
SAFETY EVALUATION REPORT

Source Materials License

No. SUA-1605

DISA Technologies, Inc.

Multi-Site Service Provider License

Abandoned Uranium Mine Waste

Remediation

Docket No. 040-38417



Office of Nuclear Material Safety and Safeguards

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Summary of the Staff's Findings

The U.S. Nuclear Regulatory Commission (NRC) staff concludes that the issuance of a multi-site service provider license to DISA Technologies, Inc. (DISA) to perform high-pressure slurry ablation (HPSA) remediation at abandoned uranium mine (AUM) waste sites is in accordance with the standards and requirements of the Atomic Energy Act of 1954, as amended (AEA), as well as NRC regulations. Based on the evaluation in this safety evaluation report (SER), the NRC staff finds that the issuance of this license will not be inimical to the common defense and security or to the health and safety of the public.

On the basis of the generic environmental assessment (EA), the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

1.0 Introduction

In a letter dated March 28, 2025, DISA submitted an application to the NRC for a performance-based, multi-site source materials license to use its HPSA technology to remediate AUM waste (DISA, 2025a). DISA is seeking to license the HPSA technology and the source material that will be extracted as part of HPSA remediation activities.

Using the HPSA technology, AUM waste is crushed and mixed with water to create a slurry. The slurry is then pumped through opposing nozzles into a high energy impact zone, where the mineral rich patina containing source material is separated from the host sand. The HPSA process results in the generation of two types of material: (1) "fines concentrates" containing licensable quantities of source material that will be packaged and sent offsite either for disposal or further processing, and (2) "coarse material" that DISA intends to return to the environment. DISA also plans to treat the process water used to generate the slurry before returning it to the environment. DISA expects the HPSA process could achieve a reduction in the uranium (U) and radium (Ra)-226 concentrations in AUM waste between 60 and 90 percent.

In a letter dated April 11, 2025 (NRC, 2025a), the NRC staff informed DISA that they completed their acceptance review of the license application and found that it contained sufficient information for the staff to begin their detailed technical review. On May 12, 2025, a notice of an opportunity to request a hearing and to petition for leave to intervene on this licensing proceeding was published in the *Federal Register* (90 FR 20193, NRC, 2025b). No petitions were filed.

DISA also submitted an environmental report (DISA, 2025a) with its application package. The NRC staff prepared a generic EA in parallel to this SER to address potential environmental impacts of the proposed licensing action in accordance with 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions." The draft generic EA was published for a 30-day public comment period on August 8, 2025 (90 FR 38514, NRC, 2025h). The final generic EA (NRC, 2025i) determined there would be no significant impact from the proposed licensing action if certain assumptions about HPSA operations and site conditions are met at each site. Accordingly, the NRC determined not to prepare an environmental impact statement for the proposed action and issued a generic Finding of No Significant Impact (FONSI) on September 29, 2025 (NRC, 2025j).

In a letter dated June 2, 2025, the NRC staff requested additional information (RAI) on the license application from DISA (NRC, 2025c). DISA responded to this request by letter June 16, 2025 (DISA, 2025b). The NRC determined DISA's June 16, 2025, RAI response did not include enough detail for staff to make the safety decisions required to complete the application review. Therefore, the staff conducted a regulatory audit of the RAI responses in accordance with the audit plan issued in letter dated July 8, 2025 (NRC, 2025d). To finalize audit information, DISA submitted a supplement to their March 2025 license application on July 31, August 4, and August 8, 2025 (DISA, 2025c; 2025d) documenting additional information and commitments made during the audit.

Prior to receiving DISA's March 2025 application, the NRC staff conducted a pre-submittal audit of a preliminary version of DISA's application (NRC, 2025f). DISA revised its preliminary application with the results of the NRC staff's audit report (NRC, 2025g) prior to submitting the March 2025 version. This SER summarizes the NRC staff's review of DISA's March 2025 license application, RAI responses, and the application supplement.

2.0 Regulatory Framework and Guidance

DISA submitted an application to use HPSA technology to remediate AUM waste sites in August 2022 (DISA, 2022). The NRC evaluated the submittal using the definition of "ore" contained in Regulatory Issue Summary (RIS) 2000-23, "Recent Changes to Uranium Recovery Policy" (NRC, 2000), which defines ore as the following:

Ore is a natural or native matter that may be mined and treated for the extraction of any of its constituents or any other matter from which source material is extracted in a licensed uranium or thorium mill.

The NRC staff determined that the AUM waste treated by the HPSA process generally meets the definition of ore in NRC guidance, and that therefore, the production of waste from the source material extraction was byproduct material — the generation of which meets the definition of uranium milling (10 CFR 40.4). As such, the NRC informed DISA that the HPSA process is a form of uranium milling and that the regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40, "Domestic Licensing of Source Material" and Appendix A, "Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the Extraction or Concentration of Source Material from Ores Processed Primarily for Their Source Material Content" provided the appropriate framework for licensing DISA's HPSA technology (NRC, 2022a).

In February 2023, the Commission issued Staff Requirements Memorandum (SRM) 23-0126, "Staff Requirements – Strategic Programmatic Overview of the Decommissioning and Low-Level Waste and Nuclear Materials Users Business Lines" (NRC, 2023a) directing the NRC staff to "provide a notation vote paper to the Commission evaluating the advantages and disadvantages of different options for the licensing of emerging technologies used for remediation of mine waste." The NRC staff developed SECY-23-0055, "Options for Licensing Emerging Technologies Used for Remediation of Mine Waste" (NRC, 2023b), which provided an overview of four different options for licensing emerging technologies used to remediate AUM waste.

On September 25, 2024, the Commission issued SRM-SECY-23-0055 stating "The Commission has approved Option 2B, which would license emerging technologies used for mine waste

remediation under the source material framework in 10 CFR Part 40, via a service provider license” (NRC, 2024). Notably, the Commission directed the NRC staff to perform the license review of AUM waste remediation using the source material rather than the uranium milling framework. The SRM continues “The staff should use license conditions in service provider licenses for emerging technologies to remediate abandoned mine waste, as appropriate” to bridge any gaps between the source material/service provider framework and the uranium milling framework to ensure safety.

As a result of the HPSA process, the extracted “fines concentrates” will contain uranium and thorium (Th) in quantities that meet the source material definition in 10 CFR 40.4 (i.e., containing by weight 0.05% or more of: (i) uranium, (ii) thorium or (iii) any combination thereof). As described in the application, DISA anticipates shipping the fines concentrates to a licensed low-level waste disposal facility or to a uranium mill for further processing. The coarse material stream is not considered byproduct material and may be left onsite, provided that the license termination criteria in 10 CFR Part 20, Subpart E have been met.

The AEA authorizes the NRC to issue licenses for the possession and use of source material. The primary subparts of the regulations the NRC staff used in reviewing the license application include, but are not limited to:

- 10 CFR 20.1402 states a site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent (TEDE) to an average member of the critical group that does not exceed 25 millirem (mrem) (0.25 millisieverts) per year (yr).
- 10 CFR 20.1501(a) states that each licensee shall make, or cause to be made, surveys of areas, including the subsurface, that are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels, concentrations or quantities of residual radioactivity, and the potential radiological hazards.
- 10 CFR 20.1301 specifies dose limits for members of the public and 10 CFR 20.1302(b) references Part 20, Appendix B, Table 2 for allowable concentrations of radionuclides in effluents.
- 10 CFR 20.1101(a)-(c) specifies development and implementation of a radiation protection program commensurate with the scope and extent of licensed activities; engineering controls to minimize occupational doses and doses to members of the public; and periodic (at least annually) review of the radiation protection program content and implementation.
- 10 CFR Part 40.32(b) requires that licensees are qualified by training and experience to use the source material for the purpose listed in the license in a manner that protects health and minimizes danger to life or property.
- 10 CFR 40.32(c) requires that the licensee’s equipment, facilities and procedures are adequate to protect and minimize danger to life or property.
- 10 CFR 40.32(d) requires that the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.
- 10 CFR 20.1406(c) requires that licensees shall, to the extent practical, conduct

operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection requirements in Subpart B and radiological criteria for license termination in Subpart E of 10 CFR Part 20.

The guidance documents used to perform the safety review of DISA's application include the relevant portions of the following:

- NUREG-1556, Volume 18, Revision 1, "Consolidated Guidance About Materials Licenses: Program-Specific Guidance About Service Provider Licenses, Final Report" (NRC, 2017)
- NUREG-1556, Volume 12, Revision 1, "Consolidated Guidance About Materials Licenses – Program Specific Guidance About Possession Licenses for Manufacturing and Distribution" (NRC, 2018)
- NUREG-1757, "Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees," Vol. 1, Rev. 2 (NRC, 2006)
- NUREG-1757, "Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria," Vol. 2, Rev. 2 (NRC, 2022b)

3.0 Project Description

HPSA uses mechanical and kinetic energy to separate a mineral-rich patina, containing source material (uranium and thorium) from host sand grains. DISA is seeking to license the HPSA technology and the resulting source material for use in site remediation and to reduce the volume and radiological toxicity characteristics of AUM waste.

DISA proposed to use its HPSA technology in the form of mobile units as a multi-site service provider to treat AUM waste at AUM sites. The length of time DISA would operate at each site depends on the amount of material to be processed and could range from about 6 months for small sites to almost 13 years for large sites. DISA stated it could perform remediation at up to 5 different sites simultaneously.

DISA intends to use HPSA technology on AUM waste sites on private, state, Federal public lands, and Federal Indian Reservations. DISA would not use HPSA at an active uranium mine or licensed uranium mill unless authorized under a separate license.

An AUM site is defined per SRM-SECY-23-0055:

a site where the applicant or licensee verifies and informs the NRC that the site is abandoned, that there was documented production of uranium, and that the site is no longer in use for that purpose

AUM waste is defined by NRC staff as:

waste rock material containing uranium or thorium that is remediated or treated onsite and presents a radiological hazard to public health and safety and the environment

AUM waste may occur in a variety of settings including, but not limited to:

- at the site of the mine from which it was extracted
- on Federal land adjacent to or near the mine from which it was extracted
- on Federal lands adjacent to or near the mine from which it was extracted that are claimed by mining companies
- on private lands

DISA will describe the location and origin of the AUM waste in the pre-mobilization notification (PMN) (see Section 3.1.1).

The HPSA process results in the generation of three main process streams:

1. “fines concentrates” containing by weight 0.05% or more of: (i) uranium, (ii) thorium or (iii) any combination thereof that will be packaged and sent offsite for either disposal at a low-level waste disposal facility or for further processing at a uranium recovery facility
2. “coarse material” that DISA intends to leave onsite after stabilizing, regrading, and reseeded
3. “process water” that is used to generate the slurry in the HPSA process that will be sampled, treated, and discharged by land application onto the coarse material

DISA stated that the coarse material would be sand and would be reintegrated into the remediation sites, assuming the material meets NRC and other regulatory requirements for unrestricted release. DISA plans to transport the fines concentrates to a licensed recipient such as a low-level radioactive waste disposal facility, a uranium recovery facility, or a storage facility. After HPSA operations are concluded, DISA intends to demobilize and leave the site, including the deposited coarse material and process water, in a condition that meets NRC requirements for unrestricted release.

3.1 Site Selection and Notifications

The U.S. Environmental Protection Agency (EPA) has identified approximately 15,000 AUM waste sites, which are primarily located in 14 western states, namely Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, North Dakota, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming. DISA has not yet identified specific sites for HPSA operation in its application or associated submittals. Before mobilizing to any site, DISA proposed to notify NRC with site-specific information through a PMN. Once remediation is complete at each site, DISA will notify the NRC of the completion through a demobilization notification (DMN). This practice is consistent with the direction in SRM-SECY-23-0055, “[t]he staff should incorporate a requirement for the licensee to notify the NRC of the commencement of remediation activities prior to installing equipment and beginning operations at an AUM temporary job site and after remediation is complete.” DISA intends to survey and characterize each site prior to submitting the PMN (see Section 4.1) and stabilize the coarse material at the site prior to demobilizing (see Section 5.1).

3.1.1 Pre-mobilization Notification

DISA stated it would submit the PMN for each site to NRC no less than 90 days prior to mobilizing to any new worksite. The items the PMN must include are presented in license

condition 19 provided in Section 10.0 of this SER. The NRC must approve the PMN prior to the licensee installing equipment and beginning operations at an AUM waste site.

Also, during this 90-day period, the NRC staff will compare the site-specific information in the PMN to the assumptions detailed in the generic EA. If HPSA operations at a site are consistent with the generic EA, the generic finding of no significant impact (FONSI) would apply for that site. If necessary, the NRC staff will conduct a limited-scope, site-specific environmental review to identify the specific impacts for environmental areas that are not bounded by the assumptions in the generic EA. In all cases, the NRC or its designee will conduct site-specific reviews and consultations under Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act and will assess the site-specific impacts of depositing the coarse material generated after HPSA remediation onto the site. This site-specific analysis could result in a FONSI or a determination that an environmental impact statement should be prepared.

The NRC staff plans to complete its safety and environmental review of each PMN within the 90-day pre-mobilization period and will issue a determination that will be placed on the publicly available docket, as to whether DISA may proceed with site remediation.

3.1.2 Demobilization Notification

DISA stated it would submit a DMN for each site to NRC within 30 days after completing remediation at each worksite. The items the DMN must include are presented in license condition 19 provided in Section 10.0 of this SER. If the NRC finds that the DMN is not acceptable, the licensee shall submit within 30 days after that determination a plan for resolving outstanding issues, including the timeframe for resolution.

DISA must meet the 25 mrem/year dose limit in 10 CFR 20.1402 for the site and the 0.05 weight % source material exemption limit in 10 CFR 40.13(a). DISA will determine compliance with the release criteria using either concentration data (for the exemption limit), concentration-based screening criteria, or dose modeling (see Section 8.2.1).

3.2 Performance-Based Safety and Environmental Review Panel

DISA indicated in Section 5.6 of the application, that it is seeking a performance-based license and proposed to establish a Safety and Environmental Review Panel (SERP) to oversee changes, tests, and experiments to be performed under DISA's license. The SERP will include a chief operations officer, a chief executive manager, and the radiation safety officer (RSO), and others experienced in specific technical issues such as health physics. DISA provided NRC with SOP-17, which describes the manner in which the SERP will operate (DISA, 2025d).

DISA's SERP will review the analytical data collected and dose assessments performed for each site undergoing HPSA remediation. The SERP will evaluate proposed changes to operations and will record the decision of whether the change requires a license amendment. The SERP records will include written health and safety evaluations and provide the basis for determining whether changes, tests, or experiments were implemented.

Based upon DISA's explanation of the role of the SERP, the NRC has reasonable assurance that DISA is qualified to comply with a performance-based license. License conditions related to the SERP and its authority are presented in Section 10.0.

3.3 Phased Licensing Approach

DISA proposed to use a phased licensing approach whereby a pilot study will be performed to demonstrate that HPSA is effective at treating AUM waste before DISA begins HPSA remediation at AUM waste sites. DISA expects the pilot study to use equipment capable of treating a maximum of 12,000 tons of AUM waste over a maximum of 180 days. Following the demonstrated efficiency of the pilot study, DISA requested possession of an unlimited quantity of source material.

DISA's SERP will review the analytical data collected during this project and provide its assessment regarding the safety of the HPSA process. DISA will submit this SERP report for review as a license amendment request to the NRC staff. Within 30 days of receipt of the license amendment request, the NRC staff will evaluate the request. Upon approval, DISA will be authorized to possess unlimited quantities of source material. A license condition regarding the pilot study is provided in Section 10.0.

3.4 Other Agency Coordination

Under the Uranium Mill Tailings Radiation Control Act (UMTRCA), Congress gave the NRC authority "to protect the public health and safety and the environment from radiological and non-radiological hazards associated with the processing and with the possession and transfer of [11e (2) byproduct material]." The Commission has determined that AUM waste is not ore under UMTRCA and that mine waste remediation technologies should be licensed under the source material framework, without inclusion of the requirements of Appendix A to 10 CFR Part 40. Under this source material framework, the NRC does not have the authority to regulate any non-radiological hazards (e.g., chemical hazards) associated with DISA's license application. This regulatory gap might need to be filled by the EPA or the States.

An NRC license would allow DISA to use HPSA at AUM waste sites within Federal jurisdiction (or Federally recognized Tribal Land) where it is otherwise authorized by the license. If DISA chooses to work in an Agreement State, DISA may apply for reciprocity for the NRC license in that state. However, several states (e.g., Colorado and Utah) have promulgated regulations that may require DISA to obtain a separate Agreement State license to perform HPSA at AUM waste sites within their state.

The NRC published the draft generic EA to solicit comments from individual members of the public, Federal and State agencies, American Indian Tribes, organizations, and other entities. During NRC's review of the PMNs for each site, the staff will consult as needed with the state, interested American Indian Tribes, and other Federal agencies.

4.0 Site and Process Characterization

4.1 DISA Proposal

Upon preliminary site selection, DISA intends to perform site characterization and laboratory bench scale testing to confirm the site is suitable for HPSA remediation.

Pre-remediation site characterization will include:

- Characterization walkover gamma surveys:

- To determine the extent and volume of the AUM waste, to estimate the mass of source material to be recovered, and to perform a dose assessment for current radiation dose to workers and the public
- To determine the background dose rate to deduct in dose assessments (i.e., calculating 25 mrem/year or less above background). DISA will identify 5m x 5m sample plots outside the area of the waste pile
- Samples of AUM waste as described in response to RAI 9 (DISA, 2025b). DISA will seek background sample plot locations within 0.25-mile upgradient and upwind of a uranium mine waste pile/area. DISA will collect nine shallow surface samples spaced in a grid to blend into one composite sample for analysis of natural uranium, Th-230, and Ra-226.
- Laboratory bench scale testing of AUM waste samples to set the operational parameters for HPSA operation
- Analysis of 5 samples of coarse material from the laboratory testing to estimate the standard deviation of a site and calculate the sample size (e.g., 18 samples per 40,000 tons) to report to NRC on the PMN for each site

Post-remediation site characterization will include:

- Collecting grab samples of coarse material as it is generated through HPSA and as determined from the PMN (e.g., 18 samples per 40,000 tons). DISA will collect a minimum of 5 samples of the coarse material to determine compliance with the 10 CFR 20.1402 unrestricted release dose limit. These samples will be analyzed by a commercial, accredited laboratory and will be used for final decision making.
- Collecting samples that will be analyzed by portable X-ray fluorescence equipment; these samples will be used to refine the HPSA operation and not for decision making
- Collecting 1 sample per 10 to 20 tons of fines concentrates, or approximately 1 to 2 samples per roll-off container
- Analysis of coarse materials and fines for uranium, Ra-226, and Th-230, vanadium, Toxicity Characteristic Leaching Procedure (TCLP) Resource Conservation and Recovery Act (RCRA) metals, and TCLP mercury (coarse material only)
- Synthetic Precipitation Leaching Procedure (SPLP) leaching tests on a coarse material sample and compliance of the leachate with 10 CFR Part 20, Appendix B effluent limits
- Sampling process water after or during HPSA operation to determine compliance with 10 CFR Part 20, Appendix B, Table 2 effluent limits. DISA will collect three grab samples of each process water tank, per HPSA unit, from different parts of the water column
- Analysis of treated process water samples for Total RCRA Metals, uranium, vanadium, mercury, Ra-226, Th-230 to comply with 10 CFR Part 20, Appendix B, Table 2 effluent limits

4.2 Staff Analysis and Findings

The NRC staff finds that the applicant's description of the pre-characterization sampling and laboratory testing will provide reasonable assurance to determine whether HPSA will be effective at a particular AUM site. The methodology DISA proposed for the pre-HPSA background sampling and surveys are sufficient to demonstrate compliance with 10 CFR

20.1501(a). In addition, the NRC staff finds that the methodologies DISA proposed for post-HPSA sampling are adequate to determine if the coarse material and treated process water meet the criteria for unrestricted release as required in 10 CFR 20.1402, 10 CFR 20.1302(b), and 10 CFR Part 20, Appendix B effluent limits. The SPLP leachability tests provide reasonable assurance that the remaining radionuclides in the coarse material after HPSA remediation will have limited potential to migrate into groundwater in sufficient concentrations to exceed the unrestricted release criteria. Therefore, the staff finds DISA's proposed site and process characterization meets the requirements of 10 CFR 20.1302(b), 10 CFR 20.1406(c) and 10 CFR 20.1501(a) and is acceptable.

5.0 Equipment, Process Controls, and Site Stabilization

5.1 DISA Proposal

5.1.1 Equipment

Section 4.2.4.1 of the application provides information associated with the equipment and facilities that DISA plans to utilize as a base case for remediation of an AUM site. While the exact layout of equipment will vary depending on site-specific conditions, DISA's activities will require the following equipment: crusher, HPSA unit, multiple centrifuge/filter presses, process water tank(s), process water treatment unit, analytical trailer, office trailer, transportation truck for the fines fraction, front end loader, and a filter press/stacker for the coarse fraction material that could remain on-site. DISA will create a restricted area during operations, around portions of the site where source material will be present. DISA plans to use containment berms to minimize the potential for soil contamination during operation. Finally, DISA will use either water or dust enclosures to minimize the spread of dust during the crushing process.

In Section 4.2.4.2 of the application, DISA acknowledged that multiple HPSA units may be needed to facilitate remediation activities at larger AUM sites. In Table 4-1 of the application, DISA identified how many HPSA units may be needed at larger sites. Each HPSA unit would require the equipment listed above, although it may be possible for multiple HPSA units to share some equipment.

5.1.2 Process Water Treatment

DISA will be utilizing a proprietary absorbent alumina complex with other proprietary reagents to treat the slurry water onsite. Headwater Technologies will provide the treatment train design and the treatment media. The entire treatment system will consist of bag filter housings followed by a TurnAbout™ upflow filter system that will contain the treatment media.

DISA expects to possess approximately 5,000 gallons of water per each 50 ton per hour HPSA unit. DISA will either remove this water from the remediation site and reuse it or discharge it onsite to the ground. DISA will use sprinkler type nozzles to release water to a treatment site and will irrigate seed at the same time. DISA committed to releasing water in a manner that will not cause runoff from the site into existing waterways.

In Section 9.3 of the application supplement, DISA confirmed that it will use 10 CFR Part 20, Appendix B, Table 2, effluent limits to discharge treated process water to the ground surface. However, in some cases, DISA would seek to discharge water to a sanitary sewer or a sewage treatment plant. In these cases, DISA would comply with Appendix B, Table 3, sanitary sewer

limits. In response to RAI 13, DISA committed that water storage will occur in polyethylene water tanks until discharge. If water does not meet standards, it will not be released; it will be processed and/or released appropriately.

5.1.3 Site Stabilization

In Section 4.0 of the application supplement, DISA described its planned procedures for site stabilization. After remediation is completed, DISA will stabilize the site using general standards from typical mining reclamation sources such as those found in the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard Rock, Metal, And Designated Mining Operations, Effective July 15, 2022. DISA committed that it will not stabilize a site in a manner that promotes pond formation and will not create streams or wetlands on remediation sites. DISA committed to identifying the specific site stabilization plans in each PMN.

In response to RAI 12, DISA committed to grade the coarse material into the existing topography and will seed it with seed mixes provided by DISA's ecological resources consultant. Sections 4.2 through 4.5 of the application supplement discuss DISA's guidelines that it would follow for stabilization of soil, and protection of surface water, wildlife, and vegetation after HPSA remediation. DISA committed that post-remediation land use (e.g., recreational, wildlife, and rangeland) will be identified in the PMN and will provide a guide for stabilizing remediation sites.

As stated in the response to RAI 16, DISA indicated that it does not intend to cap the coarse material generated from HPSA remediation. However, Section 2.3.8 of the application supplement states that DISA will utilize the soil mixing guidance found in NUREG-1757, Volume 1, Revision 2, Section 15.13.3 (NRC, 2006) to implement soil mixing methods if site-specific modeling (see Section 8.2) indicates the coarse material does not meet the unrestricted release criteria. If DISA uses soil mixing at a site, it commits to detailing all procedures implemented in the DMN.

5.2 Staff Analysis and Findings

The NRC staff observes that the use of berms to contain potential spills and the use of water or dust enclosures with the crushing unit are practices that minimize the spread of contamination. Process water treatment to meet 10 CFR Part 20, Appendix B, Table 2 (effluent) or Table 3 (sanitary sewer) limits also minimizes contamination when the process water is returned to the environment. Finally, site stabilization following HPSA remediation, soil mixing (if necessary), and minimizing dust and erosion through grading and seeding will provide reasonable assurance of reducing the potential for windblown contamination to occur. Measures like these provide reasonable assurance that DISA will leave the site in a condition that is suitable for unrestricted use.

The NRC staff finds that the applicant's proposed use of its equipment, engineering process controls, and site stabilization are consistent with NRC guidance and sufficient to protect the health and safety of workers, the public and the environment. Additionally, DISA has developed an approach to remove licensable quantities of source material from their project sites. The staff finds that DISA meets the requirements of 10 CFR 20.1101(b), 10 CFR 20.1406, and 10 CFR 40.32(c) and is therefore acceptable.

6.0 Radiation Safety Training

6.1 DISA Proposal

6.1.1 Individuals Responsible for the Radiation Safety Program – Training and Qualifications

Corporate Organization

In Section 5.3 of the March 2025 application, DISA stated that the radiation safety organization will include the CEO/President, the RSO, the alternate RSO or ARSO, radiation safety technicians (RST), field service managers (FSM) and authorized users. An organizational chart for DISA is provided as Figure 5.1 of the application, which shows that the RSO and FSM both report to the CEO/President. Staff notes that the NRC does not recognize the title of “Alternate RSO” or list an ARSO on the license.

The as low as reasonably achievable (ALARA) policy is provided in Section 5.2 of the application. In this policy statement, DISA committed to keeping doses to personnel and the public ALARA from the maximum limits specified at 10 CFR Part 20. DISA will implement ALARA by providing appropriate training to all personnel, the use of SOPs, control measures, radiation work permits and good housekeeping practices.

DISA committed to the management responsibilities as detailed in Regulatory Guide (RG) 8.31, Revision 1, “Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities will be As Low As Is Reasonably Achievable,” including the implementation of a periodic management audit and inspection program that reviews the procedures and operations efforts to maintain exposure ALARA (NRC, 2002a).

DISA stated it would follow select provisions of RG 8.31 by requiring education and specified training for the RST. DISA stated that this is because the HPSA process is different from a uranium recovery facility. DISA provided a table in its response to RAI 4 comparing the experience of its proposed RSO to the list of RSO responsibilities, as stated in NUREG-1556, Revision 1, Volume 18, Appendix C.

FSM and RST

Section 6 of the application supplement discusses RST specific training. DISA stated that RSTs are known as RSO-designees in license documents because they will execute functions that are typically performed by the RSO and that this RSO-designee function will only occur at DISA remediation sites. All RSTs will be required to complete an introduction to radiation safety course and an RSO course. The RSTs will be specifically trained to conduct project specific tasks as detailed in Section 6.2 of the supplement and to practice these activities on a mock remediation site to ensure they understand their job functions prior to executing their duties at an actual remediation site.

Section 5.5.3 of the application states the FSM is considered an authorized user and is responsible for coordinating site activities with the RST to ensure proper implementation of the radiation protection program and ALARA policy.

Authorized Users

In Section 5.4 of the application, DISA committed to providing radiation safety training in accordance with the Criteria for Training and Experience for Authorized Users in Appendix D to NUREG-1556 Volume 18, Revision 1.

6.1.2 Training for Individuals Working in or Frequenting Restricted Areas (Radiation Workers)

In Section 5.8 of the application, DISA committed to the performance of initial training for all workers or individuals frequently working in the restricted area. Training will cover the risks of exposure to radiation and fundamentals of protection against exposure to natural uranium and thorium and their progeny. DISA stated in SOP-14, that training will include the guidance provided in NRC RG 8.29, "Instructions Concerning Risks from Occupational Radiation Exposure" (NRC, 1996) and RG 8.13 "Instructions Concerning Prenatal Radiation Exposure" (NRC, 1999).

6.2 Staff Analysis and Findings

The resumes for the RSO and ARSO are provided in Appendix A to the application. The NRC staff believes both individuals have sufficient training and experience related to the use of the HPSA system. The NRC staff finds that the applicant's proposed training and qualification requirements for the RSO are consistent with the guidance provided in NUREG-1556, Volume 18, Revision 1. The RST qualifications DISA committed to are consistent with RG 8.31 for health physics technicians.

The NRC staff has reasonable assurance that DISA's radiation safety staff will meet the training and qualification requirements of 10 CFR 40.32(b) and 10 CFR 40.32(c) and be able to adequately address the identified and unidentified radiological hazards associated with the use of source material. Therefore, the staff finds DISA's commitments for radiation safety training and qualifications to be acceptable.

7.0 Radiation Safety Program

7.1 DISA Proposal

7.1.1 Radiation Protection Program and SOPs

Section 5.0 of the application contains the radiation protection program DISA proposed for its operations. DISA documented the radiation protection program in a series of SOPs. DISA submitted its current SOPs to NRC staff (DISA, 2025d), which are descriptive of the basic elements of a radiation safety program.

Changes to SOPs may be made through the SERP, with the exception of any SOPs written to demonstrate compliance with license conditions. The parameters under which the SERP can be used versus requesting an NRC license amendment for this risk-informed performance-based license are detailed in Section 10.0. SERP evaluations to change the SOPs can be reviewed during NRC inspections.

7.1.2 Recordkeeping

Sections 5.16 through 5.19 of the application present DISA's commitments for recordkeeping. Section 5.16 indicates all personnel exposure and dosimetry records will be maintained for the life of the company.

Table 5-5 in Section 5.19 provides the record retention requirements of receipt of sealed sources, inventory of the fine (unsealed sources), transfer or disposal of licensed material, records identified as important to site release and the additional protocol documents required by 10 CFR 40.31. SOP-06 contains the records retention requirement for radiation surveys and associated QC documents and indicates these records will be maintained until disposition is authorized by the NRC. In accordance with LC 12(D), DISA shall maintain records of any changes made through the SERP until license termination.

7.1.3 Radiation Monitoring Instruments and Surface Contamination Dose Limit Rate

The applicant described its proposed radiation monitoring instruments in Section 5.11 of the application with specific details on how to use and verify operability captured in SOP-02 and SOP-03. DISA committed to doing operability checks using the check and reference sources each day before the survey instrument is used and to calibrating the instruments annually.

In Section 5.10 of the application, the applicant stated that the release of equipment and material from the site restricted area will be conducted in accordance with SOP-06 and SOP-12, Routine surveys that will be conducted in the restricted area and controlled area and the frequency at which these types of surveys will be conducted is documented in these SOPs.

7.1.4 Material Control and Accountability

In Section 5.19.1 of the application, DISA described the controls they intend to implement associated with sealed and unsealed sources of radioactive materials. DISA committed that it will develop, implement, and maintain procedures for ensuring accountability of licensed materials at all times. DISA will also comply with the National Source Tracking System reporting requirements as described in 10 CFR 20.2207.

7.1.5 Air Sampling

In Table 5-6 of the application, DISA committed to conducting air sampling based on a 5-tier system. Tiers were classified based on the tons of AUM waste processed. Table 5-6 provides details on perimeter air sampling for airborne particulate, direct gamma and radon as well as breathing zone air sampling in the restricted area.

DISA clarified in Section 8.0 of the application supplement its commitment to collect air monitoring information for 12 months and review the data across multiple sites. If the data indicates that air particulate, radon and direct gamma do not create an important radiological dose pathway, then DISA proposed the elimination or reduction for all or parts of the air monitoring program through a review by the SERP. If DISA has only collected data from one large site, then DISA will only request SERP approval to discontinue air monitoring at the perimeter for that single site.

DISA provided NRC with its SOP-08, "Air Sampling". This SOP reflects the frequency by type of

sampling (continuous versus grab sample and radon versus direct gamma) and location (restricted area, controlled area) at which air sampling is to be conducted. The SOP also includes action levels based on concentrations measured.

7.1.6 Occupational Dose

DISA committed to the summation of internal and external dose in Section 5.7.5 of the application. Specifically, DISA stated that if routine air sampling and dosimeter results indicate that the dose from either internal or external radiation exposure could exceed 10 percent of the limit, DISA will implement the summation requirements of internal and external radiation doses under 10 CFR 20.1202(b)(2).

7.2 Staff Analysis and Findings

The NRC staff finds that DISA's radiation safety program as described in the application, its response to RAIs, and the application supplement is sufficient for compliance with 10 CFR 20.1101(a)-(c) regarding development and implementation of a radiation protection program commensurate with the scope and extent of licensed activities; engineering controls to minimize occupational doses and doses to members of the public; and periodic (at least annually) review the radiation protection program content and implementation.

The NRC staff finds that the applicant's proposed program for development and use of SOPs and emergency operating procedures support the safe use of radioactive materials and respond to emergency situations are acceptable. DISA has shared the current version of SOPs with NRC staff and committed in Section 5.17 of the application to any SOP revisions through the SERP process.

DISA's commitments to establish and implement an audit and a quality assurance program; evaluate potential dose from surface contamination; conduct radiation surveys, and other radiation protection requirements will protect the health and safety of workers, the public and the environment. These commitments, as detailed in the application and the application supplement, comply with the requirements of 10 CFR Parts 20 and 40 and the applicable guidance in Section 8.10 of NUREG-1556 Volume 18 Revision 1 and are acceptable.

The recordkeeping criteria detailed in 10 CFR 20 Subpart L, 10 CFR 40.36 (f), 10 CFR 40.42, and 10 CFR 40.61 apply to DISA. The staff finds that DISA's record retention commitments are consistent with NRC record retentions requirements and therefore are acceptable.

The NRC staff determined that the applicable regulations for the review of the applicant's proposed selection and calibration of radiation monitoring instruments are 10 CFR 20.1501(c), 10 CFR 20.1501(d), 10 CFR 20.2103(a), and 10 CFR 40.32(c). These regulations contain requirements for radiation instrument calibration, records associated with these calibrations, personnel dosimetry processing, and having available equipment for protecting health and minimizing danger to life and property. The NRC staff finds that the information provided in DISA's SOPs is of sufficient detail to have reasonable assurance that survey and monitoring equipment will be available and appropriately used at sites where DISA plans to operate.

The NRC staff reviewed information in SOP-06 and SOP-12 and found it to be consistent with RG 8.30, "Health Physics Surveys in Uranium Recovery Facilities," (NRC, 2002b) and the release criteria identified in Enclosure 2 to Policy and Guidance FC 83-23. "Termination of Byproduct, Source and Special Nuclear Material Licenses," (NRC, 1987) specific to uranium

and thorium criteria for unrestricted use of materials and equipment to uranium programs were used. Therefore, the contamination program DISA describes is acceptable.

The NRC staff compared the information in Section 5.19 of the application to the requirements of 10 CFR 20.1801 (for sealed and unsealed sources) and found them to be in compliance with the applicable security requirements and therefore acceptable to the NRC.

The information DISA included in SOP-08 for air sampling meets guidance provided in NRC RG 4.14, "Radiological Effluents and Environmental Monitoring at Uranium Mills," (NRC, 1980) and RG 8.25, "Air Monitoring in the Workplace," (NRC, 1992) and is therefore acceptable. DISA committed to the summation of internal and external dose in Section 5.7.5 of the application. Specifically, DISA stated that if routine air sampling and dosimeter results indicate that the dose from either internal or external radiation exposure could exceed 10 percent of the limit, DISA will implement the summation requirements of internal and external radiation doses under 10 CFR 20.1202(b)(2). This commitment is acceptable to the NRC.

8.0 Public Dose

8.1 Public Dose During Operations

8.1.1 DISA Proposal

In Section 5.12 of the application, DISA committed to maintaining radiation exposures to the public below 100 mrem/year TEDE and the dose rate in unrestricted areas to less than 2 mrem in any one hour. Furthermore, the applicant committed to determining the public dose using measurements and calculational methods as appropriate in NUREG-1556, Volume 12, Appendix J and NUREG-1556, Volume 18, Appendix I.

In Section 7.0 of the application, DISA estimated potential doses to the public during operations. Section 14.0 of the application supplement provides revised estimated dose calculations. DISA estimated the potential public dose from external sources during operations following the guidance in Appendix J of NUREG-1556, Volume 16. DISA selected an occupancy factor of 0.05 (1/20) and calculated a maximum, average, and median annual public dose for an individual located 50 feet from the source of radiation.

The estimated external public doses shown below are presented in Table 14-2 of the application supplement. DISA compared the potential public dose during operations to the annual dose limit not to be exceeded during operations in 10 CFR 20.1301 and noted that the maximum potential dose is 22 percent of the limit.

Case	Estimated Dose Rate mrem/hr	Estimated Annual External Dose (mrem)	Annual Dose Limit (mrem)	Percent of annual limit
Maximum	0.05	22	100	22%
Average	0.02	6.7	100	6.7%
Median	0.01	4.4	100	4.4%

The internal public dose estimates were also revised in the application supplement to use the new occupancy factor of 0.05 and assumed the same 50 feet from the source of radiation.

The table below presents the revised public dose estimates from internal sources that DISA calculates for the eight receptors shown in Figure 14-1 of the application supplement.

Receptor	Estimated Total internal dose (mrem)	Estimated Maximum Dose (internal plus external) in mrem	Estimated Average dose (internal and external) in mrem	Estimated Median Dose (internal and external) in mrem
1	0.4	22.4	7.1	4.8
2	0.1	22.1	6.8	4.5
3	0.4	22.4	7.1	4.8
4	0.5	22.5	7.2	4.9
5	< 0.1	22	6.7	4.4
6	< 0.1	22	6.7	4.4
8	0.4	22.4	7.1	4.8

Note: Receptor 7 is an occupational worker and not included in this table.

8.1.2 Staff Analysis and Findings

DISA committed in Section 5.12 of the application to the dose limits established in 10 CFR 20.1301(a) for public dose TEDE and (b) dose rates in unrestricted areas, which staff finds acceptable. The NRC staff verified DISA's external dose calculations using its dose assessment assumptions and occupancy factors. Due to the small contribution from internal dose, the NRC staff did not replicate those doses but did find the assumptions and defaults used to be reasonable. The estimated potential doses to the public during operations that DISA calculated are well below the regulatory limits for public dose and are therefore acceptable.

8.2 Method for Demonstrating Unrestricted Release Criteria

8.2.1 DISA Proposal

In Section 1.5 of its application, DISA commits to meeting the unrestricted release dose criteria in 10 CFR Part 20, Subpart E (TEDE, excluding background) before demobilization from a remediation site. DISA also commits to ensuring that the coarse material does not exceed the source material exemption limit of 500 mg/kg as specified in 10 CFR 40.13(a). In the application supplement, DISA commits to determining compliance with the unrestricted release criteria using concentration data (for the source material exemption limit), concentration-based screening criteria developed based on the 25 mrem/year unrestricted release dose limit, or dose modeling.

In Section 2.0 of the application supplement, DISA developed concentration-based screening criteria for Ra-226, U-238, natural uranium, and Th-230 for five different exposure scenarios: resident farmer, resident gardener, rural resident, rancher, and recreationalist. DISA stated that these screening criteria represent the concentrations above background that are equivalent to 25 mrem/yr for a 5 ft thick, 10,000 m² area. If more than one radionuclide is contributing to the dose, DISA committed that it will use the radium benchmark dose approach described in 10 CFR Part 40, Appendix A, Criterion 6(6) to demonstrate that the dose from all radionuclides is consistent with the 25 mrem/yr dose criteria (i.e., the sum of the ratios of the radionuclide concentrations to the concentration limits will not exceed 1). DISA stated that in cases where the sum-of-fractions based on the screening criteria exceeds 1, dose modeling will be used to

demonstrate compliance with the 25 mrem/yr requirement. DISA committed to including the dose assessment scenario, the associated threshold that will be used for calculating doses for compliance with the 10 CFR 20.1402 unrestricted release criteria, and the analysis used for selecting the dose modeling as part of its PMN for each remediation site.

The scenarios that DISA developed screening values for in the application supplement include the following:

- Resident Farmer: An individual who lives and grows their food onsite.
- Resident Gardener: An individual who lives and grows a portion of their food onsite.
- Rural Resident: An individual who lives but does not grow any food onsite.
- Rancher: An individual who is temporarily on the site and allows their cattle to graze on the land.
- Recreationalist: An individual who spends a limited amount of time at or near a site while playing, fishing, hunting, hiking, or engaging in other outdoor activities. DISA noted that the ingestion of meat would be included in this scenario, if applicable.

Section 2.3 of the application supplement describes the process that DISA will use to determine which scenario to use for each remediation site as well as the assumptions and pathways included for each scenario. DISA also provided a summary of key parameter values used in the calculations in the application supplement and provided the RESidual RADioactive materials (RESRAD) summary files for the calculations (DISA, 2025c). None of the scenarios include the use of groundwater or surface water from the site as a drinking water source and the consumption of fish from an onsite water source is also not considered. The screening values DISA calculated as equivalent to 25 mrem/yr for each radionuclide for each scenario are shown in Table 1 below.

Table 1: Radionuclide Concentrations Equivalent to 25 mrem/yr per Scenario¹

Scenario	Ra-226, pCi/g	U-238, mg/kg ²	Natural Uranium, mg/kg ²	Th-230, pCi/g ²
Resident Farmer	1.7	556	1,151	12
Resident Gardener	4.1	866	1,792	30
Rural Resident	5.3	970	2,008	42
Rancher	12	2,360	5,445	86
Recreationalist (no ingestion of meat)	63	8,000	16,562	295

¹ Based on Table 2-1 in the application supplement

² The concentrations presented here are for the purpose of determining the dose contribution to the sum of fractions calculation described above. The total mass concentration of uranium, thorium, or any combination thereof must also be below the source material exemption limit of 500 mg/kg as specified in 10 CFR 40.13.

In Section 2.3.7 of the application supplement, DISA noted that given the large number of sites that DISA may treat, site conditions may not fit into the scenarios used to develop the screening values. In those cases, DISA committed to incorporating the new conditions into a model scenario, calculating screening values associated with the scenario, and presenting the scenario and its screening values in the PMN for that remediation site.

8.2.2 Staff Analysis and Findings

The NRC staff finds that DISA's proposed approach of demonstrating compliance with the dose criteria in 10 CFR 20.1402 by using either its proposed concentration-based screening criteria, if applicable to the conditions at the site, or by doing a site-specific dose analysis is acceptable. The NRC staff also finds that DISA's commitment to ensure that the final site concentrations are less than the source material exemption limit of 500 mg/kg is consistent with 10 CFR 40.13(a).

The NRC staff performed independent calculations of the screening criteria proposed by DISA and obtained comparable results. In addition, the NRC staff reviewed the parameter values assumed by DISA and found that they are generally consistent with the assumptions in the scenarios. The NRC staff notes that the methodology used to estimate the inhalation rate for the resident farmer, resident gardener, and rural resident by using a weighted average based on the occupancy factor appears to double count the credit for the individual being assumed to be offsite some of the time. However, sensitivity analyses performed by the NRC staff using a higher inhalation rate had a minimal effect on the calculated dose and the screening values. The NRC staff reviewed the approach that DISA plans to use to evaluate which scenario is reasonable and appropriate for a given site and finds that it is consistent with NRC guidance in NUREG-1757, Vol 2 (NRC, 2022b) regarding the selection of land use scenarios. For the reasons described above, the NRC staff concludes that the use of the screening criteria developed by DISA are acceptable for demonstrating compliance with the 25 mrem/yr dose criteria provided that (1) the scenario selected is reasonable for the site based on the site characteristics and the land use of the site and its neighbors and (2) the site conditions are consistent with or are bounded by the assumptions used in the calculations for the scenarios, including the assumed area and thickness of the course material.

The NRC staff notes that while the scenarios evaluated by DISA include the most likely scenarios for most of the potential sites, there are some potential land uses and exposure pathways that are not included (e.g., the use of site water as a drinking water source through a well, the presence of a surface water body that has fish that could be consumed). In the unlikely event that a site had these conditions present, DISA would need to consider the potential dose from these exposure pathways. Similarly, if hunting and consuming the meat is an applicable land use for a recreationalist scenario for a site, the recreationalist scenario would need to be adjusted to reflect a realistic meat consumption rate for the site. The NRC staff agrees with DISA's proposed approach for assessing site conditions that do not fit into the scenarios described above (i.e., incorporating the new conditions into a model scenario, calculating screening values, and presenting the new scenario and associated screening values in the PMN) is a reasonable approach for estimating the dose from outlier scenarios that are not already evaluated. The NRC staff also finds that DISA's proposal to use site-specific dose modeling to demonstrate that the site conditions are consistent with the 25 mrem/yr unrestricted release criteria is also an acceptable approach for demonstrating compliance with the criteria.

The NRC staff will review the information on the dose assessment scenario, the associated threshold that will be used for calculating doses for compliance with the 10 CFR 20.1402 unrestricted release criteria, and the analysis used for selecting the dose modeling scenarios when DISA submits the PMN for each site. The NRC staff will also review DISA's final demonstration that the 10 CFR 20.1402 unrestricted release criteria is met when DISA provides the DMN for each site.

9.0 Financial Assurance

9.1 DISA Proposal

In its application, DISA provides a decommissioning funding plan, which includes a generic decommissioning cost estimate (DCE) for an individual site, a general description of how funding will be made available to decommission and release a site, and a proposed license condition to ensure financial assurance is monitored and adjusted, as needed, on an annual basis.

9.1.1 Decommissioning Cost Estimate

DISA's DCE calculated the costs for reclaiming a mine site where DISA has started remediation but cannot continue. Section 8.0 of the application stated that while HPSA remediation will not continue if DISA discontinues operations, DISA personnel will continue to treat AUM waste in the HPSA system at the time DISA discontinues operations until that material is treated, and the interior of the equipment has been washed. According to the applicant, this is a conservative approach when considering a generic DCE to be used across a variety of individual work sites, ensuring funds are available to complete the operations that have been started before leaving the site.

In accordance with NRC regulations, the DCE that DISA provided represents an estimated amount required to decommission and demobilize HPSA equipment from a site by a third-party. The "discontinuation of operations" DCE considers transport of fines concentrates, decontamination and offsite transportation of equipment, water disposal, health physics, and project management. DISA stated that it used the applicable information from the third-party estimate, including unit rates and most quantities; however, some of the costs were inaccurate or not applicable to DISA's scope of work.

Additionally, DISA proposed that it will provide an escalation of its per site financial assurance cost dependent upon the area of the AUM waste footprint. The proposed escalation factors are:

- 1 to 20 acres: no escalation
- 20 to 50 acres: 1.25 escalation
- 50 to 100 acres: 1.75 escalation
- 100 to 500 acres: 2.0 escalation
- 500+ acres: 2.5 escalation

Finally, the NRC staff recognizes that each site will have site-specific factors that may affect the DCE. Accordingly, DISA committed in Section 7.1 of the application supplement, that the PMN for each remediation site will include an updated site-specific decommissioning cost estimate and a certification that funding in that amount is being provided.

9.1.2 Decommissioning Funding

In its application, DISA stated that it will maintain financial assurance in the amount of the DCE, as described above, per site that is being actively remediated. Additionally, the amount will include the AUM waste footprint escalation factor described in the application, providing additional assurance that funding will be available to decommission and demobilize a site. DISA will determine that a project is complete when the following occur:

- fines concentrate materials are transported offsite for disposal or processing at a uranium recovery facility
- equipment within the restricted area is decontaminated and scanned for unrestricted release
- post-operational surveys of the work area are performed and DISA confirms no releases have occurred
- equipment is moved offsite

With respect to the funding mechanism, DISA stated in Section 12.0 of the application supplement that it will use a surety method in the form of a surety bond, as described in 10 CFR 40.36(e)(2). DISA stated that it will secure the bond prior to starting its first remediation project and that the bond will be in the amount required to perform all remediation projects for the first year. DISA stated that the bond amount will be updated annually to account for the projects to be treated in that year and will account for projects where the bond may be released because the NRC staff has approved the DMN. Finally, DISA stated that it will maintain an accounting system to track the bond amount and covered projects.

Additionally, DISA proposed a license condition related to the financial assurance arrangement that is presented in Section 10.0. This condition will ensure that a funding mechanism is established and maintained for an active remediation site throughout the period of the license and establishes a schedule to adjust the generic, "discontinuation of operations" DCE, as appropriate, on an annual basis.

9.2 Staff Analysis and Findings

The NRC staff reviewed the proprietary third-party DCE and compared it to DISA's DCE and found the rationale provided in the application, as well as the content and amount of the DCE to be reasonable.

The NRC staff finds that the financial assurance license condition, coupled with the PMN requirement to provide an updated site-specific cost estimate and certification of funding, demonstrates reasonable assurance that DISA is financially qualified to carry out the activities described in the application with respect to the decommissioning and demobilization of active remediation sites. The staff finds DISA to be in compliance with 10 CFR 40.36.

10.0 License Conditions

The following are license conditions proposed for DISA's multi-site service provider Source Materials License No. SUA-1605.

9. Authorized use: Activities necessary for the possession and management of source material concentrated from the operation of a High-Pressure Slurry Ablation (HPSA) remediation system at abandoned uranium mine (AUM) waste sites.
10. Except as specifically provided otherwise, the licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the following documents:
 - a. Transmittal letter and Response to NRC Comments, March 28, 2025 (ML25087A095)
 - b. Application for a Performance-Based, Multi-Site Radioactive Materials License to Operate a High-Pressure Slurry Ablation Remediation System, Revision 3, March 21, 2025 (ML25087A096)
 - c. Environmental Report, Revision 2, March 21, 2025 (ML25087A097)
 - d. Response to Requests for Additional Information, June 16, 2025 (ML25167A328)
 - e. Application Supplement, July 31 and August 4, 2025 (ML25216A248, ML25212A250, ML25216A269, ML25216A270)
11. The licensee is authorized to use its HPSA technology according to the following:
 - a. HPSA will be used to remediate AUM waste where the licensee verifies and informs the NRC staff that the waste and the waste site are abandoned, and the waste was generated from uranium production at a site that is not in use for that purpose.
 - b. HPSA may be used on private, state, and Federal public lands, and Federal Tribal Lands. This approval does not exempt DISA from satisfying any state, Tribal or municipality requirements for conducting operations or gaining access to privately owned land or land designated as Federal Tribal lands under the control of Tribal nations or under state jurisdiction.
 - c. DISA is not authorized to store radioactive materials under this license after demobilization from a treatment site. Following termination of HPSA operation at each remediation site, the coarse material and process water must be dispositioned if not remaining onsite.
 - d. The fines concentrates will be transported to a licensed recipient, such as a low-level radioactive waste disposal facility, source material storage facility, or a uranium recovery facility.
12. Change, Test and Experiment License Condition
 - A. The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:
 - i. Make changes in the type of equipment used in HPSA as described in the license application (as updated).
 - ii. Make changes in the standard operating procedures as described in the license application (as updated)

- iii. Conduct tests or experiments not described in the license application (as updated)
 - B. The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:
 - i. Result in a radiological release scenario that has not been previously addressed in the license application (as updated)
 - ii. Result in a more than a minimal increase in the likelihood of a radiological release from structures and equipment evaluated in the license application (as updated)
 - iii. Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the safety evaluation report (SER) or environmental assessment (EA) or technical evaluation reports (TERs) or other analyses and evaluations for license amendments
 - iv. Result in inconsistency with NRC's previous conclusions, or the basis of or the analysis leading to those conclusions, regarding actions, designs, or design configurations analyzed and selected in a site or facility SER, TER, and EA associated with the licensed activity. This would include all supplements and amendments to the license, as well as all SERs, TERs, EAs, and EISs associated with amendments to this license.
 - C. The licensee's determinations concerning (B) of this condition shall be made by a Safety and Environmental Review Panel (SERP). The SERP shall consist of a minimum of three individuals. One member of the SERP shall have expertise in management and shall be responsible for financial approval for changes; one member shall have expertise in operations and/or construction and shall have responsibility for implementing any operational changes; and one member shall be the radiation safety officer (RSO) or equivalent, with the responsibility of assuring changes conform to radiation safety and environmental requirements. Additional members may be included in the SERP, as appropriate, to address operational and technical aspects. Temporary members or permanent members, other than the three above-specified individuals, may be consultants.
 - D. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations made by the SERP that provide the basis for determining that changes comply with (B) of this condition. The SERP shall document all decisions and determinations required by this specific license and as set forth as commitments in the application and make such documentation available for NRC inspection. SERP records shall be maintained at the address listed in license condition 2.
- 13. Financial Assurance. The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40.36. Pursuant to Table 8-1 of the March 2025 license application, the licensee shall maintain financial assurance at a per site cost while

the site is under remediation. Once remediation is completed, and the NRC accepts the demobilization notification (DMN), the surety for that site will be removed. DISA will re-evaluate the financial surety amount annually and submit the annual review to the NRC staff 30 days before the anniversary of the license issue date.

14. The licensee shall ensure that written standard operating procedures (SOPs) exist prior to operations for all routine operations or activities involving radioactive materials authorized under this license that address:

- 1) all operational activities involving radioactive materials associated with licensed activities that are handled, processed, stored, or transported by employees
- 2) radiation protection and environmental monitoring
- 3) emergency procedures for potential accident/unusual occurrences including significant equipment.

The SOPs shall identify the radiological hazards and appropriate radiation safety practices (engineering controls, use of protective equipment) that can be taken by employees to limit or preclude the radiological hazard, in accordance with 10 CFR Part 20. SOPs for operational activities shall enumerate pertinent radiation safety practices to be followed. A copy of the current written procedures shall be kept on every site where HPSA is used. For non-routine operations and activities that do not have a written SOP, radiological hazards and protective measures to limit dose will be documented in a radiation work permit.

15. Remediation Reporting

- a. The licensee must notify the NRC of the commencement of remediation activities prior to installing equipment and beginning operations at an AUM temporary job site and after remediation is complete. See LC 19 for what the notifications must include.
- b. The licensee shall develop a report every year on the anniversary of this license issuance that summarizes HPSA activities at NRC-licensed and Agreement State-licensed sites, including the documented background and post-HPSA analytical data for every site remediated and copies of all shipping papers documenting the fate of the fine concentrates. The report shall be maintained onsite for NRC inspection.
- c. The licensee shall periodically (at least annually) review the radiation protection program content and implementation in accordance with 10 CFR 20.1101(c). Documentation of this review shall be maintained onsite for NRC inspection.
- d. The licensee shall submit to the NRC by January 31st of the following year, a completed DOC/NRC Form AP-1 and any other associated forms needed to satisfy the requirements for Additional Protocol as detailed in 10 CFR 40.31 and 10 CFR 75.11.

16. RSO. The initial RSO will be that person presented in the license application and approved by the NRC, as listed in LC 29. Future RSOs will be nominated by the licensee and approved by the NRC. This person will meet or exceed the qualifications presented in the March 2025 application, as modified by the RAI responses. Replacements for the RSO will be approved by the NRC staff.

17. The licensee is granted a phased approval to utilize its HPSA remediation system. The first phase will consist of performing a demonstration project to remediate a maximum of 12,000 tons of AUM waste over a maximum of 180 days. During this initial project, DISA will collect samples for analysis to demonstrate that the technology produces a coarse material and process water that meets the dose assessment criteria in LC 25. Post-HPSA

remediation samples will be analyzed in accordance with LC 22. The Licensee will also assess doses due to radionuclides found in the fines concentrates, the coarse material, and within process equipment.

The licensee's SERP will review the analytical data collected and dose assessments produced during this project and provide its assessment regarding the safety of HPSA technology. DISA will submit this SERP report for review to the NRC staff in a license amendment request. The NRC staff will review the license amendment request and provide a response within 30 days of receipt of the report. The response shall either be a letter of concurrence and a revised license or a letter stating further actions are required. If NRC concurs that the release criteria have been met, it will issue an amendment to this license removing LC 17 and reflecting unlimited source material as the possession amount.

18. For all reclamation/remediation projects that DISA undertakes, DISA shall ensure:
 - a. That at all times, the source material is and shall remain the property of DISA and that DISA will take title to the source material after it leaves the collision cell.
 - b. That DISA shall have access to the HPSA system at all times.
 - c. During the HPSA operations, DISA shall be responsible for all system repairs, maintenance and service activities that have the potential for contact with the licensed material.
 - d. During the HPSA operations and site release activities, DISA shall be responsible for the containment and remediation of any inadvertent release or spill of licensed material.
 - e. DISA shall be responsible for all source material transportation. DISA will transfer possession and control of source material to the appropriately licensed recycling, storage, or disposal facility.

19. The licensee must notify the NRC through a PMN at least 90 days prior to mobilizing to any new worksite, and the licensee must receive the NRC's approval of the PMN prior to the licensee installing equipment and beginning operations at an AUM waste site.

The licensee must provide a DMN to the NRC within 30 days after completing remediation at each site. If the NRC finds that the DMN is not acceptable, the licensee shall submit within 30 days after that determination a plan for resolving outstanding issues, including the timeframe for resolution.

Notifications will include the following information:

A. Pre-Mobilization Notification:

1. Estimate the quantity of gravel and resulting number of truck shipments that would be needed per 10 miles of road.
2. Schedule for NRC touchpoints
 - a. Mobilization
 - b. Commencement of remediation
 - c. 50% completion of remediation
 - d. Within one week of completion
 - e. Expected demobilization

3. Dose assessment scenario and the associated threshold that will be used for calculating doses for compliance with the 10 CFR 20.1402 unrestricted release criterion. Also include the analysis used to select the scenario.
4. The number of samples per 40,000 tons of coarse material post-HPSA remediation will be presented in the pre-mobilization notification along with the ProUCL output. Automatically assume that 5 samples will be collected if the total AUM waste mass is less than 40,000 tons.
5. Information specified in Appendix A, "Environmental Information Requirements for Premobilization Notification," of the NRC's generic Environmental Assessment (ML25265A212). Respond to the applicability of the assumptions included in NRC's generic EA to the project site using the checklist.
6. Specific location for that project site and origin of the AUM waste.
7. A description of the site to include anticipated land disturbance activities (i.e., constructing temporary roadways, grading of soil for equipment placement, approximate volume of soils/waste rock to be processed, and whether large volumes of soil/waste rock will be moved at the project site to facilitate remediation). Provide estimated surficial boundaries and depth of ground disturbance.
8. Preliminary data developed by the applicant for each project site to include concentrations of uranium and thorium in the waste rock and the surface soils prior to mobilization, waste rock volumes expected to be processed and the anticipated number of HPSA units, and survey data used to establish background radiation levels that will be used in subsequent public dose calculations.
9. Identify and provide justification for the proposed future land use based on existing land use in the vicinity of the site and other site characteristics.
10. Approximate mass of source material that the licensee will possess (this can later be refined for inventory and material accountability).
11. Anticipated date(s) of mobilization and start of operations as well as the anticipated duration of operations.
12. Methodology used to determine that the project site will meet release criteria including the extent of residual radioactivity remaining at the site from operations and justifications based on land use in the vicinity of the site and other site characteristics for scenarios and parameters used to calculate dose to demonstrate 10 CFR 20 Subpart E release criterion are met.
13. An updated site-specific decommissioning cost estimate, as applicable.
14. A certification that financial assurance for decommissioning has been provided in an amount that is at least that of the updated decommissioning cost estimate.
15. If the project site is an outlier scenario, DISA will incorporate the outlier scenario conditions into a model scenario, calculate screening values, and present the new scenario and associated screening values in the PMN.

16. A description of the expected post-HPSA stabilization methods, including scaled map showing area and depth of coarse material disposition.

B. Demobilization Notification:

1. Dose assessment results and radionuclide concentration results for coarse material, fines concentrates, and process water
 2. Results of the Synthetic Precipitation Leaching Procedure (SPLP) analysis for the coarse material
 3. Results of the Toxic Characteristic Leaching Procedure (TCLP) analysis for the coarse material
 4. Presentation of release criterion, screening criteria, and applicable effluent standards
 5. Comparisons of doses and concentrations to the criteria and standards presented in Items 2 and 3 above
 6. Determination that process water may be discharged onsite or decision to take the process water offsite
 7. Description of how process water was discharged onsite, if applicable
 8. Facility-specific site number to be created by DISA
 9. Name, location, geographic coordinates of the site
 10. Owner and owner's contact information
 11. Actual volume of AUM waste remediated
 12. Name of the actual licensed recycling, disposal, or storage facility receiving fine concentrates
 13. Mass of mineral-rich material transported to the recycling facility
 14. Description of how coarse material was handled and stabilized following processing
 15. Description of any soil mixing measures implemented, if applicable
 16. Final determination on clean coarse material. Did concentrations meet the screening criteria for the scenario specified in the PMN? If not, describe the final survey data and methodology used to determine that the project site meets release criteria, including the extent of residual radioactivity remaining at the site from operations and justifications based on land use in the vicinity of the site and other site characteristics for scenarios and parameters used to calculate dose to demonstrate 10 CFR 20 Subpart E release criterion are met.
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20. The licensee will use engineering controls such as water or dust enclosures to minimize the spread of dust during the crushing process and during operations.
 21. The licensee will assess air monitoring data for the first 12 months of operations across multiple sites. If the data indicates that air particulates, radon, and environmental gamma do not create important radiological dose pathways, then DISA will propose the

elimination or reduction of all or parts of the air monitoring through a review by its SERP. If DISA is working on one large site, DISA will propose the elimination or reduction of air monitoring through a SERP review for that particular site only.

22. The licensee will perform post-HPSA characterization as described in Section 3.3 of the application supplement, and summarized below:

A. Fines Concentrates:

- a. Collecting 1 sample per 10 to 20 tons of fines concentrates, or approximately 1 to 2 samples for roll-off container

B. Coarse Fraction:

- a. Collecting grab samples of coarse material as it is generated through HPSA and as determined from the PMN (a minimum of 18 samples per 40,000 tons). DISA will collect a minimum of 5 samples of the coarse material if less than 40,000 tons to determine compliance with the 10 CFR 20.1402 unrestricted dose limit. These samples will be analyzed by a commercial, accredited laboratory and will be used for final decision making.
- b. Collecting samples that will be analyzed by portable X-ray fluorescence equipment; these samples will be used to refine the HPSA process and not for decision making
- c. Analysis of coarse materials and fines for Uranium, Ra-226, and Th-230, Vanadium, TCLP Resource Conservation and Recovery Act (RCRA) Metals and TCLP mercury
- d. SPLP leaching tests on a coarse material sample and compliance of the leachate with 10 CFR Part 20, Appendix B, Table 2 effluent limits

C. Process Water:

- a. Sampling process water after or during HPSA operation to determine compliance with 10 CFR Part 20, Appendix B limits. DISA will collect three grab samples of each process water tank, per HPSA unit, from different parts of the water column.
- b. Analysis of treated process water samples for Total RCRA Metals, uranium, vanadium, mercury, Ra-226, Th-230 to comply with 10 CFR Part 20, Appendix B limits
- c. In Section 9 of the application supplement, DISA states that it will use the 10 CFR Part 20, Appendix B, Table 2, effluent limits to discharge treated process water to the environment. DISA may also discharge water to a sanitary sewer or a sewage treatment plant in compliance with Appendix B, Table 3, sanitary sewer limits.
- d. Other radionuclides present in the process water and not part of the natural uranium decay chain must be less than the concentrations listed for each radionuclide in 10 CFR 20 Appendix B Table 2 or Table 3 and a sum of the ratios must be performed to determine if the process water can be returned to the environment or if the process water must be processed via the HPSA system again to meet the release criteria. If DISA reprocesses the process

water through the HPSA system twice and it does not achieve the release criteria it will ship the process water offsite for disposal.

23. SPLP leaching tests will be performed on a coarse material sample. The 10 CFR 20, Appendix B, Table 2 – Effluent Concentration values will be used to determine if SPLP leachability is acceptable. These values are as follows:

- Ra-226 = 60 pCi/L
- Th-230 = 100 pCi/L
- Natural uranium = 0.43 mg/L based on 300 pCi/L limit

24. After remediation is completed, DISA will stabilize the site using general standards from typical mining reclamation rules such as those found in the Mineral Rules and Regulations of the Colorado Mined Land Reclamation Board for Hard Rock, Metal, And Designated Mining Operations, Effective July 15, 2022, using the guidelines presented in Section 4.0 of the application supplement. The expected future land use (per LC 19(A)(9)) will provide a guide for stabilizing remediated sites.

The licensee will grade the coarse material into the existing topography and will seed it with seed mixes provided by DISA's ecological resources consultant, as discussed in its RAI responses. The licensee will minimize the potential for dust spreading after demobilizing from the site.

DISA commits that it will not stabilize a site in a manner that promotes pond formation and will not create streams or wetlands on remediated sites. DISA commits to identifying the specific site stabilization plans in each PMN.

25. DISA's unrestricted release criteria are the 25 mrem/year dose limit in 10 CFR 20.1402 and the 500 mg/kg source material exemption limit in 10 CFR 40.13. DISA will determine compliance with the release criteria using concentration data (for the source material exemption limit).

DISA will determine compliance with the 25 mrem/year dose limit using the screening criteria provided in the application supplement (Table 2-1), presented below as Table 1, as applicable for the site, or through site-specific dose modeling. DISA will determine which scenario applies based on the criteria described in Section 2.3 of the application supplement. If more than one radionuclide is contributing to radiation dose, the sum of the ratios of the radionuclide concentrations to the screening criteria concentration limits, as calculated using the radium benchmark dose method, will not exceed "1".

Table 2: Radionuclide Concentrations Equivalent to 25 mrem/yr per Scenario¹

Scenario	Ra-226, pCi/g	U-238, mg/kg ²	Natural Uranium, mg/kg ²	Th-230, pCi/g ²
Resident Farmer	1.7	556	1,151	12
Resident Gardener	4.1	866	1,792	30
Rural Resident	5.3	970	2,008	42
Rancher	12	2,360	5,445	86
Recreationalist (no ingestion of meat)	63	8,000	16,562	295

¹ Based on Table 2-1 in the application supplement

² The concentrations presented here are for the purpose of determining the dose contribution to the sum of fractions calculation described above. The total mass concentration of uranium, thorium, or any combination thereof must also be below the source material exemption limit of 500 mg/kg as specified in 10 CFR 40.13.

26. If the coarse material does not meet the concentration-based screening criteria or the unrestricted release criteria of 25 mrem/year through dose modeling as described in LC 25, DISA will follow NRC guidance in NUREG-1757, Volume 1, Revision 2, Section 15.13.3 to implement soil mixing methods, as discussed in Section 2.3.8 of the application supplement. If DISA uses soil mixing at a site, it will detail all procedures implemented in the demobilization notification. DISA also retains the option of requesting alternate criteria for license termination pursuant to 10 CFR 20.1404.

27. Until license termination, the licensee shall maintain documentation on unplanned releases of radioactive material including process waters. Documented information shall include but is not limited to, the date, the site, spill volume, total activity of each radionuclide released, radiological survey results, soil sample survey results (if taken), corrective actions, results of post remediation surveys (if taken) and a map of the spill location and impacted area and an evaluation of NRC reporting criteria.

If the licensee is required to report any spill or other event involving radioactive material, including process water, to another State or Federal agency, the licensee shall make a report to the NRC Headquarters Project Manager by telephone or electronic mail (e-mail) within 24 hours. This reporting shall be followed within 30 days of the notification by submitting a written report to NRC Headquarters detailing the conditions leading to the spill or event, the corrective actions taken and results achieved.

28. Environmental License Conditions

A. The licensee shall report to the NRC any killing, injury, or other takings of Federally listed threatened or endangered species or critical habitats protected under the Federal Endangered Species Act that occur over the course of implementing HPSA.

B. Before engaging in any site development activity, the licensee shall conduct a cultural resource inventory and provide the results to the NRC. All disturbances associated with the proposed development shall be completed in compliance with applicable regulations, such as the National Historic Preservation Act (as amended) and its implementing regulations (36 CFR part 800), the Archaeological Resources Protection Act (as amended) and its implementing regulations (43 CFR part 7) and Tribal, state and local regulations and guidance.

- C. In the event that human remains or prehistoric or historic archaeological materials are uncovered during site development, the licensee shall cease work in the vicinity immediately and protect the discovery from further disturbance. Discovery notifications shall follow identified protocols and regulations depending on land jurisdiction. No work in the vicinity of the discovery shall resume until the licensee has received authorization from the NRC to proceed.
29. License documents and records shall be maintained by the RSO. The RSO for this license is Mr. Stephen Cohen who may be contacted at:

1010 Falcon Ave.
P.O. Box 1846
Mills, WY 82644
s.cohen@DISAusa.com
(720) 237-2358

30. All written notices and reports to NRC required under this license shall be submitted through one of the following methods:

- NRC Electronic Information Exchange System (<https://eie.nrc.gov/eie/gf/termsOfService.eie>)
- Mailed to:

ATTN: Document Control Desk
Director, Division of Decommissioning, Uranium Recovery, and Waste Programs
Office of Nuclear Material Safety and Safeguards, Mailstop T-5A10
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Include Docket # 040-38417 and NRC PM on all correspondence. Required telephone notification shall be made to the NRC Operations Center at (301) 816-5100 for emergencies.

11.0 References

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- NRC Form 313: Application for Materials License (ML22213A145)
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