UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, IL 60532-4352

July 18, 2017

Mr. John Sauger
General Manager
Zion Restoration Project
Zion*Solutions*, LLC
101 Shiloh Boulevard
Zion, IL 60099

SUBJECT: NRC INSPECTION REPORT NO. 05000295/2017001(DNMS);
05000304/2017001(DNMS) – ZION NUCLEAR POWER STATION

Dear Mr. Sauger:

On June 21, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed onsite inspection activities from January 13 through June 21, 2017, at the permanently shut down Zion Nuclear Power Station (ZNPS), in Zion, Illinois. The purpose of the inspection was to determine whether decommissioning activities were conducted safely and in accordance with NRC requirements. The enclosed report presents the results of this inspection, which were discussed with you and members of your staff on June 21, 2017.

During the inspection period, the NRC inspectors reviewed the following aspects of onsite activities: design changes and modifications; self-assessments, audits, and corrective actions; maintenance and surveillance; occupational radiation exposure; radioactive waste treatment; effluent and environmental monitoring; and solid radioactive waste management and transportation of radioactive materials. The inspection consisted of an examination of activities at the site as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observation of work activities, and interviews with personnel.

Based on the results of this inspection, the NRC identified one Severity Level (SL) IV violation of NRC requirements. Because the issue was entered into your corrective action program (CAP), the NRC is treating it as a Non-Cited Violation (NCV), in accordance with Section 2.3.2.a of the NRC's Enforcement Policy. No response is required for the NCV. However, if you contest the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; and the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Michael A. Kunowski, Chief
Materials Control, ISFSI and
Decommissioning Branch
Division of Nuclear Materials Safety

Docket Nos. 050-00295; 050-00304
License Nos. DPR-39; DPR-48

Enclosures:
1. IR 05000295/2017001(DNMS);
2. 05000304/2017001(DNMS)

cc w/encl: Zion*Solutions,* Service List

Letter to Mr. John Sauger from Michael A. Kunowski, dated July 18, 2017

SUBJECT: NRC INSPECTION REPORT NO. 05000295/2017001(DNMS);
05000304/2017001(DNMS) – ZION NUCLEAR POWER STATION

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U.S. NUCLEAR REGULATORY COMMISSION
REGION III

Docket Nos:	050-00295; 050-00304
License Nos:	DPR-39; DPR-48
Report No:	05000295/2017001(DNMS); 05000304/2017001(DNMS)
Licensee:	Zion*Solutions*, LLC
Facility:	Zion Nuclear Power Station, Units 1 and 2
Location:	Zion, Illinois
Dates:	January 13, 2017, through June 21, 2017
Inspectors:	Bill C. Lin, Health Physicist Rhex A. Edwards, Senior Health Physicist
Approved by:	Michael A. Kunowski, Chief Materials Control, ISFSI, and Decommissioning Branch Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Zion Nuclear Power Station, Units 1 and 2
NRC Inspection Report 05000295/2017001(DNMS); 05000304/2017001(DNMS)

The Zion Nuclear Power Station (ZNPS) is a permanently shut-down and defueled power reactor facility that was maintained in a safe storage (SAFSTOR) condition from 1998 through 2010. Active decommissioning began in 2011, and continued throughout this inspection period. This routine safety inspection reviewed licensed activities associated with design changes and modification, self-assessment and corrective actions, environmental monitoring, effluent release, occupational radiation exposures, and radioactive material transportation.

Safety Reviews, Design Changes, and Modifications

- The licensee performed adequate safety evaluations or screenings, completed design change evaluations, and properly assessed decommissioning impacts of various work activities, as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59. (Section 1.0)

Self-Assessment, Auditing, and Corrective Action

- Issues were identified by the licensee at appropriate thresholds and entered into the corrective action program (CAP). Issues were screened and prioritized commensurate with safety significance. Licensee evaluations determined the significance of issues, and included appropriate remedial corrective actions. (Section 2.0)

Maintenance and Surveillance

- Maintenance and surveillance for structures, systems, and components were adequate and resulted in the safe storage of effluent control equipment. Workers followed work plans, surveillance procedures, and industrial safety protocols, and were aware of job controls specified in work instructions. (Section 3.0)

Occupational Radiation Exposure

- Decommissioning activities were executed in general alignment with planning documents and as provided in Radiological Work Permits (RWPs) and As Low As Is Reasonably Achievable (ALARA) reviews. Radiation surveys were performed adequately to identify the hazards present. (Section 4.0)

Radioactive Waste Treatment, and Effluent and Environmental Monitoring

- The inspectors identified one Severity Level (SL) IV violation of 10 CFR 50.9(a) for the licensee's failure to provide complete and accurate information in the required 2016 Annual Effluent Report submittal to the NRC. (Section 5.0)

Solid Radioactive Waste Management and Transportation of Radioactive Materials

- The inspectors reviewed several shipping manifests. The licensee transported radioactive materials in accordance with the regulations. Radioactive materials planned for shipment were classified and characterized appropriately in accordance with 10 CFR 61.55 and 61.66 so as to meet low-level waste burial site criteria. (Section 6.0)

REPORT DETAILS

Summary of Plant Activities

During the inspection period, the licensee continued the preparation for open air demolition of Unit 1 and Unit 2 containments and the demolition of the auxiliary buildings. The licensee also disposed of unused radioactive sources, performed liquid waste discharges, and continued with its environmental monitoring program.

1.0 Safety Reviews, Design Changes, and Modifications (Inspection Procedure (IP) 37801)

1.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Determination that licensee procedures and processes conform to the regulation and guidance associated with 10 CFR 50.59;
- Procedures that control and implement design changes and modifications to assess that the procedures provided adequate guidance for implementation, review, and approval;
- Design change modifications to verify that procedures and controls were followed and to confirm that the applicable changes were effectively implemented in the field and in plant procedures, drawings, and training programs if applicable;
- Verification that changes made under 10 CFR 50.59 did not require prior NRC approval; and
- Verification that changes to preventive maintenance, corrective maintenance, and operational procedures for required equipment were implemented in accordance with the licensee's processes and procedures.

The inspectors verified that when issues were identified that licensee personnel appropriately documented the issue in the CAP.

1.2 Observations and Findings

The inspectors reviewed the licensee's programs for changes; attended a sampling of licensee weekly onsite safety review committee meetings throughout the inspection period to verify that requirements were met; and performed a review of procedure and modification changes on a sample of licensee-approved changes. Specifically, the inspectors reviewed the licensee's change process for changes made to the License Termination Plan (LTP) while it was being reviewed by the NRC. Changes to the procedures implementing the LTP were made following requests for additional information by the NRC. Additionally, the inspectors reviewed the licensee's procedures for reviewing work plans developed by their demolition contractor and the specific plans

for demolishing the reactor containment buildings. The inspectors determined that when issues were identified, the issues were documented by the licensee in the CAP at an appropriate threshold.

No findings were identified.

1.3 Conclusions

The licensee performed adequate safety evaluations or screenings, completed design change evaluations, and properly assessed decommissioning impacts of various work activities, as required by 10 CFR 50.59.

2.0 Self-Assessments, Audits, and Corrective Actions (IP 40801)

2.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Administrative procedures prescribed actions for the identification, evaluation, and resolution of problems;
- License procedures prescribed thresholds for the performance of self-assessments, audits, and surveillances;
- Licensee management reviewed self-assessments, audits, and corrective actions to remain knowledgeable of plant performance;
- Issues or problems were identified and corrected in accordance with the licensee's CAP;
- Quality assurance personnel audited changes in the status of decommissioning and licensee organization; and
- Licensee management observed maintenance and surveillance activities, operations evolutions and training.

The inspectors reviewed CAP documents to determine if a sufficiently low threshold for problem identification existed; the quality of follow-up evaluations, including extent-of-condition; and if the licensee assigned timely and appropriate prioritization for issue resolution commensurate with the significance of the issue. Issues that were repetitive and those with the potential for safety or regulatory consequence were evaluated further by the inspectors to assess apparent and/or common cause and significance. The inspectors also observed a sample of licensee corrective action review team and corrective action review board meetings to ascertain if these aspects of the CAP were implemented appropriately.

2.2 Observations and Findings

The inspectors determined that issues were identified by the licensee at an appropriate threshold within various functional areas of the site and entered into the CAP. Issues were effectively screened, prioritized, and evaluated commensurate with safety significance. The scope and depth of evaluations were adequate in that the evaluations reviewed addressed the significance of issues and assigned an appropriate course of remedial action.

The inspectors verified that self-assessments conducted during the inspection period were performed with technically qualified personnel; and when appropriate, utilized personnel independent of the audited organization.

During this inspection period, the inspectors reviewed several condition reports (CRs), an Apparent Cause Evaluation report, and an Issue Review of several near-miss industrial safety accidents. On December 29, 2016, ZNPS completed the cutting of the steam generator support ring inside Unit 1 containment when a steel plate that weighted approximately 5000 pounds fell about 15 feet on to a manned excavator. There were no injuries and the NRC inspectors reviewed the Apparent Cause Evaluation that was issued on February 21, 2017, and determined there were no radiological safety consequences. On March 10, 2017, a wire rope fell from the top of the containment dome and struck a worker who was standing on the polar crane bridge walkway. The worker was injured but was released from the hospital later that same day. The NRC inspectors reviewed the Issue Review that was generated by the licensee on April 10, 2017, and determined there was no radiological safety consequences. Finally, on June 5, 2017, NRC inspectors reviewed a CR involving a reachstacker (a vehicle used for moving shipping containers and other large objects) that struck the supporting cable for the energized electrical line (a 12-kiloVolt (kV) line) to the Unit 2 containment. After the cable was struck, the electrical line snapped, with one end landing on a manned excavator and the other end striking the outside of the Engineering and Construction building. No one was injured. The inspectors reviewed the CR and determined that there were no radiological safety consequences resulting from the industrial safety accident.

Finally, the inspectors verified that quality assurance personnel continued to audit changes implemented at the plant.

No findings were identified.

2.3 Conclusions

Issues were identified by the licensee at appropriate thresholds and entered into the CAP. Issues were screened and prioritized commensurate with safety significance. Licensee evaluations determined the significance of issues and included appropriate remedial corrective actions.

3.0 Maintenance and Surveillance (IP 62801)

3.1 Inspection Scope

The inspectors conducted plant tours and interviews, and directly observed maintenance and surveillance activities throughout the inspection period to evaluate the effectiveness of the licensee in maintaining structures, systems, and components important to the proper operation of radiation monitoring and effluent control equipment.

During walkdowns, the inspectors evaluated material condition and housekeeping, assessed area radiological conditions, radiological access control and associated posting/labeling, and reviewed the overall condition of systems, structures, and components that support decommissioning. Independent radiation measurements were periodically made by the inspectors in areas toured to determine if those areas were controlled properly and posted as prescribed in 10 CFR Part 20.

3.2 Observations and Findings

The inspectors noted that throughout the inspection period housekeeping remained satisfactory and changing radiological conditions and fire hazards were addressed in a prompt and timely manner by licensee staff.

The inspectors also verified that equipment, which remained available following the shutdown, had the appropriate preventive maintenance schedules established with input from equipment vendors. Inspectors accompanied licensee staff on daily surveillances to verify systems important to the safe decommissioning of the facility were in service, functioning appropriately, and were periodically checked by the licensee. Finally, the inspectors verified that when equipment issues occurred, the licensee staff implemented the appropriate troubleshooting procedures to identify and correct the equipment deficiency identified.

No findings were identified.

3.3 Conclusions

Plant material condition and housekeeping were adequate and had not adversely impacted safe decommissioning. Workers followed work plans, surveillance procedures, and industrial safety protocols and were aware of job controls specified in work instructions.

4.0 Occupational Radiation Exposure (IP 83750)

4.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Personal dosimetry for external exposure meets requirements;
- Processes or engineering controls were used to the extent practicable to limit concentrations of airborne radioactive materials;

- Survey and monitoring activities were performed as required;

- Control of radioactive materials and contamination met requirements;

- Identifying, resolving, and preventing issues, events, and problems in the area of radiological controls.

4.2 Observations and Findings

The inspectors reviewed contamination surveys and air sample results taken in preparation for the open air demolition of Unit 1 and Unit 2 containments. The results of the surveys indicated that there were no radiological contaminations as resulted from the preparation of the open air demo work that was performed. The air sample results also indicated that there were no occurrences of airborne contamination during the open air demolition prep work. The inspectors also reviewed the surveys regarding the disposal of sealed sources. Based on the surveys, there were no indications of any leaking sealed sources. All licensee personnel had the appropriate dosimetry in accordance with all applicable procedures and regulations.

No findings were identified.

4.3 Conclusions

Workers adhered to the radiological controls provided in the RWPs and ALARA plans and followed the Radiation Protection (RP) staff instruction. Radiation and contaminations surveys were performed adequately to identify the hazards present. Licensee personnel had all applicable dosimetry to ensure monitoring.

5.0 Radioactive Waste Treatment, and Effluent and Environmental Monitoring (IP 84750)

5.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Radioactive waste treatment systems were maintained and operated to keep offsite doses ALARA;

- The licensee effectively controlled, monitored, and quantified releases of radioactive materials in liquid, gaseous, and particulate forms to the environment; and

- The radiological environmental monitoring programs were effectively implemented to ensure effluent releases were being adequately performed as required to minimize public dose;

As part of the inspection, the inspectors verified that licensee programs and procedures were appropriately implemented by licensee staff. In addition, the inspectors verified that when issues were identified licensee personnel appropriately documented the issues in the corrective action program and adequate corrective actions were taken.

5.2 Observations and Findings

The inspectors identified a Severity Level (SL) IV, Non-Cited Violation of 10 CFR 50.9(a), "Completeness and Accuracy of Information," for the failure to submit to the NRC complete and accurate information in the 2016 Annual Radiological Environmental Operating Report.

On May 3, 2017, the licensee submitted its 2016 Annual Radiological Environmental Operating Report (ML17130A701) to the NRC. The inspectors reviewed the report and discovered that the data reported in Table 3.2-1, "Maximum Dose Resulting from Liquid Effluents," were inaccurate. Specifically, the inspectors noted that the summation of all releases did not match the values reported for continuous mode and batch mode releases. After discussing the inaccuracy with the licensee, the licensee reviewed the report and discovered several additional inaccuracies. For example, there were numerous sections within the 2016 report that contained 2015 data. The licensee subsequently submitted a corrected Report on June 12, 2017.

Because this issue involved incomplete and inaccurate information that was required to be submitted to the NRC in accordance with the licensee's Quality Assurance Project Plan (Appendix B, Section 5.7.2), and Certificate of Compliance No. 1031 for the MAGNASTOR system (Appendix A, Technical Specification 5.1.1 and 5.1.3), 10 CFR 50.9 was applicable. As such, failing to provide complete and accurate information impeded the NRC's oversight function and was a performance deficiency and subsequent violation of more than minor significance. In determining the significance of the violation, the inspectors referenced the examples of violations in Section 6.9, "Inaccurate and Incomplete Information or Failure to Make a Required Report," of the NRC's Enforcement Policy. Consistent with the guidance in Section 1.2.6.D of the NRC Enforcement Manual, if a violation does not fit an example in the Enforcement Policy Violation Examples, it should be assigned a severity level: (1) commensurate with its safety significance; and (2) informed by similar violations addressed in the Violation Examples. Because the issue was determined to be more than minor, but did not meet the threshold of the examples of Severity Level I, II, or III violations in Section 6.9 of the NRC Enforcement Policy, the inspectors determined the issue was a Severity Level IV violation.

Title 10 CFR 50.9(a) requires, in part, that information provided to the Commission by an applicant for a license or by a licensee be complete and accurate in all material aspects.

Contrary to the above, on May 3, 2017, the licensee failed to submit an accurate 2016 Annual Radiological Environmental Operating Report to the NRC. Specifically, there were numerous sections within the submitted report that contained 2015 data instead of the correct 2016 data. The licensee corrected the inaccuracies and resubmitted the 2016 Annual Radiological Environmental Operating Report to the NRC on June 12, 2017. Because this violation was entered into the licensee's CAP on May 15, 2017 (as CR 2017-0070), it is being treated as a NCV consistent with Section 2.3.2.a of the NRC Enforcement Policy (NCV 05000295/2017001-01; 05000304/2017001-01; Failure to Submit Accurate Annual Radiological Environmental Operating Report).

5.3 Conclusions

The inspectors identified a SL IV, NCV of Title 10 CFR 50.9(a) for the failure to submit complete and accurate information to the NRC.

6.0 Solid Radioactive Waste Management and Transportation of Radioactive Materials (IP 86750)

6.1 Inspection Scope

The inspectors reviewed documents and interviewed plant personnel to assess the licensee's performance in the following areas:

- Whether the licensee provided detailed instructions and operating procedures for transfer, packaging, and transport of low-level radioactive waste;
- Whether the material was properly classified, described, packaged, marked, and labeled for transportation; and
- Whether shipments made by the licensee were in compliance with NRC and Department of Transportation regulations.

6.2 Observations and Findings

The inspectors reviewed the shipping manifest for the decommissioning equipment that was shipped to Clive, Utah, and then will be eventually delivered to the San Onofre reactor (SONGS) decommissioning site. The shipment was properly characterized and the manifest was generated in accordance with all applicable regulations and procedures. However during the transport, water was detected during the transport of the equipment. Zion sent RP personnel to survey the package and could not detect any contamination present. The shipment was eventually delivered to Clive, Utah, where small amounts of contamination, below the regulatory limits, were discovered at the bottom of the transport container. NRC inspectors will follow up with Zion personnel regarding this transportation item during the next NRC inspection in August 2017.

6.3 Conclusions

The inspectors will further review Zion's transportation program during the next inspection period.

7.0 Exit Meeting

The inspectors presented the results of the inspection to Mr. John Sauger and other members of the plant staff at a telephone exit meeting on June 21, 2017. The licensee acknowledged the results presented and did not identify any of the information discussed as proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

G. Van Noordennen, Vice President of Regulatory Affairs
J. Ashley, Zion Licensing Engineer
J. Houff, Licensing Manager
J. Smith, Radiological Engineer
T. Orawiec, Plant Manager
B. Yetter, Characterization/License Termination Manager
C. Keene, RP Director

INSPECTION PROCEDURES (IPs) USED

IP 37801	Safety Reviews, Design Changes, and Modifications at Permanently Shutdown Reactors
IP 40801	Self-Assessment, Auditing, and Corrective Action at Permanently Shutdown Reactors
IP 62801	Maintenance and Surveillance at Permanently Shutdown Reactors
IP 83750	Occupational Radiation Exposure
IP 84750	Radioactive Waste Treatment, and Effluent and Environmental Monitoring
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened	Type	Summary
05000295/2017001-01 05000304/2017001-01	NCV	Failure to Submit Accurate Annual Radiological Environmental Operating Report

Closed	Type	Summary
05000295/2017001-01 05000304/2017001-01	NCV	Failure to Submit Accurate Annual Radiological Environmental Operating Report

Discussed
None

PARTIAL LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

- 2016 SCWE Survey Report
- ZNPS 50.59 Screenings and Evaluations for 2016
- ZS-WC-100; Decommissioning and Work Control Process, Initiating and Screening Work Requests; Revision 13
- AD-11; Regulatory Reviews; Revision 1
- AD-12; Routine Communication With Regulators; Revision 2
- ZS-OP-101; Shift Surveillance; Revision 19
- ZS-AD-102; Construction Management; Revision 1
- ZS-WC-101; Lockout/Tagout; Revision 10
- OP-1; Operating Logs; Revision 1
- OP-2; Shift Relief and Turnover; Revision 1
- OP-3; RP Shift Technicians Operations Qualifications; Revision 0
- PT-14; Tracking of Inoperable/Degraded Equipment; Revision 0
- Zion Nuclear Power Plant Demolition Reactor Containment BLDG; Revision 1
- Technical Support Documents 17-003; Evaluation of Efficiency Calibration Geometries for In-Situ Gamma Spectrometry During Final Status Surveys; Revision 0
- Technical Support Documents 17-005; Evaluation of Pipe Penetrations by In-Situ Gamma Spectrometry for Final Status Surveys; Revision 0
- Auxiliary Building 17 Core Sample Locations
- CR-2017-0032; Recycle Truck Alarm Truck Monitors; April 10, 2017
- CR-2017-0038; U2 Construction Tent Damage in High Wind; April 12, 2017
- Issue Review for CR-2017-0040; Injury in Unit 2 Containment; April 10, 2017
- CR-2017-0053; Formal Zion Process Controls Used to Modify the LTP Are Not Being Fully Employed; April 6, 2017
- CR-2017-0060; Suspicious Vehicle in Owner Controlled Area; May 1, 2017
- CR-2017-0081; Reachstacker Struck Support Cable for 12KV Line to Unit 2 Containment; June 3, 2017
- Apparent Cause Evaluation for CR-2016-0161; February 21, 2017
- March 2017 Radiological Surveys of Open Air Demos for Unit 1 and Unit 2 Containments
- April 2017 Radiological Surveys of Open Air Demos for Unit 1 and Unit 2 Containments
- May 2017 Radiological Surveys of Open Air Demos for Unit 1 and Unit 2 Containments
- March and April 2017 Air Sample Results
- 2016 Annual Radiological Environmental Operating Report
- Zion Job Aid No. LRW-1; Liquid Rad Waste Treatment System Operations; Revision 2.1
- Zion Station Liquid Release Documentation; ZCP-421-1; Revision 42
- Shipping Manifest for Song Equipment

LIST OF ACRONYMS USED

ALARA	As Low As Is Reasonably Achievable
CAP	Corrective Action Program
CFR	*Code of Federal Regulations*
CR	Condition Report
DNMS	Division of Nuclear Materials Safety
IR	Inspection Report
LTP	License Termination Plan
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
RP	Radiation Protection
RWP	Radiation Work Permit
SAFSTOR	Safe Storage
SL	Severity Level
ZNPS	Zion Nuclear Power Station