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U.S. Nuclear Regulatory Commission  
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Zion Nuclear Power Station, Units 1 and 2  
Facility Operating License Nos. DPR-39 and DPR-48  
NRC Docket Nos. 50-295 and 50-304

Subject: Zion Clean Concrete Disposition at Zion

The purpose of this letter is to inform the NRC of Zion Solutions (ZS) plans for the disposition of the remaining Clean Concrete Demolition Debris (CCDD) and use of soil originating from off-site in accordance with Revision 2 to the Zion License Termination Plan (LTP). We have reviewed this plan against the LTP License Condition and have determined the plan is consistent with LTP, Rev 2.

The path forward, following completion of the NRC Confirmatory Survey of the Power Block survey units, is to remove the soil from both Containment basements and then reuse the same material as fill for excavations and grading in the surrounding Power Block survey units. Once the containment basements are empty, the remaining CCDD, currently stored in survey units 10214 and 12205, will then be placed in the Containment basements and covered with a minimum of 3-feet of soil in accordance with the Zion LTP, Rev.2, Chapter 6, section 6.16. The final end-state grade of all survey units will undergo Final Status Survey (FSS) to verify compliance with the Operational Derived Concentration Guideline Levels (DCGLs) for soils.

A detailed description of the plan is provided below.

#### CONTAINMENT BASEMENT CLEAN FILL

The soil that currently resides within the footprints of the two Containment basements is fill imported to the Zion site from an approved off-site non-radiological source. Section 5.7.1.7 of LTP Chapter 5 is titled, "Reuse of Excavated Soils." This section of the LTP addresses any restrictions that are imposed on where soil can be used. In this section, ZS commits that it will "not stockpile and store excavated soil originating from on-site for reuse as backfill in basements." The section also addresses the survey protocol required to use soils indigenous to Zion as backfill in excavations created to expose and remove subsurface commodities. Finally, the section addresses the survey requirements necessary to "introducing off-site material to Zion for use as backfill in a basement, or for any other use." The soils that were used to backfill the Containment basements were from an off-site source and were surveyed accordingly.

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Prior to demolition, the Containment basements were not only surveyed for compliance with the unrestricted release criteria, but both were also surveyed to comply with a continuing characterization commitment from LTP Chapter 5, Section 5.3.4.4. The objective of the continuing characterization survey was to assess the radiological condition of the exposed steel liners above the 565-foot elevation after the contaminated concrete had been removed. The liner was subjected to smear samples and beta scans to ensure that the liners were adequately decontaminated prior to performing FSS. The locations for taking samples and/or measurements were biased toward locations with the highest potential for the presence of loose or fixed contamination. The survey results from both Containments indicated no detectable loose contamination greater than 1,000 dpm/100cm<sup>2</sup>.

FSS was subsequently completed in both basements and compliance was demonstrated in accordance with the process described in LTP Chapter 5, Section 5.5. For the surfaces above the 565-foot elevation, 164 measurements were taken in both Containments representing 100% areal coverage of the liner surface. All measurements were less than the Operational DCGLs for Containment basement surfaces, with the exception of one measurement taken in Unit 1 Containment (SOF of 1.1565). The SOF (based on the Operational DCGL) for a systematic or a judgmental measurement/sample(s) may exceed one without remediation as long as the survey unit passes the Sign Test and the mean SOF (based on the Operational DCGL) for the survey unit does not exceed one. This was the case in Unit 1 Containment.

Upon completion of FSS, both Containment basements were subjected to Isolation and Control (I&C) measures in accordance with procedure ZS-LT-300-001-003, "Isolation and Control for Final Status Survey." These measures are designed to prevent the reintroduction of a source term into a FSS unit where compliance has been demonstrated in an end-state configuration. During the demolition of the Containment exteriors (exteriors were surveyed clean to Unconditional Release levels prior to demolition) and the period of time afterwards, I&C controls ensured that no additional radioactive material not already quantified by the FSS was introduced into the basements. Consequently, as the soil was free of residual radioactivity when it was introduced to the basement footprints and, due to the fact that both basements were surveyed and found to be free of loose contamination, there is a very low probability that the soils used to fill the Containment basements became cross-contaminated to levels greater than the Operational DCGLs for subsurface soils. In short, clean fill was introduced to clean (<1,000 dpm/100 cm<sup>2</sup>) containment basements under procedural I&C controls throughout.

To confirm this premise, scoping surveys were performed on the current exposed soil surfaces within both Containment footprints. The surface soils in both Containment footprints were 100% scanned and no detectable radioactivity was identified. A total of 11 surface soil samples and 15 subsurface soil samples at depths of 3 to 23 feet were taken of the fill from the two containments, as well as one below grade water sample from each containment. No plant-derived radionuclides were positively detected by the on-site gamma spectroscopy analysis. Ten percent (10%) of the soil samples (combination of surface and subsurface) were sent to an off-site laboratory for analysis for Hard-to-Detect (HTD) radionuclides. With the exception of one sample that showed positive results for tritium (H-3), no plant derived HTD Radionuclides of Concern (ROC) were positively identified. The concentration of H-3 in the one soil sample was detectable, however at a concentration within the Minimum Detectable Concentration (MDC) margin of error for the instrument and a small fraction of the Operational DCGL. The

water sample taken in the Unit 2 Containment footprint showed detectable H-3 at a concentration of 314 pCi/liter. However, this concentration is a factor of 6 times less than the Offsite Dose Calculation Manual release criteria.

ZS plans to remove the soil from the Containment basements and use the excavated soil as fill to backfill excavations and to establish grade in the survey units surrounding the Containment footprints. The fill can also be used without restriction, anywhere within the impacted area of the site. The bases for this conclusion are as follows:

- The soil was clean fill brought to the site from a non-radiological off-site source.
- The Radiological Assessment performed on the fill from the non-radiological off-site source showed no detectable plant-derived radioactive materials in the fill material.
- Prior to introducing the fill, the Containment basements were surveyed to show no loose contamination.
- Prior to introducing the fill, the Containment basements were successfully subjected to FSS and compliance with the unrestricted release criteria was demonstrated.
- Prior to performing FSS, I&C controls in accordance with procedure ZS-LT-300-001-003 were implemented. I&C controls on the Containment basements has been uninterrupted to date.
- No source term was introduced into the Containment basement footprints following implementation of I&C.
- Due diligence scoping soil and water samples were acquired and analyzed for plant-derived radionuclides to ensure the fill would meet surface and subsurface soil DCGLs.
- A review was conducted for these planned activities to verify compliance with the LTP License Conditions.
- The survey units where the fill from the Containment basements will be placed will be subjected to FSS and compliance will be demonstrated in accordance with the approved process in LTP Chapter 5.

Once the fill is excavated, ZS intends to place the remaining CCDD currently stored in Survey Units 10214 (parking lot) and 12205 into the Containment basements for use as fill inside of a basement as described in LTP Chapter 6, Section 6.16.

#### CLEAN CONCRETE DEMOLITION DEBRIS (CCDD)

Unrestricted release surveys of concrete from structures approved for use as CCDD in accordance with Section 2.1.1 of TSD 17-010, "Final Report - Unconditional Release Surveys at the Zion Station Restoration Project" (e.g. Turbine, Crib House, Containment Exterior) were performed using 'MARSAME' compliant procedures and Lower Limits of Detection (LLDs) in accordance with ZS procedure ZS-LT-400-001-001, "URS of Materials Equipment and Secondary Structures." By performing surveys in situ with hand held survey instruments via a graded MARSAME approach, LLDs in the 2,500-3,000 dpm/100 cm<sup>2</sup> range were determined acceptable. TSD 17-010 was previously submitted to the NRC and it was incorporated as a

license condition for the approval of Revision 2 of the Zion LTP. Following completion and documentation of these surveys, in accordance with ZS approved processes and procedures for the unrestricted release of materials, CCDD could be disposed of to an off-site source as a "non-radioactive" material or, with appropriate I&C, used as fill in building basements in accordance with LTP Chapter 6, Section 6.16.

Although no detectable radioactivity was observed in the unrestricted release surveys of the CCDD, when used as fill in a basement, ZS will assign a dose for reused concrete as specified in LTP Chapter 6, Table 6-53 and in accordance with section 8 of TSD 14-010, "RESRAD Dose Modeling for Basement Fill Model and Soil DCGL and Calculation of Basement Fill Model Dose Factors and DCGLs."

### CONCLUSION

ZionSolutions has concluded, based on its technical reviews and procedural process for assessing LTP compliance (i.e. LTP license condition review and associated forms), that the path forward of removing fill from the Containment basements and placing it in other survey units, and replacing the fill in the basements with CCDD is fully compliant with LTP Revision 2.

If the NRC has any questions regarding our proposed plan for disposition of CCDD or would like to discuss any element of this proposed plan, please contact us before June 27, 2019.

Respectfully,



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Senior Vice President Regulatory Affairs

cc: John Hickman, U.S. NRC Senior Project Manager  
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