

August 25, 2023

ZS-2023-017

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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 Summary of May 4, 2023, Clarification Meeting Regarding the Partial Site Release Request for the Zion Nuclear Power Station, Units 1 and 2

References:

1. Amy M. Snyder, U.S. Nuclear Regulatory Commission, Letter to Shaun Anderson, Chief, Reactor Decommissioning, "Summary of May 4, 2023, Clarification Meeting with ZionSolutions, LLC Regarding the Partial Site Release Request for the Zion Nuclear Power Station, Units 1 and 2," dated June 20, 2023 (ML23167A069)
2. Gerard van Noordennen, ZionSolutions, LLC, Letter to U.S. Nuclear Regulatory Commission, "Zion Nuclear Power Station Request for Partial Site Release," dated June 5, 2020 (ML20164A096)
3. Marlayna V. Doell, U.S. Nuclear Regulatory Commission, Letter to John Sauger, ZionSolutions, LLC, "Zion Nuclear Power Station Units 1 and 2 - Request for Additional Information Related to Partial Site Release and Recent Site Survey Activities," dated August 19, 2021 (ML21231A187)

The U.S. Nuclear Regulatory Commission (NRC) held a clarification meeting with ZionSolutions, LLC (ZS), on May 4, 2023 (Reference 1). The purpose of the meeting was to discuss certain aspects of multiple submittals that were associated with ZS' request for partial site release (Reference 2). Reference 1 provides the submittals of interest, a summary of discussions held during the clarification meeting, and a request that ZS provide supplementary information that would be useful in developing confirmatory surveys and the safety evaluation report.

The purpose of this letter is to docket information discussed during the May 4, 2023, clarification meeting, as outlined in the summary. The attachment to this letter provides the NRC staff's requests and the ZS response for each.

The NRC had previously submitted a request for additional information (RAI), which included RAI-1g (Reference 3). ZS' responses to RAI-1g were also discussed during the clarification meeting. RAI-1g is related to the ongoing evaluation of recently performed confirmatory surveys and an updated response will be provided later, if needed.

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This letter contains no regulatory commitments. If you should have any questions regarding this submittal, please email Justin Wheat at jtwheat@energysolutions.com.

Respectfully,

Amy C. Hazelhoff

Senior Vice President, Regulatory Affairs

Attachment – Supplemental Information

cc: w/Attachment

NRC Inspector and Health Physicist – Zion Nuclear Power Station, Units 1 and 2

NRC Senior Project Manager – Zion Nuclear Power Station, Units 1 and 2

Manager, Nuclear Facility Inspection – Illinois Emergency Management Agency

Senior Health Physicist – Illinois Emergency Management Agency

Manager – Lake County Emergency Management Agency

Zion Nuclear Power Station – Units 1 and 2

Attachment to ZS-2023-017

Supplemental Information

Request 1

Provide a consolidated description of which survey units were surveyed using the DRP DQOs [discrete radioactive particle data quality objectives]. At a minimum, please clarify which survey units in the power block, haul path, and loadout areas were surveyed using DRP DQOs. As part of this description, indicate the survey methodology used (e.g., hand scanning vs towed array). Also, please indicate approximately what fraction of the survey unit was surveyed using the given survey technique.

ZionSolutions (ZS) Response to Request 1

DRP DQOs were utilized in every survey that has been performed since the creation of ZS-LT-07, “Survey Plan for the Identification and Remediation of Discrete Radioactive Particles” (the DRP Survey Plan) in 2021.

The surveys conducted using the DQOs described in the DRP Survey Plan fall into two categories:

1. The first round conducted during initial implementation of the DRP Survey Plan, which included 36 survey units, and
2. An additional five survey units that were added following modification of the selection criteria used to select survey units. The additional survey unit selection criterion is as follows: “DRPs were previously identified and the [survey unit] was not surveyed by ORISE specifically for DRPs or surveyed using the DRP DQOs.”

In addition, final status surveys (FSSs) that were conducted subsequent to the issuance of the DRP Survey Plan applied the DRP DQOs. These FSSs were conducted on areas of the site that had to be resurveyed because of new remediation activities.

Finally, routine surveillances that were conducted after the issuance of the DRP Survey Plan were augmented to implement the DRP DQOs. ZS refers to these surveillances as Special Surveillances.

DRP Survey Plan Implementation

The following survey units were surveyed with DRP DQOs during implementation of the DRP Survey Plan, Revision 1:

12110 ^{a,b}	10204C ^c	10206E ^c	10214A	12201A ^{a,b,c}	12202E ^{a,c}
12111 ^{a,b}	10204D ^c	10207E ^c	10214B	12201B ^{a,b}	12202F ^{a,c}
12112 ^c	10206A ^b	10208D ^c	10214C ^{b,c}	12202A ^{a,c}	12203A ^c
12113 ^c	10206B ^b	10209E	10214D	12202B ^{a,c}	12203B ^c
10203A ^{a,b}	10206C ^{b,c}	10212A	10220I	12202C ^{a,c}	12203C ^c
10204B ^c	10206D ^c	10213A	12109 ^a	12202D ^a	12203D ^c

Note a: Power Block

Note b: Loadout Area

Note c: Haul Path for Containment Exterior Concrete

After implementation of Revision 1 of the DRP Survey Plan, ZS added an additional criterion for selection of survey units for inclusion into the DRP Survey Plan. Consequently, the DRP Survey Plan was revised (Revision 2) to include five additional survey units that met the new criterion.

The following survey units were surveyed with DRP DQOs during implementation of the DRP Survey Plan, Revision 2:

10202B 10207A 10220A 10220G 12204A

ZS utilized the following DRP DQOs for scanning of the survey units listed above for DRP Survey Plan implementation:

- ZS scanned 100% of the accessible surface area with the towed array. Approximately 80% of the surface area of the 41 survey units was accessible for towed array survey.
- ZS scanned areas inaccessible to the towed array via hand-held 2"x2" sodium iodide (NaI) detectors at a rate of 0.25 m/sec. Approximately 20% of the surface area of the 41 survey units was hand-scanned due to inaccessibility with the towed array.
- The towed array was used as a screening mechanism to identify areas of elevated activity that were then scanned for DRPs. Areas flagged for investigation by the towed array were scanned via hand-held 2"x2" NaI detectors at a rate of 0.25 m/sec. These investigation areas were 20-ft diameter circles. Only a small portion of the 41 survey units (approximately 2%) were flagged as elevated activity and then hand-scanned for investigative purposes.

ZS remediated two DRPs during DRP Survey Plan implementation. One DRP was detected during the hand scanning of an inaccessible area. The second DRP was initially flagged by the towed array, then isolated via hand scan of the investigation area.

FSS

The following survey units were surveyed with DRP DQOs during implementation of FSS:

10201C 12201C^b 12103 12203C^{a,c}
10201D 12201D 12205A^{b,c} 12203D^{a,c}
10202C 12201E 12203A^{a,c} 12112^{a,c}
10202D 12102 12203B^{a,c} 12113^{a,c}

Note a: Survey Unit also surveyed under DRP Survey Plan

Note b: Power Block

Note c: Haul Path for Containment Exterior Concrete

ZS utilized the following DRP DQOs for scanning of the 16 survey units listed above for FSS implementation:

- ZS scanned 100% of the surface area in the survey units via hand-held 2"x2" NaI detectors at a rate of 0.25 m/sec.

ZS remediated seven particles during the FSS of the 16 survey units listed above.

Special Surveillances

During the audit conducted by NRC staff, two areas were identified to be of concern and warranted additional investigation for DRPs: the rest of the Power Block survey units where DRPs had previously been identified and the “South Array” survey units where a DRP release occurred in 2014. Based on this, ZS expanded the scope of the routine surveillances for these survey units and scanned 100% of them with DRP DQOs. These surveillances were labeled “Special Surveillances” as they went beyond the scope of a routine surveillance, which would typically include visual inspections and scanning as necessary.

The following survey units were surveyed with DRP DQOs during implementation of Special Surveillances:

12104^a 12106^a 12108^a 10221B^b
12105^a 12107^a 10221A^b 10221C^b

Note a: Power Block area of concern

Note b: “South Array” area of concern

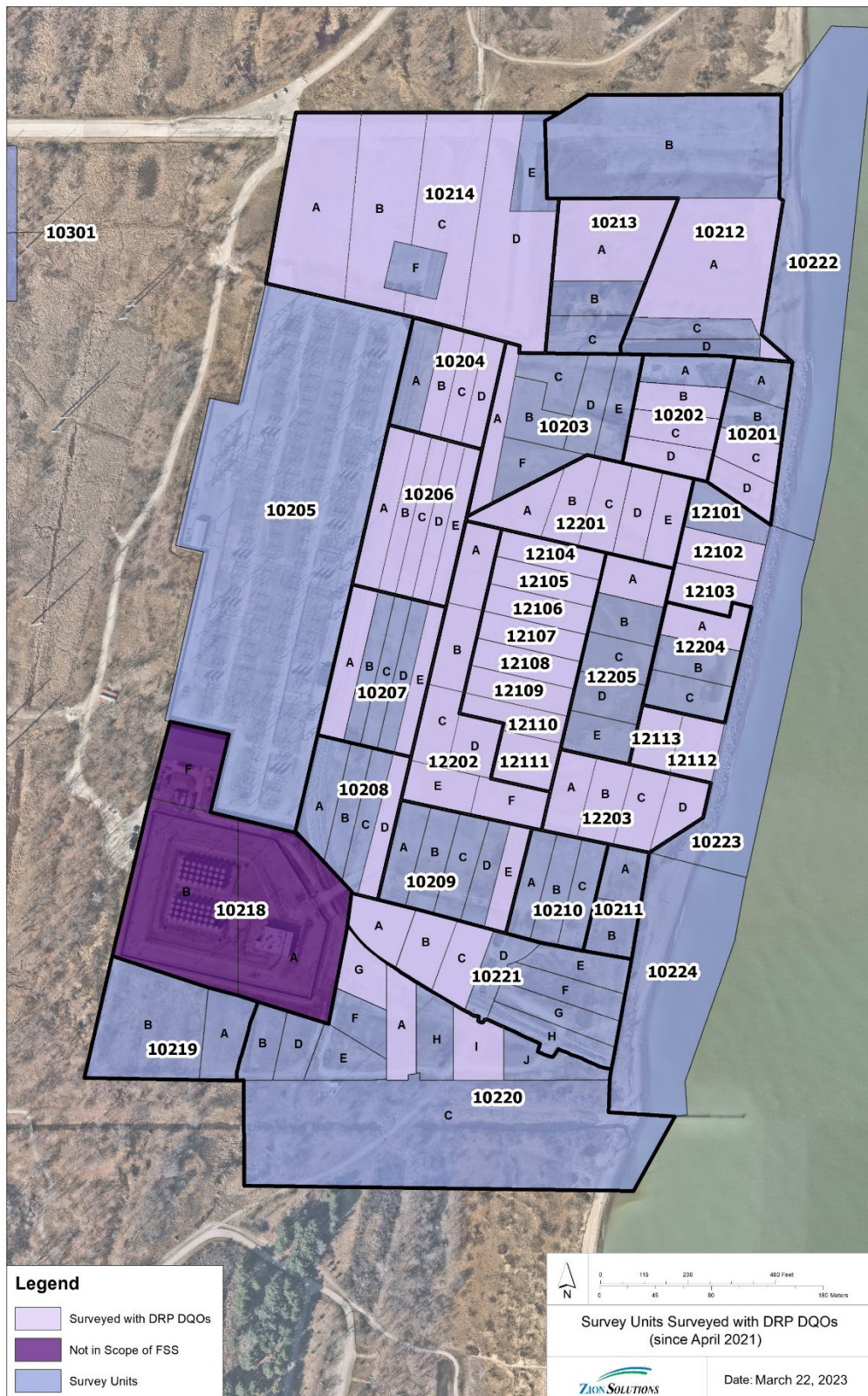
ZS utilized the following DRP DQOs for scanning of the eight survey units listed above for Special Surveillance implementation:

- ZS scanned 100% of the surface area in the survey units via hand-held 2”x2” NaI detectors at a rate of 0.25 m/sec.

No DRPs were identified during these Special Surveillances.

Figure 1 provides a visual depiction of the survey units that were surveyed with DRP DQOs. (Although there are 65 survey units listed above, there are only 59 shown on Figure 1 because some of the survey units fall into more than one of the categories described above.)

Figure 1 – Survey Units Surveyed with DRP DQOs



Request 2

Provide a description of how and where additional soil cover was placed at the site.

- a) Which areas of the site was additional soil cover placed on?*
- b) Were the areas surveyed prior to placement of the cover? If so, please provide a description of the survey type. Also, please summarize the results of the surveys.*
- c) Clarify what is meant by 'cover' and confirm that the 3-ft cover was placed in compliance with the LTP [license termination plan].*
- d) Did the soil used for the 3-ft cover clean originate from off-site? Please identify which parts of the site were covered with clean soil from off-site.*
- e) Identify any areas that were covered with less than 3 ft of cover.*
- f) Describe the surveys performed prior to placing backfill material in excavations and the source of the material.*

ZS Response to Request 2

- a) The areas where 3 ft of clean soil cover was required per the LTP are the end-state basements. Figure 2 shows the end-state basements that received the 3 ft of clean soil cover.
- b) The surveys that were performed prior to backfill and covering of the basements were the FSSs of the below-ground structural surfaces, embedded pipe, and penetrations. After completion of FSS in each basement, personnel from the Oak Ridge Institute for Science and Education (ORISE) performed an independent verification survey prior to backfill.

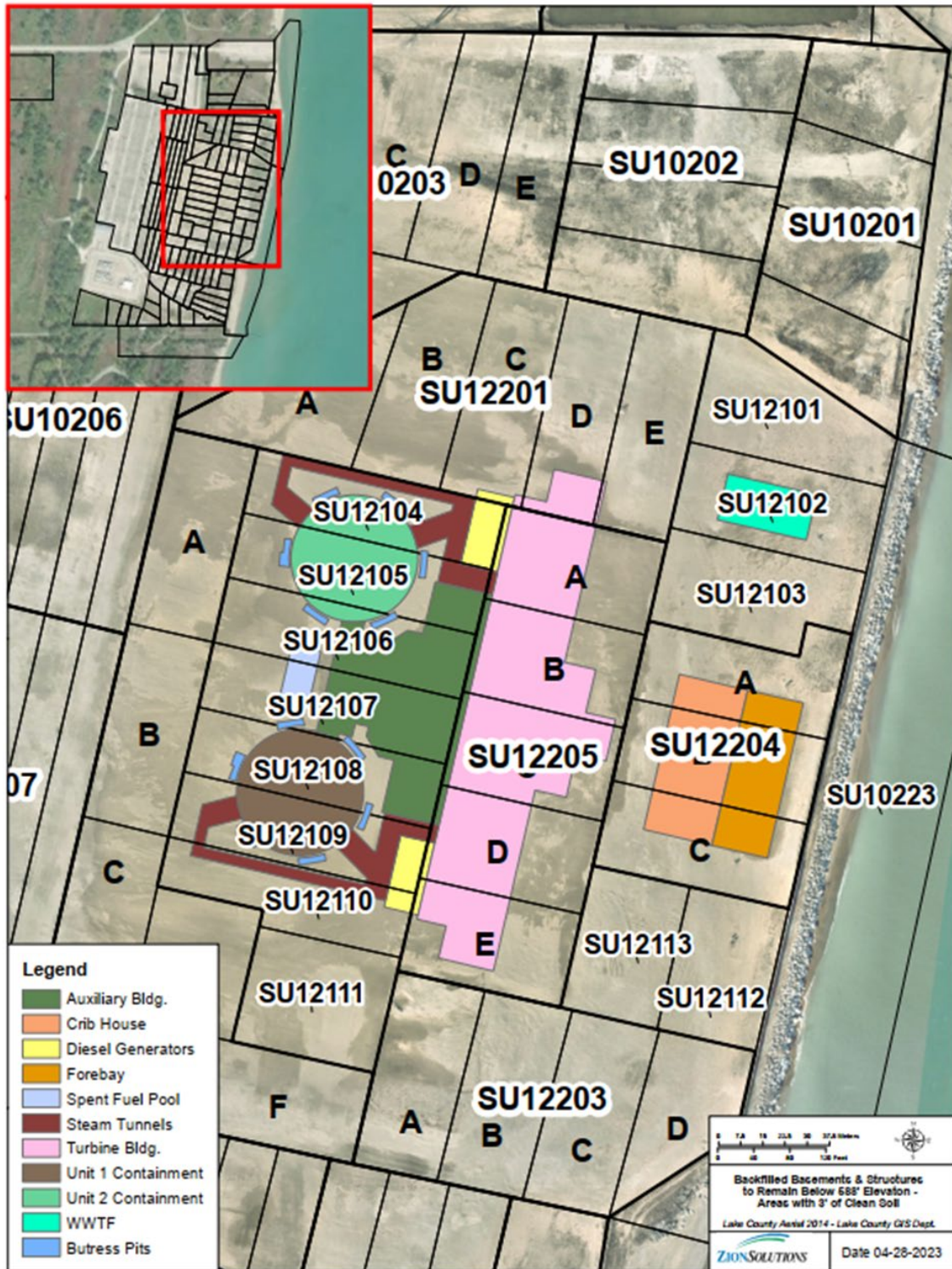
The results of these surveys can best be summarized as confirming that any activity present was less than that allowable for compliance with the LTP. This conclusion was confirmed by ORISE personnel. Quantitative survey data to support this conclusion are contained in FSS and ORISE reports.

- c) Section 6.5.4 of the LTP states, "The BFM [Basement Fill Model] applies to the backfilled Basements which will have a minimum of 3 feet cover" This requirement is a factor of the dose exposure pathway and applies only to the areas of the site where basements remain at end-state. ZS has complied with this LTP requirement.

ZS distinguishes the LTP-required 3 ft clean soil "cover" from other backfill activities, such as filling excavations after radiological assessments (RAs) or covering foundations to comply with the Asset Sale Agreement (ASA), because there are no BFM dose implications from these other activities.

- d) The soil used for the 3 ft of clean soil cover over basements was imported from an off-site source. Figure 2 shows the end-state basements that received the 3 ft of clean soil cover.

Figure 2 – Basement Structures with 3 ft of Clean Soil Cover



- e) There are no areas that were covered with less than 3 ft of “cover,” in the context of the BFM in the LTP, which applies to the top layer (i.e., clean soil imported from off-site) of end-state basements, as described in Section 6.5.4 of the LTP.

However, less than 3 ft of clean soil from off-site was added to two areas, the Interim Radwaste Storage Facility (IRSF) and Technical Support Center (TSC) footprints, to ensure that buried structures, systems, and components (SSCs) were at a minimum of 3 ft below grade in accordance with the ASA. The foundation of the IRSF and a duct bank associated with the TSC were discovered to be less than 3 ft below grade during a ground penetrating radar survey. Rather than exhuming the SSCs, ZS added fill to the areas to ensure the buried SSCs were a minimum of 3 ft below grade to comply the ASA.

- f) RAs were performed in all excavations prior to backfilling. The overburden soil from excavations was reused to fill the excavation from where it came. If the void space could not be successfully filled with the amount of soil that came out of it (e.g., in instances where the removed item was of significant volume compared to the void space), the excavation was filled with clean soil from off-site.

The following is a description of the RA process for excavations from Section 5.7.1.7 of the LTP:

The footprint of the excavation, and areas adjacent to the excavation where the soil will be staged, will be scanned prior to the excavation. In addition, periodic scans will be performed on the soil as it is excavated, and the exposed surfaces of the excavated soil will be scanned after it is piled next to the excavation for reuse. Scanning will be performed in accordance with section 5.7.1.5.1 [based on classification]. A soil sample will be acquired at any scan location that indicates activity in excess of 50% of the soil Operational DCGL. Any soil confirmed as containing residual radioactivity at concentrations exceeding 50% of the soil Operational DCGL will not be used to backfill the excavation and will be disposed of as waste.

The majority of excavations that occurred on the site were to remove clean building slabs and buried piping. For the buried piping removal RAs, the results of the RAs were provided to NRC Region III who, after review, provided concurrence that the excavations were suitable for backfilling.

Request 3

What is ZS' position regarding whether there are DRPs remaining at the site? Additionally, if ZS intends to leave DRPs behind, please clarify if there is an upper bound for dose expected from DRPs remaining onsite.

ZS Response to Request 3

ZS does not intend to leave DRPs behind at the site, and there are no known DRPs remaining at the site.

ZS has conducted surveys of the site to detect and remediate DRPs. This includes efforts that were focused on DRPs during active decommissioning and following the completion of demolition during efforts to terminate the license. There were specific events during active decommissioning that were recognized by ZS as having the potential for releasing DRPs. The areas around where these events occurred were surveyed for DRPs, which when found, were remediated. Each of these events is described in more detail below.

The surveys focused on the detection and remediation of DRPs to provide reasonable assurance that there are no known DRPs at the site because they were designed specifically for that purpose.

Request 4

It is the staff's understanding that ZS conducted surveys specifically for the purpose of detecting and remediating DRPs prior to the April 2021 Oak Ridge Institute for Science and Education inspection survey. Please describe the nature, rationale, methods, and results for those surveys.

ZS Response to Request 4

ZS conducted three large-scale surveys to specifically detect and remediate DRPs prior to the 2021 ORISE inspection survey. This goes beyond the requirements of the LTP as well as the guidance in NUREG-1757 and NUREG-1575 because DRP detection and remediation is not addressed in those documents.

2014

Particles in the form of shavings from Reactor Vessel Internals (RVI) segmentation were likely introduced into the soil via the transportation of the 8-120 liners loaded with RVI segments. The original incident in 2014 started when an 8-120 liner was transported from the south array storage area to the parking area to the north of the old NGET building. It is believed that the contents of the liner dried out. When Radiation Protection was surveying the vehicle for exit of the site, elevated readings were encountered and a DRP was captured. At this time, the exit to the site was closed for all vehicles and personnel, and FSS personnel were brought in, along with 2"x2" NaI detectors, to help locate and capture other potential DRPs from this event. These scan surveys covered the south-north travel route and extended east-west as necessary to ensure that particles were captured (survey units 10221A, 10221B, 10221C, 10202, 10208, 10206, 10204, and 10203). Personnel exiting the site had to perform a hand and foot frisk prior to entering the portal monitors. These mitigating measures that were immediately implemented after the event limited the spread of contamination to other areas of the site.

This incident and the subsequent cleanup effort is described in condition report (CR) CR-2014-001074.

Approximately 120 DRPs were remediated during the 2014 survey.

2015

Particles in the form of fuel fragments or metal, entered the soil due to a lack of negative pressure during the movement of potentially contaminated equipment and large components

through the equipment hatches of each Containment Building prior to the erection of the waste loadout tents. Surveys and DRP remediation efforts were conducted in survey units 12201A, 12201B, 12201C, 12202A, 12202B, 12202C, 12202D, 12202F, 12109, and 12111.

This incident and the subsequent cleanup effort is described in CR-2015-000324.

Approximately 100 DRPs were remediated during the 2015 survey.

2019

An RA was performed in the Power Block area from April 18, 2019, to May 28, 2019. The purpose of the RA was to assess the areas affected by the removal of the sacrificial layer for DRPs. 100% of survey units 10203A, 10203F, 12104, 12105, 12106, 12107, 12108, 12109, 12110, 12111, 12201A, 12201B, 12201C, 12202A, 12202B, 12202C, 12202D, 12202E, and 12202F were scanned for DRPs.

The incident prompting the Power Block RA is described in CR-2019-0046.

ZS remediated six DRPs during the Power Block RA.

Request 5

Provide the latest version of ZS' response to RAI-1g. The RAI requested: "Given the observations in the survey units listed above, as well as any additional observations resulting from ongoing licensee activities under the Final Status Survey Due Diligence Plan, provide an explanation for why the licensee surveys are adequate."

ZS Response to Request 5

RAI-1g is related to the ongoing evaluation of recently performed confirmatory surveys and an updated response will be provided later, if needed.

Request 6

To what depth did ZS conduct DRP surveys?

ZS Response to Request 6

ZS collected samples to a depth of 1 ft during implementation of the DRP Survey Plan. This depth provided reasonable assurance as the majority of DRPs have been identified within the surface soil layer (0" – 6" depth).

Request 7

Provide any additional survey data that ZS would like the NRC to consider (e.g., the hand scanning of the power block).

ZS Response to Request 7

ZS has conducted additional surveys that can be considered by NRC, which are the Special Surveillances described in the response to Request 1 above.