ZIONSOLUTIONS LLC
An EnergySolutions Company

May 15, 2020 ZS-2020-0028

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

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: Response to Request for Additional Information Related to the Final Status Survey Final Reports for Phases 2a, 2b, and 3

References:

1) Gerard van Noordennen, Zion*Solutions*, Letter to U.S. Nuclear Regulatory Commission, "Final Status Survey Final Report - Phase 2, Part 1," dated March 11, 2019
2) Gerard van Noordennen, Zion*Solutions*, Letter to U.S. Nuclear Regulatory Commission, "Revised Final Status Survey Report- Phase 2," dated September 30, 2019
3) Gerard van Noordennen, Zion*Solutions*, Letter to U.S. Nuclear Regulatory Commission, "Revised Final Status Survey Report- Phase 2 Part 2," dated November 25, 2019
4) Gerard van Noordennen, Zion*Solutions*, Letter to U.S. Nuclear Regulatory Commission, "Final Status Survey Report- Phase 3," dated December 30, 2019
5) John B. Hickman, U.S. Nuclear Regulatory Commission, Letter to John Sauger, Zion*Solutions*, " Zion Nuclear Power Station Units 1 and 2 – Request for Additional Information Related to Final Status Survey Reports Phase 2A, 2B, and 3" dated April 20, 2020

Zion*Solutions* submitted the Final Status Survey (FSS) Final Report and the Revised FSS Final Reports for Phase 2, Parts 1 and 2, for NRC review, as documented in References 1, 2, and 3. Zion*Solutions* submitted the FSS Final Report for Phase 3 to the NRC for review as documented in Reference 4. The NRC staff reviewed the FSS Final Reports for Phases 2a, 2b, and 3 and determined that additional information was required to complete its review. Zion*Solutions* received a Request for Additional Information (RAI) from the staff on April 20, 2020 (Reference 5).

A detailed response to the RAI is provided in the enclosure to this letter. Attachments referenced in the response are being provided electronically. Necessary revisions to FSS Final Reports and related release records will be provided in a separate correspondence.

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There are no regulatory commitments made in this submittal. If you should have any questions regarding this submittal, please contact me at (860) 462-9707.

Respectfully,

Gerard van Noordennen

Gerard van Noordennen
Senior Vice President Regulatory Affairs

Enclosures:

1) Response to Request for Additional Information Related to the Final Status Survey Final Reports for Phases 2a, 2b, and 3
2) Preflight report

cc: John Hickman, U.S. NRC Senior Project Manager
Regional Administrator, U.S. NRC, Region III
Zion Nuclear Power Station, Units 1 and 2, License Transfer Service List
(without enclosures)

Zion Nuclear Power Station, Units 1 and 2, License Transfer Service List

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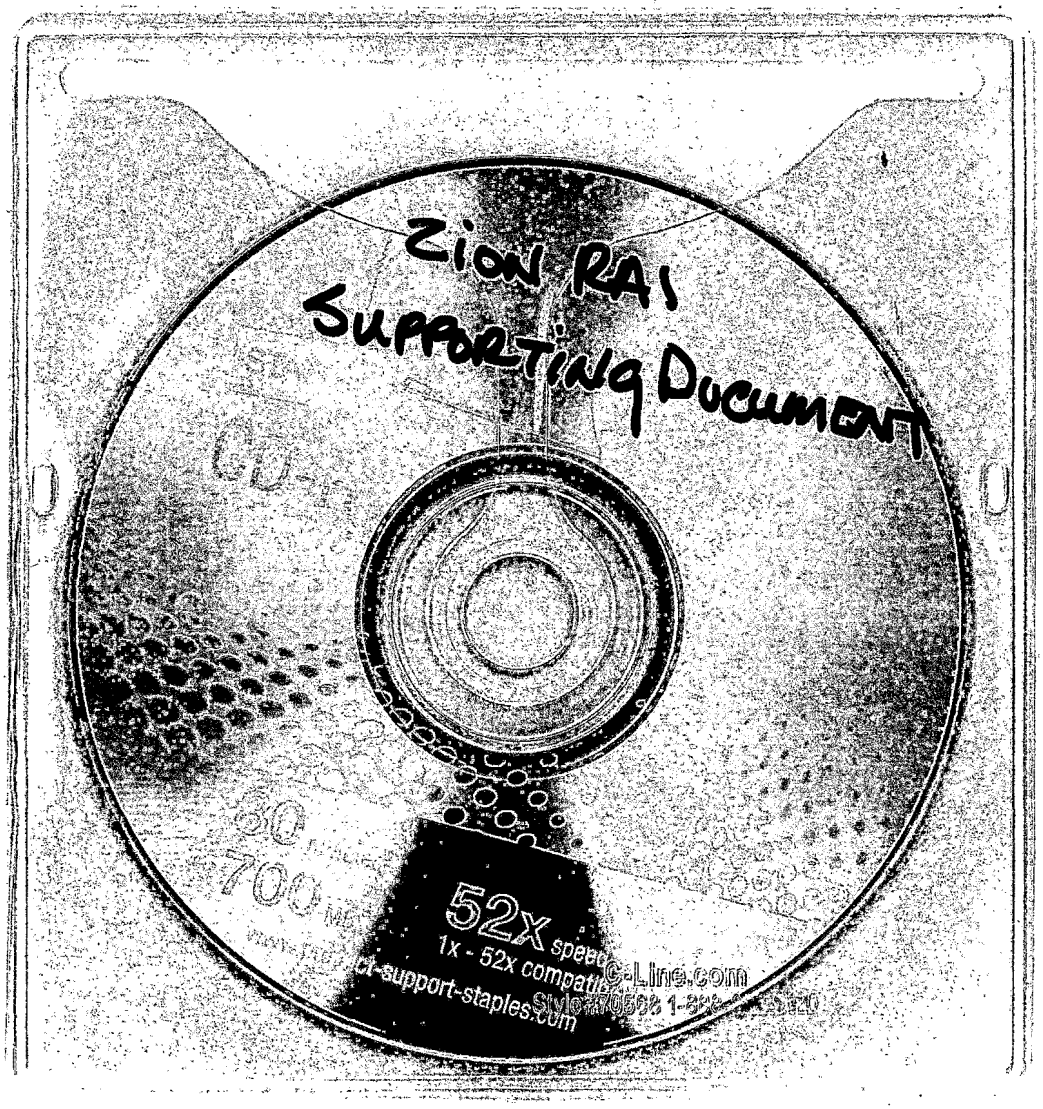
ZS-2020-0028
Enclosure 1

Zion Nuclear Power Station, Units 1 and 2

Response to Request for Additional Information Related to the Final Status Survey Final Reports for Phases 2a, 2b, and 3



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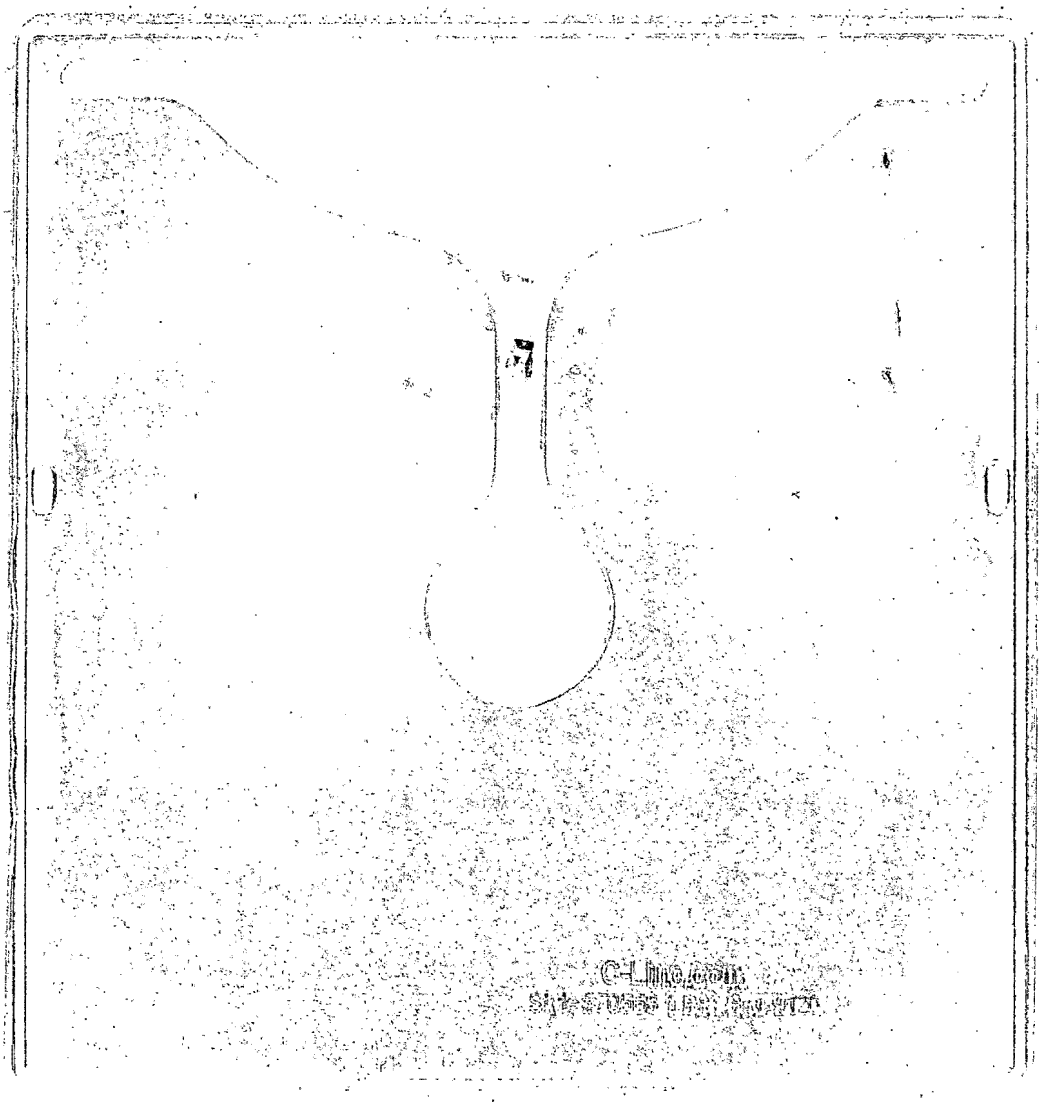
ZS-2020-0028
Enclosure 1

Zion Nuclear Power Station, Units 1 and 2

Response to Request for Additional Information Related to the Final Status Survey Final Reports for Phases 2a, 2b, and 3



1. Investigation and Reclassification Process Not Consistently Followed

RAI-1a Path Forward:

- Provide a reasonably bounding evaluation of the potential dose impacts of areas that should have been investigated per LTP Section 5.6.4.6, but were not investigated. When assessing the dose impacts, take into consideration the potential misclassification of survey units or portions of survey units. The response should include a review of all the survey units impacted and should not be limited to the survey units that are discussed as examples in this RAI.

RAI-1a - Zion*Solutions* Response: A review of all survey units in FSS Final Reports 2a, 2b, and 3 has been performed to identify survey units which required reclassification/reinvestigation based on criteria in LTP Section 5.6.4.6. The results are discussed below.

The assessment of the potential dose impacts of the elevated measurement in the Turbine Building Steam Tunnel and the elevated measurements in the Unit 2 Circulating Water Discharge Tunnel is summarized as follows and provided in Attachment 1 (Tab – TB Bounding Dose Assessment). To compensate for the inability to perform additional investigation measurements, Zion*Solutions* is proposing to adjust the area of elevated activity represented by these measurements to the area bounded by additional measurements taken in adjacent areas. For the elevated area in the Steam Tunnel, the bounded area was adjusted to 140.52 m^2, which roughly represents the area between measurements B3-06100B-FRFC-007-GD, B3-06100A-FRFC-013-GD and B3-06100A-FRFC-014-GD. In accordance with TSD 14-014, in the Circulating Water Discharge Tunnel, it is 152.58 feet from the down comer to the slope. During all discharges, water flow was maintained from the tunnels to the Lake. For the purposes of this assessment, measurements B3-09200B-FRCC-001-GD and B3-09200B-FRWC-007-GD are considered as bounding measurements. The area from the slope in the Tunnel floor to the Lake isolation valve was considered as elevated. Zion*Solutions* then applied Equation 5-5 from LTP Chapter 5 to derive the additional dose applied to the dose from the mean ROC concentrations. For the elevated measurement in the Steam Tunnel, the additional dose equated to 0.005 mrem/yr, and for the elevated measurement in the Circulating Water Discharge Tunnel, the additional dose equated to 3.037 mrem/yr. Both values will be added to the mean compliance dose for the Turbine Building basement. The Release Record for the Turbine Building (06100) will be revised accordingly.

Zion*Solutions* could not identify any other survey units which required reclassification or reinvestigation based on criteria in LTP Section 5.6.4.6. The assessment of all survey units is also provided in Attachment 1 (Tab – Comprehensive Summary List, Columns H through N).

While acknowledging that no concrete cores were taken in the Crib House during the FSS, Zion*Solutions* analyzed two of the twenty concrete core samples taken during characterization for the full suite of radionuclides to ensure compliance with the FSS material sampling

requirements of approved LTP Revision 2. The results for the full suite analysis of concrete core samples B2-08101A-BJFC-007-CV and B2-08201-CJWC-A018-CV, both acquired from the Crib House prior to demolition, are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The Release Record for Crib House/Forebay (survey units 8100/8401) will be revised to reflect the additional analyses. The Eberline reports for the sample analysis are also provided in Attachment 2. The only plant-derived radionuclide detected in either sample was Eu-155 at a residual concentration slightly above MDC. All other potential plant-derived radionuclides were less than MDC.

Section 5.6.4.6 of LTP Chapter 5 states that areas exceeding investigation levels will be "addressed by further biased sampling as necessary." With the exception of the Turbine Building (including the Fire Sump, Steam Tunnel and Circ Water Tunnel), sufficient investigation samples were taken as necessary during the FSS of all other survey units. The FSS of the following survey units are used to form the basis for the response to this RAI:

- Survey Unit 06213, Turbine Building Unit 1 Steam Tunnel East Valve House – The Unit 1 East and West Main Steam Valve Houses were part of the Turbine Building basement and were initially subjected to FSS as Class 3 structures. Due to measurement results in excess of the OpDCGL, the initial FSS failed. The Unit 1 East and West Main Steam Valve Houses were reclassified as Class 1 and subjected to a new survey design for FSS. The FSS required 100% areal coverage. Subsequently, the elevated areas were sufficiently bounded by the FOV of the ISOCS measurement, as well as the ISOCS measurements taken adjacently.
- Survey Unit 01100, Unit 1 Containment Basement above 565 ft elevation – In accordance with LTP Chapter 5, Table 5-18, the 565 ft of the Unit 1 Containment was classified as Class 1. The required areal coverage for a Class 1 basement survey unit was 100%. One measurement was taken that exceeded an OpSOF of one. As 100% areal coverage was achieved with the FSS, the elevated area was adequately bounded to the area of the ISOCS FOV.
- Survey Unit 03202, Spent Fuel Pool Transfer Canal – In accordance with LTP Chapter 5, Table 5-18, the SFP/Transfer Canal was classified as Class 1. The required areal coverage for a Class 1 basement survey unit was 100%. Two measurements were taken that exceeded an OpSOF of one. As 100% areal coverage was achieved with the FSS, the elevated area was adequately bounded to the area of the ISOCS FOV.
- Survey Unit 05100, Auxiliary Building basement – In accordance with LTP Chapter 5, Table 5-18, the Auxiliary Building was classified as Class 1. The required areal coverage for a Class 1 basement survey unit was 100%. Five (5) investigation ISOCS measurements were taken within the Auxiliary Building; one (1) wall location and four (4) floor locations. These measurements were taken based on concerns with uneven surfaces (ruts, trenches, holes, etc.) affecting the ISOCS geometry and not to bound the area of an elevated measurement. Sixteen (16) measurements were taken in the Auxiliary Building basement that exceeded an

OpSOF of one. As 100% areal coverage was achieved with the FSS, the elevated area was adequately bounded to the area of the ISOCS FOV.

In the cases where the survey unit was reclassified, the original FSS design was discarded and a new survey design for the Class 1 classification was used. As required by LTP Chapter 5, Section 5.5.2.2, all Class 1 structural survey units required sufficient measurements to provide 100% areal coverage with sufficient overlap to ensure complete survey coverage of all accessible surfaces. Consequently, elevated areas identified in structural survey areas were bounded by the FOV of the ISOCS measurement as well as the ISOCS measurements taken adjacent to the elevated area. No additional bounding measurements (investigations) were required per LTP Chapter 5, Section 5.6.4.6.

RAI-1b Path Forward:

- Provide an explanation why the 1% OpDCGL reclassification criterion for Class 3 survey units in LTP Table 5-26 does not appear to be followed.

RAI-1b - Zion*Solutions* Response: The 1% OpDCGL reclassification criterion for Class 3 survey units in LTP Table 5-26 is only applicable if an investigation was initiated and the results of the investigation confirm residual radioactivity in excess of 50% of the OpDCGL. It is not criterion for which all data are compared to.

LTP Section 5.6.4.6.1, *Remediation, Reclassification, and Resurvey*, states, "If an individual survey measurement in a Class 3 survey unit exceeds 50 percent of the OpDCGL, then the survey unit, or a portion of a survey unit, will be investigated. If the investigation confirms residual radioactivity in excess of 50 percent of the OpDCGL, the survey unit, or the impacted portion of the survey unit will be reclassified to a Class 1 or a Class 2 survey unit and the survey will be re-designed and re-performed as discussed above for Class 1 or Class 2."

LTP Chapter 5, Section 5.6.4.6.1 also states, "The DQO process will be used to evaluate the remediation, reclassification and/or resurvey actions to be taken if an investigation level is exceeded. Based upon the failure of the statistical test or the results of an investigation, Table 5-26 presents actions that will be required."

Actions in Table 5-26 are required when the statistical test fails or when an investigation confirms residual radioactivity in excess of 50 percent of the OpDCGL. In the balance of Class 3 survey units, the Sign Test was passed and therefore the 1% OpDCGL criteria stated in Table 5-26 was not applicable. In summary, in all instances when the investigation level was triggered for a Class 3 survey unit (50 percent of the OpDCGL or an OpSOF greater than 0.5), Zion*Solutions* remediated, reclassified, or resurveyed using Table 5-26. If the investigation verified levels between 1% and 50% of the OpDCGL, then the survey unit, or a portion of the survey unit, would have been reclassified as a Class 2 survey unit. If the investigation verified levels that were greater than 50% of the OpDCGL, then the survey unit, or a portion of the survey unit, would have been reclassified as Class 1.

2. Dose from Turbine Sump Sediment Unknown

RAI-2a Path Forward:

- Evaluate the potential dose impact to an inadvertent intruder (well-driller scenario) upon the Turbine Building fire sump. This evaluation should include a justification for why it is or is not ALARA to not have further remediated the sediment from the sump (e.g., accessibility of the area, worker safety, etc.).

RAI-2a - Zion*Solutions* Response: Zion*Solutions* has evaluated the potential dose impact to an inadvertent intruder upon the Turbine Building Fire Sump using a well-driller scenario. The report from the ORAU Confirmatory Survey was not specific as to the depth or quantity of sediment that was in the sump at the time the sediment samples were collected. Zion*Solutions* had discussions with the personnel who performed the cleanup to try to ascertain the as-left condition of the sump prior to FSS. Upon initial entry into the sump, there was an estimated 6 to 8 inches of sediment on the first landing, or shelf, where floor and equipment drains emptied into the sump. The sump had not been cleaned prior to this initial entry and the level of sediment was assumed to have been the result of years of accumulation. Sediment removal was difficult, as it was accomplished by lowering and loading a bucket and then raising it to the Turbine Building floor level. The sump was considered a Confined Space at the time of the cleanup and subsequent FSS. Following remediation, it was reported that there was less than 2 inches of sediment remaining on the shelf floor area and there was no sediment on the very bottom floor of the sump.

The calculation of the drilling spoils intruder dose was performed assuming there was a minimum of 2 inches of sediment in the sump. Results are provided for two inches of sediment assuming Cs-137 and Co-60 concentrations of 34.5 pCi/g and 0.181 pCi/g, respectively. The relevant data used for the calculation are provided in the tables below. The calculation is provided in Attachment 1 (Tab – Turbine Sediment Dose Calc).

INPUTS TO CALCULATION		
34.5	pCi/g	Cs-137 Fire Sump Sediment from RAI No. 2
0.181	pCi/g	Co-60 Fire Sump Sediment from RAI No. 2
1.5	g/cm^2	sediment density
1.00E+04	cm^2/m^2	conversion factor
1.00E+00	cm	unit sediment depth
2.54E+00	cm/inch	conversion factor

LTP Chapter 5, Table 5-2, Dose Significant Radionuclides and Mixture

Radionuclide	Auxiliary Building [1] % of Total Activity
Co-60	0.92
Cs-134	0.01
Cs-137	75.32
Ni-63	23.71
Sr-90	0.05

(1) Per LTP Chapter 6, Auxiliary Building mixture applies to Turbine Building

LTP Chapter 6, Table 6-25, Adjusted BFM Drilling Spoils Scenario $DCGL_{BS}$ (Adjusted for IC Dose)

Radionuclide	Turbine Building (pCi/m^2)
Co-60	9.13E+07
Cs-134	1.58E+08
Cs-137	3.73E+08
Ni-63	4.71E+13
Sr-90	1.90E+10

LTP Chapter 5, Table 5-15, Surrogate Ratios

Ratios	Auxiliary Building Max
H-3/Cs-137	N/A
Ni-63/Co-60	180.45
Sr-90/Cs-137	0.002

Drilling Spoils Dose per cm of Sediment Thickness by Radionuclide

Radionuclide	mrem/year
Co-60	7.43E-04
Cs-134	1.09E-05
Cs-137	3.47E-02
Ni-63	2.60E-07
Sr-90	1.36E-06
SUM	**3.54E-02**

Drilling Spoils Intruder Dose at 2 inches Sediment Thickness

2 inches sediment thickness	1.80E-01 mrem/year

Because the sump was a confined space, Zion*Solutions* was not able to remove all sediment from the sump. As shown in the above tables, the potential dose to a drilling spoils intruder is extremely low compared to the hazards and risks of additional remediation in a confined space area where additional safety measures, such as body harnesses and tie-offs, would have been required. Additionally, the activity in the sediment that remained in the sump would have been accounted for in the ISOCS measurement taken at the location where the sediment was identified; however, Zion*Solutions* will add the above calculated dose from the Fire Sump to the overall dose for the Turbine Building (Survey Unit 06100).

In summary, due to worker safety and confined spaces, further remediation was not practical, and the residual dose of 0.18 mrem/yr was considered ALARA.

3. Commitment for Hard to Detect (HTD) and Full Initial Suite Analyses to Verify Surrogate Ratios and Insignificant Radionuclide Contribution (IC) Dose During Continuing Characterization

RAI-3a Path Forward:

- For areas that underwent continuing characterization, including areas listed in Section 5.3.4.4. of the LTP where the licensee committed to performing continuing characterization, describe which release records include the description and data (including Eberline Analytical reports) for the continuing characterization.

RAI-3a - Zion*Solutions* Response: The list of survey units where continuing characterization was performed, as well as the location of where the results are documented, is provided in Attachment 1 (Tab – Comprehensive Summary List, Columns D through G). The reports from Eberline documenting the analytical results of the continuing characterization samples that were previously taken are provided in Attachment 2. The results are documented in the applicable Release Records.

A summary of the continuing characterization performed in the areas listed in LTP Chapter 5, Section 5.3.4.4 is provided below.

SFP/Transfer Canal - Section 5.3.4.4 cites the underlying concrete of the SFP/Transfer Canal below the 588 foot elevation after the steel liner has been removed. The continuing characterization was performed following demolition and prior to performing FSS. The continuing characterization consisted of a scan of the exposed concrete surfaces and the acquisition of eight additional concrete core samples at the locations identified by the scan that exhibited the highest activity. The concrete cores were acquired to a depth of 6 inches, and each core was segmented into ½ inch concrete core pucks. Each puck was then analyzed by the on-site gamma spectroscopy system for gamma-emitting radionuclides. The results of the full suite

analysis of the eight concrete cores are documented in Section 3 and Table 3 of the Release Record for Survey Unit 03202.

Unit 1 and Unit 2 Containments Under-Vessel - The concrete walls and floor of the Under-Vessel areas in Unit 1 and Unit 2 Containments were surveyed for continuing characterization in December of 2017. The survey consisted of scanning the exposed concrete surfaces and the acquisition of sixteen (16) concrete core samples. The surveys are documented in Section 3 of the Release Records for Survey Units 01100 and 01110 and Survey Units 02100 and 02110. Two concrete cores from each unit were selected and sent for full isotopic analysis by Eberline. The results of the analysis are presented in Table 5 of each Release Record. Following remediation, an additional foot or more of concrete was removed from the walls and floors of the under-vessel areas. Nineteen additional concrete cores were acquired in each survey unit, and all were analyzed for the HTD ROC by Eberline. Results of analysis are provided in Tables 13 and 14 of the Release Records.

Auxiliary Building - In December of 2017, as part of continuing characterization activities, four (4) survey packages were implemented to collect and analyze a total of thirty-two (32) additional concrete cores throughout the Auxiliary Building basement 542 foot elevation for the purpose of determining the concentration profiles at depth and to develop an ISOCS efficiency calibration for the Auxiliary Building basement. The first three (3) survey packages addressed the north, south and west portions of the Auxiliary Building basement. The fourth survey package was focused on the HUT area, or the west end of the Auxiliary Building basement. A total of twenty-two (22) floor and ten (10) wall core locations were collected. Analytical results for the analysis of these cores are presented in Table 3 of the Release Record. A summary of the analysis of continuing characterization concrete cores for the full suite of radionuclides by Eberline is presented in Table 4 of the Release Record for Survey Unit 05100.

Keyway Soils - LTP Chapter 5, Section 5.3.4.4 states that the subsurface soils in the "keyways" between the Containment Buildings and the Turbine Building will be assessed for radiological contamination once subsurface utilities and subsurface access-interfering structures (e.g., Waste Annex Building) have been removed. This applied to the Survey Unit 12109 as well as the north boundary of Survey Unit 12110. The disposition of these areas was addressed in Section 3.3 of the Phase 4 FSSR. During the course of the decommissioning and the remediation of the indigenous soils following the removal of the sacrificial layer, the soils that were earmarked for continuing characterization were completely removed and disposed of as contaminated waste. The tops of the underlying structures were exposed, and post-remediation scans and samples taken from the excavation prior to backfill did not indicate the presence of any ROC at concentrations exceeding the OpDCGLs for subsurface soils.

Foundation Soil Samples – LTP Chapter 5, Section 5.3.4.4 states that attempts shall be made to acquire subsurface soil samples from beneath each Containment basement foundation and the Auxiliary Building basement floor slab. The LTP states that attempts shall be made to acquire soil samples from beneath each basement floor slab and around each foundation from grade to

the floor slab depth or refusal, whichever was less. Many attempts were made to acquire these samples following the demolition of all above-grade structures. This is documented in Section 3.3 of the Phase 4 FSSR. One (1) subsurface soil sample was taken in Survey Unit 12109 along the west side of the Auxiliary Building to a depth of 52 feet below grade, where refusal was met. Several attempts were made to acquire samples at a deeper depth and below the basement slab in Survey Unit 12109; however, with the exception of sample acquired under the Auxiliary Building, the "mud-mat" placed around the Containment basement exterior during construction obstructed the GeoProbe from acquiring samples at a deeper depth. For the sample acquired in Survey Unit 12109, the probe was able to acquire a sample at a sub-basement slab depth. Twelve (12) additional samples were taken adjacent to the foundations of both Unit 1 and Unit 2 Containment Buildings and the Auxiliary Building to a depth of 32 feet to 48 feet. All of the deep subsurface soil samples were analyzed by the on-site gamma spectroscopy system. No ROC were positively detected in any of these samples except for one sample taken along the foundation of Unit 2 Containment where Cs-137 was positively detected at a concentration of 0.095 pCi/g. Two samples (L1-12109L-CJGS-001-SB-A and L1-12106L-CJGS-001-SB-A) were analyzed for the full suite of radionuclides from LTP Chapter 5, Table 5-1. The results are provided in Attachment 1 and the Eberline reports are provided in Attachment 2. Residual concentrations of Cs-137 were detected in both samples. In addition, residual concentrations of H-3 and Eu-155 were positively detected in sample L1-12109L-CJGS-001-SB-A, but at levels that do not require reassessment of IC dose or mixture as per LTP Chapter 5, Section 5.1.

Buried Pipe - Section 5.3.4.4 of LTP Chapter 5 states that when the interior surfaces become accessible, several potentially contaminated embedded and buried pipe systems that will be abandoned in place will be characterized. When survey design was performed, no sediment was available within the Condensate Feed Water Supply and Recirculation, Primary Water, Diesel Generator Heat Exchanger Service Water Supply and Return and Survey Water Supply Header systems; therefore, a characterization survey was not performed.

During a surveillance survey, sediment was taken from the North End Storm Drain piping and analyzed using the on-site gamma spectroscopy system. Low levels of Cs-137 and Co-60 were identified. Because the pipes were cleaned by water flushing prior to performing FSS, the sediment sample was not sent to Eberline for HTD analysis. The sediment sample was retrieved and sent to Eberline for a full suite HTD analysis. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The report from Eberline is provided in Attachment 2. Residual concentrations of Co-60, Cs-137 and Eu-154 were positively detected in concentrations greater than MDC. Analysis shows that the IC dose and surrogate ratios do not require adjustment as per LTP Chapter 5, Section 5.1.

Unit 1 and Unit 2 Containments Above 565 foot - Continuing characterization of the steel liner in both Containment Buildings consisted of beta-gamma scans and swipe samples. The liners were subjected to sufficient smear samples and beta-gamma scans of accessible surfaces to

ensure that the liner was adequately decontaminated prior to FSS. The results are documented in the Release Records for Survey Units 01100 and 01110 and Survey Units 02100 and 02110.

RAI-3b Path Forward:

- For areas that underwent continuing characterization, provide detailed calculations to estimate the actual IC dose for each individual sample result. The DCGLs from TSD 14-019 Table 27 (for structures) and Table 28 (for soils) should be used for the calculation, assuming a reasonably bounding volume of concrete or soil within the survey unit that is represented by the sample result. The results of the analysis should demonstrate the IC dose contribution was not exceeded (1.25 mrem/yr for all basement structures other than containments, and 2.5 mrem/yr for containments and soils).

RAI-3b - Zion*Solutions* Response: The calculations performed to estimate the actual IC dose for each continuing characterization sample result are provided in Attachment 1 (Tab – IC Dose Assessment Core Samples). The calculations demonstrate that the IC dose contribution was not exceeded (1.25 mrem/yr for all basement structures other than Containment Buildings, and 2.5 mrem/yr for Containment Buildings and soils).

RAI-3c Path Forward:

- If the dose contribution from the insignificant radionuclides exceeds what was assumed for a survey unit, assign an appropriate additional dose from the insignificant radionuclides for the total dose from that survey unit.

RAI-3c - Zion*Solutions* Response: The calculations provided in Attachment 1 (Tab – IC Dose Assessment Core Samples) demonstrate that the IC dose contribution was not exceeded (1.25 mrem/yr for all basement structures other than Containment Buildings, and 2.5 mrem/yr for Containment Buildings and soils). The assignment of additional dose from the presence of insignificant radionuclides is not required per LTP Chapter 5, Section 5.1.

RAI-3d Path Forward:

- For the buried pipe survey units, the rationale for not collecting sediment and/or debris samples in Survey Units 00101A, 00101B, 00101F, and 00101H should be provided, along with additional information on why the sediment sample from Survey Unit 00150 A/B and C was not analyzed for HTD radionuclides or the full suite of radionuclides in Table 5-1 of the LTP.

RAI-3d - Zion*Solutions* Response: No sediment and/or debris was available to sample during the turnover and FSS of Survey Units 00101A, 00101B, 00101F, and 00101H. Turnover scans of the pipe openings indicated minimal residual activity. Characterization surveys were deemed redundant and compliance was immediately demonstrated through the acquisition of direct measurements and comparison against the OpDCGLs for buried pipe.

During the performance of a surveillance survey in the north parking lot, a sediment sample was acquired from inside of a system catch basin (manway) and analyzed by the on-site gamma spectroscopy system. Low levels of Co-60 and Cs-137 were positively detected in the sample. The manway accessed the North End Storm Drain system that serviced the Switchyard and was classified as non-impacted. Due to the presence of low concentrations of positively detected plant-derived residual activity in the sediment, it was decided to reclassify the North End Storm Drain system as impacted with a Class 2 designation, and Survey Unit 00150 A/B & C was designated. Following discovery of the sediment and prior to FSS, the pipe interiors were flushed with high volume/high pressure water hoses and the available sediment was removed. Due to the fact that the pipe was cleaned, the sediment sample was deemed as unrepresentative of the end-state and not analyzed for HTD radionuclides. To address regulatory concerns, Zion*Solutions* recovered the sediment sample from the archives and sent the sample for full isotopic analysis. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The report from Eberline is provided in Attachment 2. Analysis of sample L2-10214C-RJGS-001-SM-A indicates positive detectable concentrations of Co-60, Cs-137 and Eu-154. While Eu-154 was not expected, it was detected in residual concentrations that does not change the assumed mixture, IC dose adjustments or ratios per LTP Chapter 5, Section 5.1.

4. Commitment for HTD Analysis and Re-evaluation of Surrogate Ratios was Not Consistently Implemented

RAI-4a Path Forward:

- Provide additional justification for why the applied HTD surrogate ratios are representative, for those survey units where the commitment to analyze samples for the HTD ROCs (Sr-90 and Ni-63) in 10% of the samples was not consistently followed.

RAI-4a - Zion*Solutions* Response: LTP Chapter 5, Section 5.1, states soil samples and concrete cores will be collected during FSS to confirm the HTD to surrogate radionuclide ratios. The number of concrete cores required was ten percent (10%) of the FSS ISOCS measurements, and the number of soil samples was ten percent (10%) of the samples collected during FSS. With the exception of the FSS of the Turbine Building basement (includes the FSS of the Steam Tunnel, Fire Sump and Circulating Water Discharge Tunnel) and Crib House, which have been acknowledged as deficient, Zion*Solutions* is in compliance with the FSS sampling requirements outlined is the LTP, Section 5.1. Compliance is illustrated in Attachment 1 (Tab – Comprehensive Summary List, Columns AG through AK).

LTP Chapter 5, Section 5.1, also states that only HTD radionuclides included as ROC (H-3, Ni-63, Sr-90, for the Containment Buildings and Ni-63 and Sr-90 for all other structures and soils) will be analyzed in the FSS confirmatory samples. Again, with the exception of the FSS of the Turbine Building basement and Crib House, Zion*Solutions* is in compliance with the FSS

analysis requirements in all other survey units. All samples presented in Attachment 1 (Tab – Comprehensive Summary List, Column AG) were analyzed for the appropriate HTD ROCs.

LTP Chapter 5, Section 5.1 also states that, "For soil samples or concrete cores with positive results for both a HTD ROC and the corresponding surrogate radionuclide (Cs-137 or Co-60), the HTD to surrogate ratio will be derived." Again, with the exception of the FSS of the Turbine Building basement and Crib House, Zion*Solutions* is in compliance with the HTD ratio assessment requirements in all other survey units. If either the HTD ROC and/or the gamma-emitting ROC were not both positively identified in the analysis of the FSS media samples taken in compliance with LTP Chapter 5, Section 5.1, then no further actions were taken, and the maximum surrogate ratios from LTP Chapter 5, Table 5-15 were used.

Zion*Solutions* has acknowledged that a specific requirement in Revision 2 of the LTP was not followed, given that the Turbine Building FSS was performed under Revision 0 of the LTP. Specifically, Zion*Solutions* did not collect concrete cores at 10% of the measurement locations during the FSS of the Turbine Building and Crib House. As part of the effort to address this discrepancy, Zion*Solutions* has retrieved two concrete cores from the sample archive that were taken in the Turbine Building (concrete core B2-06207-CJFC-002-CV and B2-06104-CJFC-003-CV) and sent them to Eberline for full suite analysis. The results for the full suite analysis of concrete core samples B2-06207-CJFC-002-CV and B2-06104-CJFC-003-CV, both acquired from the Turbine Building prior to demolition, are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The Eberline reports for the sample analyses are also provided in Attachment 2. The only plant-derived radionuclides detected in concrete core samples B2-06207-CJFC-002-CV were residual concentrations of H-3 and Cs-137. In sample B2-06104-CJFC-003-CV, both Np-237 and Cm-243/244 were positively detected at residual concentrations; however, the residual detectable concentrations had no consequence on mixture, IC dose adjustments or ratios. All other potential plant-derived radionuclides were less than MDC. The Release Record for Turbine Building (Survey Unit 06100) will be revised to reflect the additional analyses.

RAI-4b Path Forward:

- For the Unit 1 and Unit 2 Turbine Building 570-Foot Diesel Fuel Storage survey units, explain why only two of the five cores were analyzed for HTDs, when LTP Section 5.1 states that 10% of the samples, or five core analyses, should be evaluated for HTDs in each survey unit.

RAI-4b – Zion*Solutions* Response:

Unit 1 Turbine Building 570-Foot Diesel Fuel Storage

Survey Unit 06201, Unit 1 Turbine Building 570-Foot Diesel Fuel Storage, is part of the Turbine Building basement. Due to the fact that this area was used as a travel path for contaminated commodity removal, the area was reclassified as Class 1. As a result, 51 ISOCS measurements were required to provide 100% areal coverage.

In accordance with LTP Chapter 5, Section 5.1, five (5) concrete core samples were acquired. However, only two samples were sent for FSS HTD analysis (B1-06201A-FSWC-024-CV and B1-06201A-FSWC-027-CV). Sending only two samples was not in accordance with LTP Chapter 5, Section 5.1.

To address this issue, Zion*Solutions* has retrieved the three concrete cores (concrete cores B1-06201A-FSFC-009-CV, B1-06201A-FSWC-041-CV and B1-06201A-FSWC-050-CV) from the sample archive that were not analyzed for HTD ROC and sent them for full suite analysis. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The Eberline reports for the sample analysis are also provided in Attachment 2. In the three samples, H-3, Pu-238 and Cm-243/244 were positively detected at residual concentrations; however, the residual detectable concentrations had no consequence on mixture, IC dose adjustments or ratios. All other potential plant-derived radionuclides were less than MDC. The Release Record for Unit 1 Turbine Building 570-Foot Diesel Fuel Storage (Survey Unit 06201) will be revised to reflect the additional analyses.

Unit 2 Turbine Building 570-Foot Diesel Fuel Storage

Survey Unit 06202, Unit 2 Turbine Building 570-Foot Diesel Fuel Storage, is also part of the Turbine Building basement. Like the Unit 1 side, this area was used as a travel path for contaminated commodity removal out of the Auxiliary Building and the area was reclassified as Class 1. As a result, 51 ISOCS measurements were required to provide 100% areal coverage.

In accordance with LTP Chapter 5, Section 5.1, five (5) concrete core samples were acquired. However, only two samples were sent for FSS HTD analysis (B1-06202A-FSFC-016-CV and B1-06202A-FSWC-035-CV). Sending only two samples was not in accordance with LTP Chapter 5, Section 5.1.

To address this issue, Zion*Solutions* has retrieved the three concrete cores (concrete cores B1-06202A-FSFC-028-CV, B1-06202A-FSWC-033-CV and B1-06202A-FSWC-040-CV) from the sample archive that were not analyzed for HTD ROC and sent them for full suite analysis. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]). The Eberline reports for the sample analysis are also provided in Attachment 2. In the three samples, only Cs-137 was positively detected in sample B1-06202A-FSWC-040-CV. All other potential plant-derived radionuclides were less than MDC. The Release Record for Unit 2 Turbine Building 570-Foot Diesel Fuel Storage (survey unit 06202) will be revised to reflect the additional analyses.

RAI-4c Path Forward:

- For the Unit 1 Turbine Building 570-Foot Diesel Fuel Storage survey units, provide additional justification for the adequacy of the Ni-63 surrogate ratio, given that Ni-63 was positively detected in the absence of Co-60 in the sample.

RAI-4c - Zion*Solutions* Response: In accordance with Section 5.1 of the LTP, the correct surrogate ratios were used during data assessment of the Unit 1 Turbine Building 570-Foot

Diesel Fuel Storage survey unit. LTP Section 5.1 states, "For sample(s) analyzed for HTD radionuclides during continuing characterization, if the analysis of the sample indicates positive results (greater than MDC) for both a HTD ROC and the corresponding surrogate radionuclide (Cs-137 or Co-60), then the HTD to surrogate ratio will be derived. If the derived HTD to surrogate ratio is less than the maximum HTD to surrogate ratio from Section 5.2.11, Table 5-15, then no further action is required," and "For soil samples or concrete cores with positive results for both a HTD ROC and the corresponding surrogate radionuclide (Cs-137 or Co-60), the HTD to surrogate ratio will be derived."

The analytical results for HTD in the two FSS samples that were previously sent to Eberline are presented in the Release Record for survey unit 06201. While Ni-63 was positively detected in sample B1-06201A-FSWC-024-CV, the results showed that Co-60 was not positively detected. Therefore, in accordance with LTP Chapter 5, Section 5.1, which requires that both the HTD and the gamma-emitting ROC be positively detected, no further action was taken, and the maximum surrogate ratios from LTP Chapter 5, Table 5-15 were used as required. Zion*Solutions* acknowledges NRC's observation that the requirements regarding surrogate ratios should be re-evaluated for future projects.

RAI-4d Path Forward:

- For the Unit 1 Steam Tunnel East and West Valve House survey units, explain why the Eberline Analytical results from only three of five core samples are analyzed for HTDs, as presented in Table 11 and Table 12 of the release record. Also, explain why the results of the two other core samples from the East and West Valve Houses, which are presented in the Eberline Analytical report, are not discussed in the release record. In addition, explain whether these results verify the surrogate ratios.

RAI-4d - Zion*Solutions* Response: During the performance of the initial FSS of the Unit 1 Steam Tunnel East and West Valve House survey units, FSS results indicated radiological concentrations in excess of 50% of the OpDCGL with several measurements exceeding an OpSOF of one. Consequently, the survey units were reclassified as Class 1 and the survey designs were revised accordingly.

Samples B3-06213A-FIWC-011-CV, B3-06213A-FIFC-015-CV, B3-06214A-FIFC-001-CV and B3-06214A-FIWC-009-CV were taken as part of the initial survey design. The "B3" in the sample ID indicates a Class 3 structure. The samples were sent for isotopic analysis but are not included as part of the FSS design used to demonstrate compliance. Tables 11 and 12 of the Release Record present the results of samples which demonstrate compliance. The results from the original FSS were reported in the same Eberline report as the subsequent FSS. Therefore, the Eberline report provided as an attachment to the Release Record includes the results of the initial samples.

Core samples B1-06213A-FSFC-002-CV, B1-06213A-FSFC-004-CV and B1-06213A-FSWC-009-CV were taken for FSS in Survey Unit 06213, and core samples B1-06214A-FSFC-001-CV, B1-06214A-FSFC-004-CV and B1-06214A-FSWC-005-CV were taken in Survey Unit 06214.

In sample B1-06213A-FSFC-002-CV, Ni-63 was positively detected, however Co-60 was not. In sample B1-06213A-FSFC-004-CV, Cs-137 was positively detected, however Sr-90 was not. In sample B1-06214A-FSFC-004-CV, Ni-63 and Cs-137 were positively detected, however Co-60 and Sr-90 were not. In sample B1-06214A-FSWC-005-CV, only Cs-137 was positively detected.

In accordance with Section 5.1 of the LTP, the correct surrogate ratios were used during data assessment of the Unit 1 Turbine Building 570-Foot Diesel Fuel Storage survey unit. LTP Section 5.1 states, "For sample(s) analyzed for HTD radionuclides during continuing characterization, if the analysis of the sample indicates positive results (greater than MDC) for both a HTD ROC and the corresponding surrogate radionuclide (Cs-137 or Co-60), then the HTD to surrogate ratio will be derived." As both the HTD ROC and the surrogate ROC were not positively detected in the samples, the assessment of the Eberline sample results against the maximum surrogate ratio in Table 5-15 was not required. Consequently, the Table 5-15 values were correctly used to infer HTD ROC concentrations as required by the LTP.

RAI-4e Path Forward:

- For the Unit 1 Steam Tunnel East Valve House, provide additional justification for the adequacy of the Ni-63 surrogate ratio, given that it was positively detected in the sample.

RAI-4e - Zion*Solutions* Response: In accordance with Section 5.1 of the LTP, the correct surrogate ratios were used during data assessment of the Unit 1 Turbine Building 570-Foot Diesel Fuel Storage survey unit. LTP Section 5.1 states, "For sample(s) analyzed for HTD radionuclides during continuing characterization, if the analysis of the sample indicates positive results (greater than MDC) for both a HTD ROC and the corresponding surrogate radionuclide (Cs-137 or Co-60), then the HTD to surrogate ratio will be derived." As both the HTD ROC and the surrogate ROC were not positively detected in the samples, the assessment of the Eberline sample results against the maximum surrogate ratio in Table 5-15 was not required. Consequently, the Table 5-15 values were correctly used to infer HTD ROC concentrations as required by the LTP.

RAI-4f Path Forward:

- For the Unit 1 Steam Tunnel West Valve House, provide additional information on the technical basis for the Sr-90 result (B1-06214A-FSFC-001-CV) is considered an unreliable outlier. Also, provide additional justification that the surrogate ratio applied for Sr-90 is reasonable.

RAI-4f - Zion*Solutions* Response: There is a transcription error in Table 12 of the Release Record for Survey Units 06213 and 06214. The values listed for Cs-137 in sample B1-06214A-FSFC-001-CV were not consistent with the reported values in the Eberline reports. The correct concentration for Cs-137 in sample B1-06214A-FSFC-001-CV is 1.48E+01 pCi/g verses the value reported in Table 12 of 1.06E+01 pCi/g. The Release Records for Unit 1 Steam Tunnel East and West Valve House survey units (Survey Unit 06213 and 06214) will be revised to reflect the correct concentration.

In sample B1-06214A-FSFC-001-CV, both Sr-90 and Cs-137 were positively indicated; however, based on the absence of detectable Sr-90 in any concrete or soils outside of the Containment Buildings and the results of other concrete cores taken in and around this area, Zion*Solutions* concluded that the single positive Sr-90 result was an outlier and was not used. Zion*Solutions* acknowledges NRC's concern that more definitive data should have been collected to verify this conclusion.

To address the concern, Zion*Solutions* has retrieved the concrete core sample B1-06214A-FSFC-001-CV from the sample archive and sent the sample for full suite analysis. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]), and the Release Record for Unit 1 Steam Tunnel East and West Valve House survey units (Survey Units 06213 and 06214) will be revised to reflect the additional analysis. The Eberline reports for the sample analysis are also provided in Attachment 2.

The reanalysis of concrete core sample B1-06214A-FSFC-001-CV for the full suite of radionuclides indicated no radionuclide concentrations greater than MDC, including Sr-90, thereby supporting the original contention that the Sr-90 result in the initial analysis was a "false positive." As Sr-90 was not positively detected, a readjustment of the surrogate ratio is not necessary, and the use of the maximum ratios from LTP Chapter 5, Table 5-15 was appropriate.

Documentation from Eberline discussing the analytical process that likely resulted in a false positive result for Sr-90 is provided as Attachment 3 to this response.

RAI-4g Path Forward:

- For the SFP Transfer Canal, provide additional justification for the acceptability of the applied surrogate ratios as reasonably bounding, given that eight concrete cores collected during continuing characterization may not be representative of the end state of the survey unit, since remediation was conducted after the cores were collected.

RAI-4g - Zion*Solutions* Response: The eight concrete cores taken on April 2, 2018, during continuing characterization are presented in Section 3 of the Release Record for Survey Unit 03202. The results are presented in Tables 2 and 3 of the Release Record, as well as illustrated in Figure 2 of the Release Record. Continuing characterization data is also presented in Attachment 1 (Tab – Comprehensive Summary List, Columns D through G). The reports documenting the analytical results of the continuing characterization samples from Eberline are

provided in Attachment 2. As illustrated in the Release Records, the results of continuing characterization indicated that the Auxiliary Building mixture was appropriate for use on the SFP/Transfer Canal concrete; however, further remediation was performed after the cores were acquired.

FSS commenced for Survey Unit 03202 on June 1, 2018. As part of the survey design, eight (8) additional concrete cores (different from the continuing characterization core samples) were acquired as FSS media in accordance with LTP Chapter 5, Section 5.1. All eight of the concrete core samples acquired during FSS were sent to Eberline for HTD ROC analysis. The results of the analysis, which are representative of the final radiological condition of this survey unit, are presented in Table 19 of the Release Record for Survey Unit 03202. The analysis results indicated no detectable activity for any of the ROC at concentrations greater than MDC.

RAI-4h Path Forward:

- For the Crib House/Forebay discuss whether any of the samples taken during site characterization were also analyzed for HTD radionuclides. If the samples were not analyzed for HTD radionuclides, provide additional justification for why the applied HTD surrogate ratios are representative for this survey unit.

RAI-4h - Zion*Solutions* Response: No concrete core samples were acquired during FSS of the Crib House/Forebay. The core samples cited in the Release Record were taken during characterization in 2012. All concrete core slices were analyzed by the on-site gamma spectroscopy system. No positively identified plant-derived radionuclides were detected in any sample taken from the Crib House.

Acknowledging that no concrete cores were taken during the FSS of the Crib House, Zion*Solutions* analyzed two of the twenty concrete core samples taken during characterization (concrete cores B2-08101A-BJFC-007-CV and B2-08201-CJWC-A018-CV) for the full suite of radionuclides to ensure compliance with the FSS sampling requirements of the approved LTP Revision 2. The results are provided in Attachment 1 (Tab – Sample Analysis [All Isotopes]), and the Release Record for Crib House/Forebay (survey units 8100/8401) will be revised to reflect the additional analyses. The Eberline reports for the sample analysis are also provided in Attachment 2. The only plant-derived radionuclide detected in either sample was Eu-155 at a residual concentration slightly above MDC. All other potential plant-derived radionuclides were less than MDC.

5. Commitment to Grout Embedded Piping and Penetrations Not Consistently Followed

RAI-5a Path Forward:

- Review the penetration and embedded piping survey units and explain any discrepancies with commitments to grout piping as specified in Section 5.5.5 of the LTP. If discrepancies exist, provide an estimated dose consequence attributable to not grouting the embedded piping or penetration.

RAI-5a - Zion*Solutions* Response: An assessment of the FSS of penetrations was performed and is presented in Attachment 1 (Tab – Penetrations). Zion*Solutions* will discuss the results of the assessment of penetrations in the response to RAI 6. The response to this RAI (RAI 5a) will focus on the implementation of the grouting requirements on embedded pipe systems.

A summary of the assessment findings for each of the seven (7) embedded pipe survey units that underwent FSS is provided below:

- Survey Unit 01111 - Unit 1 CTMT IC-Sump Drain
  The Unit 1 Containment IC-Sump Drain system was completely grouted.

- Survey Unit 05119 - Auxiliary Building Embedded Floor Drains
  The Auxiliary Building Embedded Floor Drain system was completely grouted.

- Survey Unit 06209 - Unit 1 Steam Tunnel Floor Drain
- Survey Unit 06210 - Unit 2 Steam Tunnel Floor Drain
  The Unit 1 and Unit 2 Steam Tunnel floor drains were subjected to FSS as Class 3 systems. Sixty-eight measurements were taken in the Unit 1 Steam Tunnel floor drains, and sixty measurements were taken in the Unit 2 Steam Tunnel floor drains. The maximum OpSOF observed in both pipe systems was 0.018 in Unit 1 and 0.003 in Unit 2. No measurement exceeded an OpSOF of one when compared against the structural OpDCGLs for the Turbine Building. These pipes did not require grouting in accordance with Section 5.5.5 of the LTP.

- Survey Unit 06211 - Unit 1 Tendon Tunnel Floor Drain
- Survey Unit 06212 - Unit 2 Tendon Tunnel Floor Drain
  The Unit 1 and Unit 2 Tendon Tunnel floor drains were subjected to FSS as Class 3 systems. Fifty-eight measurements were taken in the Unit 1 Tendon Tunnel floor drains, and forty-four measurements were taken in the Unit 2 Tendon Tunnel floor drains. The maximum OpSOF observed in both pipe systems was 0.074 in Unit 1 and 0.016 in Unit 2. No measurement exceeded an OpSOF of one when compared against the structural OpDCGLs for the Turbine Building. These pipes did not require grouting in accordance with Section 5.5.5 of the LTP.

- Survey Unit 06105B - Turbine Building Embedded Pipe

  The Turbine Building floor drains were subjected to FSS in April of 2016 as Class 3 systems. One hundred and thirty-four (134) measurements were acquired at one-foot intervals in sections of the pipe that were accessible. This resulted in an areal coverage of 11%, which provided sufficient measurements to allow for the 10% coverage requirement for a Class 3 survey unit. Of the 134 measurements obtained in the Turbine Building embedded pipe, no measurement exceeded an OpSOF of 0.5 when compared against the $OpDCGL_{EP}$ for the Turbine Building. The mean OpSOF was 0.011 with a maximum OpSOF of 0.028.

  The activity in this pipe was also compared to the $OpDCGL_B$ for the Turbine Building. The results of this comparison showed that 2 of the 134 measurements were greater than 1.0 when compared to the $OpDCGL_B$ for the Turbine Building, with a maximum SOF of 1.17. The 2 pipes affected were the Unit 1 Equipment Drain Sump, pipe #3, position 0, and Turbine Building Floor Drain Sump, pipe #5, position 2. Revision 2 of the LTP would require that both of these pipes be grouted in accordance with Chapter 5, Section 5.5.5; however, this compliance survey was performed prior to the acceptance of the grouting commitments. Since completion of the survey, the building was completely backfilled leaving the pipes in question not grouted.

  For the Unit 1 Equipment Drain Sump, pipe #3, position 0, the gross gamma measurement observed was 1.97E+06 pCi/m^2. Adjacent measurements verified that the source term of concern is limited to that one foot of pipe. Using the $BcDCGL_{EP}$ for the Turbine Building drains, this measurement equates to a dose of 0.001 mrem/yr. Using the $BcDCGL_B$ for Turbine Building structures, this measurement equates to a dose of 0.100 mrem/yr. Zion*Solutions* acknowledges that this pipe should have been grouted in compliance with the approved revision of the LTP, however this assessment illustrates the low dose consequence of not grouting this pipe.

  For the Turbine Building Floor Drain Sump, pipe #5, position 2, the gross gamma measurement observed was 1.79E+06 pCi/m^2. Adjacent measurements verified that the source term of concern is limited to that one foot of pipe. Using the $BcDCGL_{EP}$ for the Turbine Building drains, the gamma measurement at Turbine Building Floor Drain Sump, pipe #5, position 2 equates to a dose of 0.001 mrem/yr. Using the $BcDCGL_B$ for Turbine Building structures, this measurement equates to a dose of 0.083 mrem/yr. Again, Zion*Solutions* acknowledges that this pipe should have been grouted in compliance with the approved revision of the LTP, however this assessment illustrates the low dose consequence of not grouting this pipe.

  Although the dose consequences for not grouting the two pipes in the Turbine Building Embedded Pipe survey unit are low, Zion*Solutions* proposes to add the dose of 0.083 mrem/yr to the mean dose for the Turbine Building as a response to this RAI. The Release Record for the Turbine Building (Survey Unit 06100) will be revised accordingly.

RAI-5b Path Forward:

- Review Table 8 and corresponding text in Survey Unit 05120 for typos, and clarify which penetrations required grouting and which penetrations were, in fact, grouted.

RAI-5b - Zion*Solutions* Response: A review of Table 8 in the Release Record for Survey Unit 05120 showed that the values that were inputted into the word version of the document were different than the values in the data assessment spreadsheet. The corrected Table 8 is as follows:

Table 8 - Auxiliary Building Penetrations Summary

Penetration #	Description	Diam. (in)	Length (ft)	Area (m^2)	Accessed from (side)	Measurement #s			By Direct Scan	Max SOF			Requires Grouting
										AB $OpDCGL_{PN}$	AB $BcDCGL_{PN}$	TB $OpDCGL_{B}$	
A001	Service Water	24	3	1.75	Auxiliary	52	thru	54	X	0.001	0.000	0.021	No
A002	Feedwater	4.5	3	0.33	Auxiliary	10	thru	12		0.012	0.001	0.238	No
A003	Secondary Sample	2.5	3	0.18	Auxiliary	13	thru	15		0.033	0.001	0.338	No
A004	Service Water	24	3	1.75	Auxiliary	58	thru	60	X	0.001	0.000	0.017	No
A005	Feedwater	4.5	3	0.33	Auxiliary	31	thru	33		0.010	0.001	0.206	No
A007	Aux Vents & Drains	4.5	3	0.33	Auxiliary	1	thru	3		0.010	0.001	0.227	No
A008	Aux Vents & Drains	4.5	3	0.33	Auxiliary	4	thru	6		0.012	0.001	0.288	No
A009	Waste Disposal	3.5	3	0.26	Auxiliary	7	thru	9		0.010	0.001	0.242	No
A010	Service Water	11	3	0.80	Auxiliary	49	thru	51		0.020	0.001	0.393	No
A011	Waste Disposal	7	3	0.51	Auxiliary	19	thru	21		0.279	0.019	6.556	Yes
A012	Chemical Feed	3.5	3	0.26	Auxiliary	22	thru	24		0.014	0.001	0.251	No
A013	Primary Water	4.5	3	0.33	Auxiliary	16	thru	18		0.017	0.001	0.380	No
A014	Service Water	20	3	1.46	Auxiliary	55	thru	57	X	0.001	0.000	0.016	No
A015	Waste Disposal	6.5	3	0.47	Auxiliary	28	thru	30		0.015	0.001	0.304	No
A017	Fire Protection	11	3	0.80	Auxiliary	46	thru	48		0.025	0.001	0.488	No
A019	Primary Water	3.5	3	0.26	Auxiliary	25	thru	27		0.010	0.001	0.217	No
A020	Vacuum Control	3.5	3	0.26	Auxiliary	34	thru	36		0.012	0.001	0.274	No
A021	Demin Water	3.5	3	0.26	Auxiliary	37	thru	39		0.013	0.001	0.305	No
A022	Line with Flange	4.5	3	0.33	Auxiliary	40	thru	42		0.012	0.001	0.204	No
A023	Waste Disposal	6.5	3	0.47	Auxiliary	43	thru	45		0.165	0.011	3.873	Yes
A024	Condensate	18	3	1.31	Auxiliary	61	thru	63	X	0.003	0.000	0.035	No
A025	Service Water Supply Header	36	3	2.63	Auxiliary	64	thru	66	X	0.001	0.000	0.015	No
A002	Feedwater	4.5	3	0.33	Auxiliary	10	thru	12		0.012	0.001	0.238	No

The Release Record for the Auxiliary Building Penetrations (survey unit 05120) will be revised to correct Table 8.

To clarify, there were 22 penetrations that interfaced the Auxiliary Building and the Turbine Building at the time that FSS was performed. The 22 penetrations were A001, A002, A003, A004, A005, A007, A008, A009, A010, A011, A012, A013, A014, A015, A017, A019, A020, A021, A022, A023, A024 and A025. Compliance was demonstrated through comparison of the data against the $OpDCGL_{PN}$ for the Auxiliary Building from LTP Chapter 5, Table 5-14. Dose was derived through comparison of the data against the $BcDCGL_{PN}$ for the Auxiliary Building from LTP Chapter 5, Table 5-13. The ROC concentrations for each measurement were also compared against the structural OpDCGLs for the Turbine Building from LTP Chapter 5, Table 5-4. Two pipes exhibited sufficient residual radioactivity to exceed a SOF of one when compared against the structural OpDCGLs for the Turbine Building (penetrations A011 and A023). Both were completely grouted in accordance with LTP Chapter 5, Section 5.5.5.

RAI-5c Path Forward:

- Provide explanatory information on portions of embedded pipes that contribute to elevated readings on judgmental sample (ISCOCs measurement J-03) taken during the ORAU confirmatory survey was part of the 10% that was surveyed during the FSS. If not, then there should be an evaluation to determine if this piping should have been grouted and to determine the potential dose consequences attributable to this portion of the embedded piping. Include a diagram that overlays the ORAU judgmental measurements of the Turbine Building floor with the measurements taken by the licensee of the embedded piping.

RAI-5c - Zion*Solutions* Response: Zion*Solutions* has performed a review of the cited ORAU report dated August, 2016. The report mentions that at one of the judgmental sample locations (ISOCS-J-03), Cs-137 was measured in the spectrum. Further investigation with the NaI detector revealed that the source of the direct gamma radiation was originating from embedded piping in the floor. Section 7.2 of the ORAU report details that embedded piping located to the right of the earthen ramp (if facing east) had readings above background at 8,500 cpm. Zion*Solutions* assumes the embedded piping mentioned in Section 7.2 is the same embedded piping associated with judgmental measurement ISOCS-J-03.

Approximately 11% of the Turbine Building Embedded Floor Drain Pipe was surveyed as part of FSS (see Release Record 06105B). The embedded piping associated with the ISOCS-J-03 measurement is part of the embedded floor drain system but was not part of the FSS, as the interior portion of this section of pipe was considered inaccessible. For this reason, and due to the difficulty in recreating a diagram that accurately overlays the ORAU judgmental measurements of the Turbine Building floor with the measurements taken within the embedded piping during FSS, the diagram is not provided as part of this response.

It is difficult to perform an evaluation to determine if this piping should have been grouted and to determine potential dose consequences. In order to make these determinations, the efficiency of the detector and the diameter of the pipe would have to be known to convert to the correct unit of measure (pCi/m^2). Additionally, an actual measurement reading from within the pipe would be necessary. It should be noted that, although the 8,500 cpm falls within the range of measurements of the pipe interiors taken during FSS, the measurement values even a short distance into the pipe drop to almost half of what is detected at the pipe opening.

Zion*Solutions* has made the following assumptions in order to perform the requested evaluation. First, the 8,500 cpm is assumed to be present within the pipe. A review of Turbine Building embedded floor drain drawings show this section of pipe to be 6" in diameter. The detector that would have been used is a Ludlum 44-152 2" NaI with an efficiency factor of 0.0177 in a 6" diameter pipe with an effective area (FOV) of 0.146 m^2. Converting the 8,500 cpm into the correct unit of measure equates to 1.48E+06 pCi/m^2. As shown in the table below, the $OpSOF_{EP}$ is 0.0209 which equates to an $OpSOF_B$ of 0.8817 using the values for the Turbine Building Floor and Walls from Table 5-4 in the Zion LTP. This is below the grouting criteria specified in Section 5.5.5 of the LTP. Based on the above evaluation and the data in the table below, the ORAU ISOCS J-03 and NaI data appear to be representative of the Zion*Solutions* data for the entire length of pipe, and have been accounted for in final dose calculations accordingly.

Gamma Result (pCi/m^2)	ROC	Ratio or Mix %	Activity (pCi/m^2)	$OpDCGL_{EP}$ (pCi/m^2)	Fraction of $OpDCGL_{EP}$	$OpSOF_{EP}$	$OpDCGL_B$ TB Floor and Walls (pCi/m^2)	Fraction of $OpDCGL_B$ TB Floor and Walls	$OpSOF_B$ TB Floor and Walls
1.48E+06	Co-60	0.0120	1.78E+04	2.52E+08	7.05E-05	0.0209	5.98E+06	2.98E-03	0.8817
	Cs-134	0.0001	1.96E+02	5.72E+07	3.43E-06		1.35E+06	1.45E-04	
	Cs-137	0.9878	1.46E+06	7.56E+07	1.93E-02		1.79E+06	8.17E-01	
	Ni-63	180.4500	3.21E+06	7.84E+09	4.10E-04		1.85E+08	1.74E-02	
	Sr-90	0.0020	2.92E+03	2.78E+06	1.05E-03		6.58E+04	4.44E-02	

6. Comparison to DCGLs for Unit 1 and Unit 2 Containment Penetrations

RAI-6a Path Forward:

These items apply to both (Unit 1 and Unit 2 Containment penetration) survey units

- Re-evaluate the remediation and grouting action levels by applying the lesser Base Case $DCGL_{PN}$ for each ROC of the two basements and the most limiting Operational $DCGL_B$ of the two basements for each ROC where a penetrations interface.

RAI-6a - Zion*Solutions* Response: Zion*Solutions* would like to clarify the following as stated in the Basis for this RAI, "Specifically, the licensee applied the $BcDCGL_{PN}$ for the containment to all penetrations in the Unit 1 and Unit 2 Containments." In accordance with LTP Chapter 5,

Section 5.2.10 and Section 5.5.5, action levels for penetrations are based on the OpDCGLs for penetrations, not the BcDCGLs, and grouting requirements were based on the OpDCGLs for structures, not the BcDCGLs. While it is true that Zion*Solutions* applied the $BcDCGL_{PN}$ for the Containment to all penetrations in the Unit 1 and Unit 2 Containment penetrations, they were used only to assess dose and not for grouting assessments.

As an explanation of previous process, individual ROC OpDCGLs from different sets of DCGLs were not selected; rather, OpDCGLs were assessed as "sets" of DCGLs, and the "most-limiting" set of $OpDCGL_{PN}$s of the two structures that the penetration interfaces with were applied.

The set of $OpDCGL_{PN}$ for the Containment were more limiting than the Auxiliary Building or Turbine Building using the following as a basis: 1) the measurements that were taken were gross-gamma measurements, and the ROC concentrations were inferred based on the appropriate mixtures presented in LTP Chapter 5, Table 5-2. 2) In both mixtures, Cs-137 is the predominant gamma emitter accounting for 68% or 75% of the inventory depending upon which one was used. The set of $OpDCGL_{PN}$ for the Auxiliary Building were more limiting than the Turbine Building using the following as a basis: 1) the $OpDCGL_{PN}$ for the Auxiliary Building and the $OpDCGL_{PN}$ for the Turbine Building are essentially the same. 2) Consequently, Co-60 became the second predominant gamma emitter.

As requested by this RAI, Zion*Solutions* re-evaluated the dose and grouting requirements using an approach that utilizes the "most-limiting" individual OpDCGLs. The results are provided in Attachment 1 (Tab – Penetrations). The re-evaluation was performed as follows:

- The data was segregated into four sets representing the four basements impacted by penetrations (Unit 1 Containment, Unit 2 Containment, Auxiliary Building and Turbine Building.
- A set of "most-limiting" $OpDCGL_{PN}$ were derived by selecting the lowest value for each ROC from each of the four sets of $OpDCGL_{PN}$ for each basement.

Most Limiting OpDCGLs for Penetrations

ROC	(pCi/m^2)
H-3	2.33E+08
Co-60	6.95E+06
Ni-63	3.93E+09
Sr-90	1.40E+06
Cs-134	2.58E+07
Cs-137	3.85E+07
Eu-152	2.59E+07
Eu-154	1.84E+07

- A set of "most-limiting" $BcDCGL_{PN}$ were derived by selecting the lowest value for each ROC from each of the four sets of $BcDCGL_{PN}$ for each basement.

Most Limiting BcDCGLs for Penetrations

ROC	(pCi/m^2)
H-3	3.23E+09
Co-60	8.82E+07
Ni-63	5.48E+10
Sr-90	1.94E+07
Cs-134	3.28E+08
Cs-137	5.29E+08
Eu-152	3.29E+08
Eu-154	2.33E+08

- A set of "most-limiting" $OpDCGL_B$ were derived by selecting the lowest value for each ROC from each of the four sets of $OpDCGL_B$ for each basement.

Most Limiting OpDCGLs for Structures

ROC	(pCi/m^2)
H-3	1.10E+07
Co-60	5.98E+06
Ni-63	1.85E+08
Sr-90	6.58E+04
Cs-134	1.35E+06
Cs-137	1.79E+06
Eu-152	1.38E+07
Eu-154	1.22E+07

As an illustration of the differences between the two approaches, the following table presents the dose adjustment given to each of the four basements using the approach documented in the Release Record and the approach presented in Attachment 1 (Tab – Penetrations).

Basement	Approach	Mean BcSOF	Dose (mrem/yr)
Unit 1 Containment	Release Record	0.059	1.468
	Attachment 1	0.076	1.888
Unit 2 Containment	Release Record	0.008	0.206
	Attachment 1	0.010	0.260
Auxiliary Building	Release Record	0.069	1.730
	Attachment 1	0.037	0.927
Turbine Building	Release Record	0.069	1.727
	Attachment 1	0.002	0.038

Using the approach documented in the Release Record, less dose was attributed to the two Containments and more dose was assigned to the Auxiliary Building and Turbine Building.

Using the second approach, more dose is assigned to the Containments and less to the Auxiliary Building and Turbine Building. In both scenarios, the most limiting basement structure for the compliance equation remains the Unit 1 Containment.

Zion*Solutions* has consolidated the current three Release Records (Survey Units 01112, 02112, and 05120) into one Release Record that will address all penetrations regardless of location. Accordingly, the BcSOF and dose from the penetrations will be adjusted to the values derived using the proposed approach. Dose will still be applied separately to each of the four groupings of penetrations to derive the total dose fraction for a basement for use in the Compliance Equation (Unit 1 and Unit 2 Containment Buildings, Auxiliary Building and Turbine Building penetrations). The consolidated Release Record will be submitted to the NRC.

RAI-6b Path Forward:

- Indicate whether additional pipes should have been grouted or remediated that were not grouted or removed. If the pipes should have been removed or grouted, estimate the additional dose consequences (e.g., potential dose consequences should the source term exit the penetration into the more limiting of the adjacent basements).

RAI-6b - Zion*Solutions* Response: In Unit 1 Containment, the following additional penetrations would have required grouting when compared to the most-limiting $OpDCGL_B$ from the approach documented in Attachment 1 and outlined in the response to RAI 6a: P003, P050, P067 and P105. However, following FSS, these four penetrations were physically removed in their entirety.

In Unit 2 Containment, the following additional penetrations would have required grouting when compared to the most-limiting $OpDCGL_B$ from the approach documented in Attachment 1 and outlined in the response to RAI 6a: P203, P250 and P254. However, following FSS, these three penetrations were physically removed in their entirety.

In the Auxiliary Building and Turbine Building, no additional penetrations would have required grouting when compared to the most-limiting $OpDCGL_B$ from the approach documented in Attachment 1 and outlined in the response to RAI 6a.

RAI-6c Path Forward:

- Re-evaluate whether any additional elevated areas should be identified in the penetrations that remain by comparing to the lesser of the two Operational $DCGL_{PN}$ for each ROC and incorporate the dose accordingly.

RAI-6c - Zion*Solutions* Response: The only measurements that meet the definition of an elevated area (OpSOF greater than one but BcSOF less than one) are found in two of the five penetrations remaining between Unit 1 Containment and the Auxiliary Building (penetrations P123 and P124). One additional penetration (penetration P020) would have been classified as "elevated" using the new approach; however, that penetration was completely removed. The

dose contributions from penetrations P123 and P124 are included in the consolidated Release Record discussed in the response to RAI 6a.

RAI-6d Path Forward:

- Discuss why the demolition of the Containment buildings, which were performed after the FSS of the Containment penetrations, would not result in cross-contamination of the survey units that were already surveyed.

RAI-6d – Zion*Solutions* Response: Prior to the demolition of the Containment Buildings, the interior voids of both Containment Buildings were backfilled using clean fill that was acquired from off-site sources up to the 588-foot elevation of the Containment Buildings. At the time of Containment Building(s) demolition, all remaining penetrations were covered by 26 to 43 feet of the clean layer of soil.

RAI-6e Path Forward:

- Recalculate the doses using the DCGLs that were committed to being used in the LTP.

RAI-6e - Zion*Solutions* Response: Please see Zion*Solutions* response to RAI 6a.

RAI-6f Path Forward:

- Indicate if the dose will be subtracted for those pipes that were removed from the survey unit, as a dose "credit" for their removal.

RAI-6f - Zion*Solutions* Response: The Release Records for Unit 1 Containment Penetrations (Survey Unit 01112), Unit 2 Containment Penetrations (Survey Unit 02112) and Auxiliary Building Penetrations (Survey Unit 05120) all state the following, "No dose reduction was attributed to the survey unit because of grouting." In addition, Zion*Solutions* does not intend to subtract dose for the penetrations that were subjected to FSS and then removed after completion of the survey.

7. Inconsistent Reporting of Buried Pipe Diameters

RAI-7a Path Forward

- Verify the diameter of pipes surveyed in buried pipe Sections T-103, T-105, and T-106, and revise the Release Record to contain the correction information on pipe sizes, detector field of views, survey area coverage, and results. If necessary, revise the information on this survey unit in the document, "Final Status Survey Final report – Phase 2, Part 2" dated November 2019.

RAI-7a - Zion*Solutions* Response: Zion*Solutions* has reviewed the Release Record for the Condensate Feed Water Supply and Recirculation Buried Pipes (Survey Unit 00101A) and TSD-14-016, Rev. 0, "Description of Embedded Piping Penetrations and Buried Pipe to Remain in Zion End State."

In accordance with Attachment F of TSD 14-016, pipe section T-103 is the Condensate to Alternate Feedwater Pumps pipe. It has a 20-inch pipe diameter and is 226 linear feet in length. Pipe section T-105 is the Condensate Pump Recirculation pipe. It has a 4.5-inch diameter and a length of 221 feet. Pipe section T-106 is the condensate transfer and makeup pipe to the pumps. It has a 12.75-inch diameter and a length of 21 feet.

The Release Record states, "The pipes were cut inside the Turbine Building basement prior to the demolition and basement backfill. As they were not capped or isolated, there was unobstructed groundwater intrusion into each pipe. The T-105 pipe was accessible for survey measurements to be conducted. However, neither the T-103 nor the T-106 sections of this system were available for survey due to groundwater intrusion. Since the T-105 buried pipe was part of the same system, it was determined that measurements taken within the T-105 section of pipe would be representative of radiological conditions within the system interior, including the two (2) pipes obstructed by groundwater intrusion."

All surveys reported in the Release Record were taken in a 20-inch diameter pipe which is designated as pipe section T-103. The designation of the T-105 pipe section as the 20-inch diameter pipe that was surveyed is incorrect. Measurements taken within the T-103 section of pipe were representative of the two pipes (pipe sections T-105 and T-106) obstructed by groundwater intrusion. The Release Record for the Condensate Feed Water Supply and Recirculation Buried Pipes (Survey Unit 00101A) will be revised accordingly.

8. Assignment of Dose from Buried Pipe Surveys

RAI-8a Path Forward:

- Confirm the assigned dose contribution from these survey units, and determine whether survey data was impacted by nearby radiations sources and remain valid.

RAI-8a - Zion*Solutions* Response: Zion*Solutions* has reviewed the Release Records for the Condensate Feed Water Supply and Recirculation Buried Pipes (Survey Unit 00101A) and the Primary Water Supply (Survey Unit 00101B). The FSS of both of these pipes was performed in May of 2017. A concern was raised during the performance of the FSS that the measurement results were higher than expected based on the process knowledge pertaining to these two systems. The higher than expected measurements caused the FSS of the Primary Water Supply system to be performed as a Class 1 buried pipe with one measurement taken for every linear foot of pipe. During the performance of these surveys, it was speculated that the contaminated commodities being removed from the Unit 2 Containment and Auxiliary Building (and stored approximately 800 feet away from the survey location) could inflate the survey results.

The survey results for both FSS were subjected to data assessment, and both survey units passed FSS (the Sign Test was passed and the mean OpSOF was less than one). No background was subtracted from any of these measurements; however, it was noted that due to concerns pertaining to the compliance equation, the difference in ambient background should be assessed

once all radioactive material was removed, particularly if the dose from the Buried Pipe variable was excessive.

In August of 2019, all radioactive material from structure demolition had been removed from the site. Consequently, it was decided that it was time to perform the background study at the previous location where the FSS was performed. It was decided to compare against the data received from the FSS of the Primary Water Supply pipe, therefore the background study was performed using a Ludlum Model 44-157 NaI detector, which was the same detector used for the FSS.

The assessment of the data from the background study showed a definite reduction in background (14,200 dpm/100cm^2 during FSS and 7,650 dpm/100cm^2 during the study). However, as the original data passed FSS, and the dose was acceptable for the compliance equation, the FSS data from the May 2017 surveys was reported as a demonstration of compliance without subtracting background. The discussion pertaining to the background was added to the Release Record; however, the data was not used to demonstrate compliance.

For clarification, Zion*Solutions* will revise the Release Records for the Condensate Feed Water Supply and Recirculation Buried Pipes (Survey Unit 00101A) and the Primary Water Supply (Survey Unit 00101B) and specify that the background data is included as "information only" and was not used to demonstrate compliance for either survey unit.

RAI-8b - Zion*Solutions* Response: Please see response to RAI 8a

9. Errors in Release Records

RAI-9a Path Forward:

- Review future submittals for overall quality and editorial errors.

RAI-9a - Zion*Solutions* Response: Zion*Solutions* has performed additional reviews of all 67 Phase 4 Release Records and the FSSR to address the NRC's concern on quality and the number/types of errors identified during the review of prior submittals. Zion*Solutions* has also initiated a CR to address the number and type of errors (editorial, technical, etc.).

The CR includes the following changes to the Energy*Solutions* FSS process:

1) The LT/FSS Manager and Director of Radiological Site Closure will be the primary authors of Chapter 5 of the LTPs for all future ES projects to ensure the FSS requirements follow standard industry guidance (NUREG-1757, MARSSIM, etc.) and in accordance with NRC guidance/requirements.
2) ES will divide FSSRs into smaller, more concise reports with fewer Release Records for ease of NRC reviews.
3) The Release Record and FSSR review process will be modified to provide more detailed focus on both editorial and technical errors.

10. Elevated Area Measurement Dose Contribution

RAI-10a Path Forward:

- Review survey units where elevated areas were identified. Provide detailed calculations for applying Equation 5-5 or Equation 5-6 from the LTP in applicable survey units.

RAI-10a - Zion*Solutions* Response: At Zion, there were eight (8) structural survey units, one (1) penetration survey unit and one (1) buried pipe survey unit where a measurement result exceeded an OpSOF of one but was less than a BcSOF of one. LTP Chapter 5, Section 5.2.14 states, "For all media except soils, areas of elevated activity are defined in this context as any area identified by measurement/sample (systematic or judgmental) that exceeds the OpDCGL but is less than the BcDCGL. The SOF (when using the OpDCGL) for a systematic or judgmental measurement/sample(s) may exceed one without remediation as long as the survey unit passes the Sign Test and, the mean SOF (when using the OpDCGL) for the survey unit does not exceed one. For all media except soils, if the SOF for a sample/measurement(s) exceeds one when using BcDCGLs, then remediation is required. For soils, the EMC as described in Section 5.10.4 of this Chapter will apply."

The EMC was not applied to any of the 116 open land survey units at Zion. In the ten (10) structural and pipe survey units cited above, the Sign Test was passed and the mean OpSOF was less than one. Subsequently, LTP Chapter 5, Section 5.5.4 for structures and Section 5.5.5 for pipe and penetrations state, "Once the survey data set passes the Sign Test (using the OpDCGL), the mean radionuclide activity (pCi/m^2) for each ROC from systematic measurements along with any identified elevated areas identified by systematic or judgmental measurements will be used with the BcDCGLs to perform a SOF calculation for the embedded pipe or penetration FSS unit in the basement accordance with the following equation. The dose from residual radioactivity assigned to the FSS unit is the SOF multiplied by 25 mrem/yr." The equation applicable to structures is LTP Chapter 5, Equation 5-5 and the equation applicable to pipes and penetrations is LTP Chapter 5, Equation 5-6.

As requested, Zion*Solutions* has provided the variables and equations used for the adjustment of the mean dose fraction to account for the additional dose to the mean due to "elevated measurements" in all ten survey units where it was encountered. Please refer to Attachment 1 (Tab – Elev. Measurement Dose Calc) for the results.

RAI-10b Path Forward:

- Provide updated dose assignments when appropriate.

RAI-10b - Zion*Solutions* Response: The results for the elevated dose fractions that were reported in the Release Records are provided next to the recalculated dose fractions in Attachment 1 (Tab – Elev. Measurement Dose Calc).

This document serves as preflight report for Enclosure 1 to the letter ZS-2020-0028. The following files do not pass pre-flight criteria or do not meet NRC criteria, but text is word searchable with clarity/legibility of high quality.

File Name	Preflight Status	Reason
Enclosure 1 Formal RAI Responses Final	Passed	
Attachment 1 Supporting information	N/A	Excel file. No preflight.
Attachment 2 Eberline Reports	Error / Failed	Document contains logos, color maps signatures, and scanned pages < 300 ppi, clear and legible
Attachment 3 Eberline Correspondence	Error / Failed	Document contains logos, color maps signatures, and scanned pages < 300 ppi, clear and legible