, Written Reports or Non-routine Events at Power Reactor Facilities

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

50-295/96003-01	LER	Loss off Auxiliary Building Ventilation Resulting from Inadequate Design
50-295/96010-01	LER	Reactor Trip Due to Equipment Failure
50-295/96023-00	LER	Auxiliary Building Ventilation does not Conform to the UFSAR due to Analysis Deficiency
50-295/97016-00	LER	Failure to Recognize 125 VDC Buses Inoperable
50-295/97018-01	LER	Failure to Recognize 125 VDC Buses Inoperable
50-295/97022-00	LER	Non-Safety System Affects Control Room Habitability
500-295/97019-06	IFI	Review Licensee's Investigation and Corrective Actions for Zebra Mussels
500-304/97019-06	IFI	Review Licensee's Investigation and Corrective Actions for Zebra Mussels
500-295/98008-01	IFI	Review of the License's Final Assessment of the Maintenance Rule Program
500-304/98008-02,	IFI	Review of the License's Final Assessment of the Maintenance Rule Program

Discussed

None

LIST OF ACRONYMS USED

ALARA As-Low-As-Reasonably-Achievable
AOP Abnormal Operating Procedure
AR Action Request

ATR Administrative Technical Requirements
ATWS Anticipate Transient Without Trip
CD Condensate System
DP Differential Pressure
DSAR Defueled Safety Analyses Report
DSEP Defueled Station Emergency Plan
DTS Defueled Technical Specifications
FPR Fire Protection Report
ECCS Emergency Core Cooling system
EDG Emergency Diesel Generator
FPR Fire Protection Report
GDC General Design Criteria
IFI Inspector Follow-up Items
IM Instrument Maintenance
IP Inspection Procedure
LOCA Lost of Coolant Accident
MOV Motor Operated Valve
NEI/NUSMG Nuclear Utilities Strategic Management Group
NRC Nuclear Regulatory Commission
PC Protective Clothing
PCE Personal Contamination Events
PIF Problem Identification Form
PSDAR Post-Shutdown Decommissioning Activities Reports
ODCM Offsite Dose Calculation Manual
OSR Onsite Review
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

DOCUMENTS REVIEWED

Action Request No.990084171
AOP, “Spent Fuel Pit Level Low”
AOP, “Spent Fuel Pit Level High”
AOP-6.4, “Loss of Spent Fuel Pit Cooling”
Auxiliary Building Operator Weekly Checksheet
Corrective Action 1999 year-end report dated February 2, 2000
DSAR,”Defueled Safety Analysis Report”
DSEP, “Defueled Station Emergency Plan”
DTS, “Defueled Technical Specifications”

Fire Protection Report, Amendment 6, July 1999
Long Term Zion Decommissioning Organization Chart
March 2000 RadChem Parameters
New ALARA Plan No. 00-001, dated January 13, 2000
ODCM, “Offsite Dose Calculation Manual”
On-Site Review No. OSR/021/99, On-Site Review of Fire Protection Plan Change, Regarding Fire Brigade Elimination, dated January 24, 2000
PSAR, “Post Shut-Down Activities Report”
Quality Assurance Field Monitor Reports Nos. 22-00-0001, 22-00-0002, 22-00-0003, 22-00-0005,22-00-0009, 22-00-0011, 22-00-0013, 22-00-0015, 22-00-0019,22-00-0021, and 22-00-0023.
RWP No. 005004 (Revision 0) “Plant Tours and Inspections”
RWP No. 005100 “Perform Tank and Sump Cleaning”
RWP No. 005100/005101
RWP No. 005104 “Move and Remove Equipment from Spent Fuel Pool”
SOI-75-A, “Placing A Spent Fuel Pit Cooling Loop In Service”
SOI 75-B, “Removing A Spent Fuel Pit Cooling Loop From Service”
Top-Level Corporate NGG Organization Chart
Zion Station SFNI Security System Description (Safeguards Information)
ZAP 900-01, Station Fire Protection Program, Revision 5
Zion Station Nuclear Oversight Audit Report (Number 22-00-002), Radioactive Waste Shipping, dated March 20, 2000.
Zion Station Schedule dated April 26, 2000
10 CFR 50.59 Safety Evaluation No.99-0042, dated February 21, 1999
10 CFR 50.59 Safety Evaluation No. 99-0435, Changing Emergency Response Capability, dated January 20, 2000

End