Independent Assessment of Work Planning and Control for Liquid Waste Program Subcontractors at the Savannah River Site

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Office of Enterprise Assessments
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Acronyms

CAS	Contractor Assurance System
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
dB	Decibel
DEAR	DOE Acquisition Regulation
DOE	U.S. Department of Energy
DOE-SR	DOE Savannah River Operations Office
EA	Office of Enterprise Assessments
ECP	Employee Concerns Program
ES&H	Environment, Safety, and Health
FR	Facility Representative
HVAC	Heating, Ventilation, and Air Conditioning
IH	Industrial Hygiene
IIE	Integrated Independent Evaluation
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
LOTO	Lockout/Tagout
MFO	Management Field Observation
OE/LL	Operating Experience and Lessons Learned
OFI	Opportunity for Improvement
OSHA	Occupational Safety and Health Administration
OSQA	Office of Safety and Quality Assurance
PPE	Personal Protective Equipment
SDU	Saltstone Disposal Unit
SME	Subject Matter Expert
SRMC	Savannah River Mission Completion, LLC
SRS	Savannah River Site
STAR	Site Tracking, Analysis, and Reporting
STARRT	Safety Task Analysis Risk Reduction Talk
STR	Subcontract Technical Representative
TBO	Task-based Observation
TQP	Technical Qualification Program
TSP	Task-specific Plan
WDOD	Waste Disposition Operations Division
WP&C	Work Planning and Control
WPP	Worker Protection Plan

INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL FOR LIQUID WASTE PROGRAM SUBCONTRACTORS AT THE SAVANNAH RIVER SITE

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of work planning and control (WP&C) for Savannah River Mission Completion, LLC (SRMC) liquid waste program subcontractors at the Savannah River Site (SRS) from July to September 2024. This assessment was conducted at the request of the DOE Savannah River Operations Office (DOE-SR) Manager. The assessment evaluated SRMC's flowdown of DOE safety and health requirements to its subcontractors performing work within the liquid waste facilities, the effectiveness of SRMC's contractor assurance system in monitoring the work of subcontractors within established WP&C processes, and the implementation of the integrated safety management core functions: define the scope of work, identify and analyze hazards, develop and implement hazard controls, perform work safely within controls, and provide feedback and make improvements. The assessment also included the evaluation of Federal oversight conducted by DOE-SR.

EA identified the following strengths:

- SRMC has established comprehensive processes and procedures to support the contractual flowdown of integrated safety management core functions and DOE safety requirements to all levels of subcontractors.
- DOE-SR provides effective Federal oversight through formal assessments and operational awareness activities.

EA also identified several weaknesses, as summarized below:

- SRMC does not always require service subcontractor work order documents to reference the relevant task-specific plans (TSPs) that identify the hazards and required controls for performed work.
- SRMC has not ensured that construction subcontractors have developed sufficient detail in the governing TSPs work scopes for routine subcontractor work activities involving concrete work such that silica hazards can be identified and analyzed, and the appropriate controls implemented.
- SRMC did not ensure that subcontractors adequately identified and analyzed all potential hazards of work tasks, such as potential exposures to noise, confined space, and mold hazards.
- SRMC did not ensure that hazard controls documented in approved subcontractor TSPs and worker protection plans, including eyewashes, hearing conservation, and barricades, were appropriate and implemented.
- SRMC subcontractors did not perform work within established controls defined in work orders and TSPs during several work activities involving heat, asbestos, electrical, and noise hazards.
- SRMC does not ensure that subcontractor issues, identified in management field observations and task-based observations, are consistently tracked and corrected in the formal issues management system.
- DOE-SR has not planned or scheduled assessments to evaluate the DOE-SR operating experience and lessons learned program and its effectiveness.

In summary, the SRMC WP&C institutional programs and processes adequately outline the integrated safety management core functions and support the safe performance of subcontracted work, and DOE-SR effectively conducts oversight of subcontracted work at the liquid waste facilities. However, weaknesses

in WP&C implementation were identified. In some cases, subcontractors did not adequately define the scope of work, identify and analyze all hazards, develop and implement effective controls, and perform work within identified controls. Until the concerns identified in this report are addressed or effective mitigations are put in place, unidentified and uncontrolled hazards pose an increased risk to workers at the SRS liquid waste facilities.

INDEPENDENT ASSESSMENT OF WORK PLANNING AND CONTROL FOR LIQUID WASTE PROGRAM SUBCONTRACTORS AT THE SAVANNAH RIVER SITE

1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Worker Safety and Health Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of work planning and control (WP&C) for Savannah River Mission Completion, LLC (SRMC) liquid waste program subcontractors at the Savannah River Site (SRS). This assessment was requested by the DOE Savannah River Operations Office (DOE-SR) Manager and was conducted from July to September 2024.

In accordance with the *Plan for the Independent Assessment of Work Planning and Control of Liquid Waste Program Subcontractors at the Savannah River Site, August 2024*, this assessment evaluated SRMC's established WP&C processes and implementation of the five core functions of integrated safety management (ISM) for subcontracted work. DOE's ISM policy defines the following five core functions to ensure systematic and effective WP&C: define the scope of work, identify and analyze hazards, develop and implement hazard controls, perform work within controls, and provide feedback and improvement. The assessment also evaluated activity-level work, and the Federal oversight provided by DOE-SR.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which EA implements through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, deficiencies, findings, and opportunities for improvement (OFIs)" as defined in the order.

As identified in the assessment plan, this assessment considered objectives and criteria from DOE Guide 226.1-2A, *Federal Line Management Oversight of Department of Energy Nuclear Facilities*, appendix D, *Activity Level Work Planning and Control Criterion Review and Approach Documents with Lines of Inquiry*. EA also used elements of CRAD EA-30-07, Rev. 0, *Federal Line Management Oversight Processes*, to collect and analyze data on DOE-SR oversight activities related to WP&C. In addition, EA used selected objectives and criteria from the following EA CRADs:

- EA CRAD 30-09, Rev. 0, *Occupational Radiation Protection Program*
- EA CRAD 32-03, Rev. 1, *Industrial Hygiene Program*
- EA CRAD 32-10, Rev. 0, *Construction Safety*
- EA CRAD 32-11, Rev. 0, *Control of Hazardous Energy (Lockout/Tagout)*
- EA CRAD 32-12, Rev. 0, *Material Handling Safety*.

EA observed the planning and execution of 30 onsite service and construction work activities by SRMC and its subcontractors at the liquid waste facilities. No demolition work was observed during the onsite assessment period. EA examined key activity-level work control documents, such as task-specific plans (TSPs), work orders, worker protection plans (WPPs), SRMC and subcontractor hazard analysis documents, and other relevant WP&C documentation. EA also interviewed key personnel responsible for developing and executing the associated programs and walked down relevant portions of specific facilities where subcontractors worked. The members of the assessment team, the Quality Review Board, and the management responsible for this assessment are listed in appendix A.

There were no previous findings for follow-up during this assessment.

3.0 RESULTS

3.1 Work Planning and Control Institutional Programs and Flowdown of DOE Safety and Health Requirements to Subcontractors

This portion of the assessment evaluated the effectiveness of SRMC's integrated safety management system (ISMS) program flowdown of applicable worker safety and health requirements to ensure the safe performance of work carried out by liquid waste subcontractors.

SRMC has established comprehensive procedures and processes to ensure that ISMS, WP&C, and associated DOE safety requirements flow down to subcontractors and all lower-tier subcontractors, and to oversee subcontractor safety performance. SRMC S18, *Procurement Services Manual*, Manual 11B, *Subcontract Management*, Procedure 1.0, *Subcontract Management Program* (*SMP*), and Manual 8Q, *Employee Safety Manual*, Procedure 15, *Subcontractor and Visitor Workplace Safety and Health*, provide an effective process for establishing a graded approach to flow down requirements to subcontractors and their associated lower-tier subcontractors. Procurement contract general provisions and terms and conditions are differentiated by work scopes, such as Davis-Bacon Act construction, service, and demolition.

SRMC contractually conveys to all construction (Davis-Bacon Act) and service subcontractors, including their lower tiers, the requirements to follow 10 CFR 851, *Worker Safety and Health Program*; DOE Acquisition Regulation (DEAR) 970.5223-1, *Integration of environment, safety and health into work planning and execution*; and the employee concerns program (ECP) in SRMC-PPS-2022-00009, *Construction Subcontract Exhibit "A" General Provisions*, and SRMC-PPS-2022-00008, *Special Terms and Conditions for Commercial Purchased*, respectively. Construction contract exhibit F, *Environment, Safety and Health Provisions (ES&HP)*, included in SRMC-PPS-2022-00009, appropriately includes requirements, such as the following:

- Integration of environment, safety, and health (ES&H) into all work planning and execution (ISM core functions and guiding principles)
- Maintenance and submittal of Occupational Safety and Health Administration (OSHA) 300 logs
- Review and annual approval of an OSHA-compliant subcontractor's corporate health and safety plan, referred to as a WPP
- Approval of TSPs, which include hazard analyses for primary tasks necessary to complete the subcontract
- Inclusion of SRMC-provided focused observation checklists in subcontractors' WPPs.

For service subcontracts, SRMC-PPS-2022-00008 includes basic requirements and then appropriately adds supplemental ES&H compliance alternatives based on the complexity of the statement of work.

SRMC has established effective processes to support contractual communication and verification of WP&C flowdowns to subcontractors and their sub-tier contractors. These processes include requirements to complete the following forms: SCM-F2021-0003, *Verification of Subcontractor's Flow Down Requirements*, where DEAR 970.5223-1 is specifically referenced; OSR 1-208, *Subtier Flow Down Checklist*; and *SRS Service and Construction Subcontract Worker Protection Plan (WPP) Evaluation*

(Primary) Checklist, which outlines minimum WPP safety and health program elements and requires the subcontractor to identify the appropriate locations by sections and/or page numbers within its WPP that correspond to the applicable program elements. WP&C and safety requirements for subcontracted work are appropriately categorized (A, B, or C) based on the level of risk and proximity to the SRMC direct-hire workforce. Regardless of category, all contractually required documentation must be appropriately reviewed and accepted by SRMC prior to the start of work.

Roles and responsibilities for subcontracted work are well-defined, with SRMC subcontract technical representatives (STRs) assigned the oversight of subcontractors. An STR training and qualification program has been effectively established and documented. STRs are assigned the responsiblity for reviewing and accepting subcontractor WPPs and TSPs, as well as performing oversight of construction and service subcontractor field activities, including documenting performance using task-based observations (TBOs). SRMC managers and safety and industrial hygiene (IH) subject matter experts (SMEs) conduct field observations using management field observations (MFOs), which are documented in the SRS Site Tracking, Analysis, and Reporting (STAR) issues management system.

SRMC has established a generally effective assisted hazard analysis process as outlined in Manual 8Q, Procedure 122, *Hazard Analysis Process*, to communicate facility or project hazards potentially imposed upon Categories B and C subcontractors (i.e., subcontractors who either work independently but are collocated with SRMC workers, or are integrated with SRMC workers). This process is documented using Forms OSR 1-183, *Subcontractor Safety Checklist*, and OSR 1-126, *Subcontract Field Conditions*. Additionally, two construction subcontractor's WPPs require the use of Safety Task Analysis Risk Reduction Talk (STARRT) cards. The STARRT card use, which is unique to these construction subcontractors, is required to be completed daily by each work crew. The STARRT card provides a pre-job briefing mechanism for specifying the job description, key work steps, equipment and tools, and personal protective equipment (PPE), and includes a section requiring that workers identify the most significant potential hazards and identify the appropriate hazard controls to abate or mitigate the hazard.

Subcontractor-introduced hazards are appropriately required to be communicated and controlled using the WPP and TSPs, which are required to be reviewed and accepted by SRMC. Lower-tier subcontractors are contractually required to follow the WPP of the subcontractor and develop TSPs based on their statement of work. TSP guidance provided to subcontractors appropriately includes a breakdown of tasks based on the statement of work and conducting a hazard analysis using the five core functions of ISM.

Although SRMC has established a generally adequate ISMS program, contrary to DEAR 970.5223-1 and SRMC-ESH-2022-00001, *Integrated Safety Management System Description*, section 4.2 and appendix A, SRMC does not ensure that service subcontractor TSPs are formally linked to the governing work orders. (See **Deficiency D-SRMC-1**.) Service subcontractor TSPs are standalone documents with a variety of work tasks that can be accomplished by the subcontractor and are not linked to the work orders. Examples, including missed hazards and controls for observed service subcontract work, are discussed in section 3.2 of this report. Not including or referencing the relevant TSPs in the work orders may result in insufficient tailoring of hazards and controls to the specific work being performed. While the SRMC *Guidelines For Preparing Task Specific Plans* provide an adequate job-hazard-analysis-type format and example for TSP content, it does not address formal linkage of TSPs to the governing work orders such that the specific TSPs applicable to the work are called out, and the required hazards and controls are sufficiently tailored to the work being performed.

Work Planning and Control Institutional Programs and Flowdown of DOE Safety and Health Requirements to Subcontractors Conclusions

SRMC has established adequate contractual procedures and processes to ensure that ISM core functions and guiding principles flow down to subcontractors and all lower-tier subcontractors performing work at the liquid waste facilities. SRMC's oversight of subcontractor safety performance is provided and documented by assigned STRs, SRMC managers, and safety and IH SMEs. However, TSPs for service subcontractors are not required to be linked to the governing work orders, resulting in insufficient tailoring of hazards and controls to the work being performed.

3.2 Work Planning and Control Implementation

This portion of the assessment evaluated SRMC and subcontractor implementation of WP&C institutional programs for subcontracted work at the liquid waste facilities through the five core functions of ISM: defining the scope of work, identifying and analyzing hazards, developing and implementing hazard controls, performing work within controls, and providing feedback and making improvements.

Defining the Scope of Work

The work scopes for observed service subcontractor work activities were well documented in work order task instructions to enable the proper identification of task-specific hazards and controls. The work scopes for construction and demolition work performed by construction subcontractors is not typically described in work orders but is described in TSPs and may be supplemented by STARRT Cards. For example:

- The heating, ventilation, and air conditioning (HVAC) work order task instructions for a service subcontractor for the 6-month HVAC inspection at office trailers located at Saltstone adequately detailed inspection and preventive maintenance steps to be accomplished for 12 specific HVAC units.
- The TSP for loading and unloading prestressing reels, which was observed being implemented by the SRMC subcontractor at Saltstone Disposal Unit SDU-10, was detailed and included sequential tasks that workers followed as written. The TSP developed by this subcontractor appropriately included a description of required tools, the equipment to be used, worker training requirements, and any inspection requirements, such as for forklifts, fall protection, cranes, and rigging.
- The TSP for the SRMC subcontractor responsible for asbestos abatement of the Handi Houses at H Tank Farm was sufficiently detailed to identify the job's hazards and controls. The TSP was supplemented by a description of work documented in the procurement specification/statement of work for the SRMC contract, which provided additional details.

While most work scopes were well documented, the TSPs governing routine construction subcontractor work involving grinding, drilling, sanding, or sandblasting concrete in the construction of the SDU-10 tank, which have the potential for exposing workers to silica, were not sufficient. Contrary to SRMC-ESH-2022-00001, appendix A, SRMC has not ensured that its construction subcontractors have developed sufficient detail in TSPs for routine work involving concrete such that silica hazards can be identified and analyzed, and the appropriate controls implemented. (See **Deficiency D-SRMC-2**.) Not developing a clear and detailed TSPs that identify all relevant hazards and controls can result in unnecessary safety and health risks to workers. For example, the work description for the observed use of a hammer drill to chip concrete in preparation for the installation (embed) of a Johnson screen was not sufficiently defined in either the STARRT card or the *Floors-004* TSP under which the work was being performed. The STARRT card insufficiently described the work task as "floor embed," and the TSP did not identify a silica hazard or any silica hazard controls. While the STARRT card referenced TSP 006,

Silica in Concrete, which refers to 10 potential silica work tasks in table 1 of the *Silica Control Plan* (appendix Z to the SDU WPP), the appropriate silica work task from table 1 (chipping concrete) was not discussed in work documents (i.e., the STARRT card or TSP), resulting in the required respirators not being worn.

Identifying and Analyzing Hazards

For observed subcontracted work, most hazards were adequately identified and analyzed, including the proper engagement of appropriate SMEs to analyze task-based hazards and identify necessary controls. Subcontractor work documents (TSPs, work orders, and most STARRT cards) were generally sufficient to identify workplace hazards associated with observed work activities. For example, the TSP and STARRT card completed by the SRMC construction subcontractor shoring crew at SDU-10 identified the dominant workplace hazards observed during the replacement of cable reels. In another example, the service subcontractor's *Pump Truck* TSP appropriately identified workplace hazards and associated controls during the observed pump-out of a small septic tank.

During the planning of new work activities, SRMC and its construction subcontractors implement several hazard identification work processes (e.g., hazard review checklists, subcontract field conditions, IH hazard evaluations) that have been generally effective in identifying potential work activity hazards and hazard controls. For example:

- In preparation for the Handi House demolition project, the STR completed a hazard review checklist to identify facility- and project-introduced hazards and the organization that is responsible for managing those hazards (SRMC or the subcontractor).
- The IH hazard evaluation report prepared by the air monitoring subcontractor in support of the Handi House asbestos abatement project adequately identified potential hazards and appropriate controls for the asbestos demolition project.
- Prior to the start of work, the SRMC subcontractor at H Tank Farm completed a PPE hazard assessment checklist to identify hazards and required PPE for the demolition of the Handi Houses.

Although activity-level hazards were adequately identified in many subcontractor work documents, contrary to 10 CFR 851.21, *Hazard identification and assessment*, and SRMC 8Q33, *Confined Space Program*, noise, confined space, and mold hazards associated with subcontractor work activities were not adequately identified, analyzed, posted, and/or documented in five work observations to ensure that the appropriate hazard controls were identified and implemented. (See **Deficiency D-SRMC-3**.) Workers are at increased risk of injury or illness when facility-level hazards are not adequately identified and analyzed. Specifically:

- Potential noise hazards inside SDU-10 during shoring removal on August 14, 2024, had not been adequately assessed through sound-level monitoring or noise dosimetry. None of the workers for this subcontractor are currently enrolled in the company's hearing conservation program even though some workers could be exposed to sound levels greater than 85 dB. The subcontractor's safety representatives conducted sound-level readings inside SDU-10 on five days during the period of May 22 to July 10, 2024, while shoring was being removed from inside the tank. On June 1, 2024, for example, ambient sound levels ranged from 52.6 dB to 98.2 dB. When exposed to sound levels of 98.2 dB, a full 8-hr shift noise exposure (85 dB) would have been exceeded in less than 30 minutes, requiring both hearing protectors and enrollment in the hearing conservation program. However, noise dosimetry has not been used by this subcontractor to assess actual worker noise exposures.
- A corrective action maintenance work order performed by a service subcontractor at H Tank Farm in a pump room introduced additional noise during a lockout/tagout (LOTO) without the reevaluation of

associated sound levels involving the release of high-pressure air. Single hearing protection is required for entry into the area via posting, as this pump room is normally a noisy environment. However, during the required LOTO, bleeding off an air accumulator resulted in significantly increased ambient noise. Increased noise levels may require double hearing protection.

- Observed work by a service subcontractor during the troubleshooting of an air handler resulted in a near miss of the subcontractor inadvertently entering a "permit required confined space" that was not posted with a warning sign. During preparations for the execution of a work order for a compressor repair in the 704-Z air handling unit (AHU) 0001, the observed walkdown of the work area was performed in a location that appeared to meet OSHA's permit-required confined space criterion but was not posted as a confined space. Neither the work order, SRMC assisted hazard analysis, or subcontractor TSPs and WPP addressed confined space hazards. EA raised this concern to the STR and SRMC Environment, Safety, Health, and Quality points of contact prior to the subcontractor entering the AHU, which was subsequently evaluated by the SRMC IH department, resulting in designation and posting of this AHU and others in the area as permit-required confined spaces.
- A service subcontractor TSP associated with a work order for *SS Group Z 6 Month HVAC Inspection* did not identify hazards or controls associated with encountering and cleaning mold, mildew and slime during inspections of plenums and ductwork which was one of five tasks specified in the work order task instructions.

Developing and Implementing Hazard Controls

Hazard controls documented in reviewed work documents (work orders and TSPs) were generally detailed and appropriate for mitigating or controlling identified hazards. For example, more than 60 TSPs were developed by the SDU subcontractor to support the construction of the SDU-10 tank. Hazard controls documented in reviewed TSPs, in general, were detailed, specific, and applicable to the corresponding hazard stated in the TSP.

In addition, observed administrative and engineering controls implemented by SRMC construction subcontractors were generally well-developed, documented in TSPs and work orders, and effective in mitigating or controlling the identified workplace hazard. For example, heat stress controls for SDU-10 tank work being implemented by the SDU contractor included frequent documented wet bulb globe temperature monitoring at several tank locations (i.e., roof, tank floor, midlevel), electrolyte and cool and tepid water availability, a cooling station inside the tank, and warning color-coded flag displays to alert workers to changing heat conditions. Silica controls for SDU-10 masonry work to prepare for the installation of a Johnson screen included the use of a handheld HEPA vacuum to remove silica particles generated by use of a hammer drill to chip concrete. Dismantling of the interior tank shoring at SDU-10 by SRMC subcontractor shoring crews appropriately included the use of 100% tie-off for fall protection.

Subcontractor training for most observed work was appropriate for the work activity, and reviewed training records were current. Subcontractor workers performing asbestos abatement at the H Tank Farm Handi Houses were current with respect to asbestos training. Workers, supervisors, and air monitors each provided current South Carolina Department of Health and Environmental Control asbestos licenses. Workers at SDU-10 performing shoring removal were current with respect to fall protection and rigging training.

Although SRMC subcontractors have developed and implemented generally adequate hazard controls, the following weaknesses were identified:

- Contrary to DEAR 970.5223-1, during six observed work evolutions, hazard controls documented in subcontractor TSPs were not sufficient to control the identified hazard or were not implemented

effectively. (See **Deficiency D-SRMC-4**.) Not identifying and implementing adequate controls could place workers at an increased risk of injury and illness. Specifically:

- Eyewash provisions were inadequate for four observed HVAC unit troubleshooting evolutions, which required the testing and/or addition of refrigerant. The safety data sheet associated with the material in use and the TSP for the activity listed a potential eye hazard from contact with refrigerant, stipulating immediate flushing with water for 15 minutes. However, the eyewash control, which was in the subcontractor truck, consisted of several small eyewash bottles with a total water volume that would not the meet the flushing time stipulated in the safety data sheet and American National Standards Institute (ANSI) Z 358.1 (2014), *American National Standard for Emergency Eyewash and Shower Equipment*. In addition, the eyewash bottles were well past their marked expiration dates of 2012 and 2014.
- A service subcontractor's TSP to *Inspect/Replace as necessary belts and/or filters* included hazards involving biting/stinging insects and vermin, but the TSP did not include all appropriate hazard controls. The listed controls included inspecting the work area and eradicating nests with use of spray when possible. However, the controls did not include additional PPE, reassignment, and/or first aid response for any workers who may be sensitized to insect stings or vermin bites. Subsequent interviews with workers confirmed that one individual was sensitized to wasp bites, and no EpiPen® was available (within the worker's possession or at the work site). Additionally, the TSP controls for this task state that "Assistance from Pest/Wildlife control may be warranted." Further, the controls do not require coordination with emergency responders for any needed medical treatment.
- A hazard control used during observed construction prestressing operations at SDU-10 was not implemented effectively. The associated TSP required the erection of "barricades at least 100' from the tank." However, a portion of the barricade consisted of small green flags that were sometimes more than 20 feet apart, and one flag was embedded in the ground due to foot traffic. The green flags do not meet the definition of a barricade in 29 CFR 1926.968, *Definitions*, which is "[a] physical obstruction … that provides a warning about, and limits access to, a hazardous area." Furthermore, contrary to 29 CFR 1926.200(a), no signage was present at various worksite locations to indicate the purpose of the green flags as a barricade to maintain workers and visitors at a safe distance during prestressing operations.

- Contrary to DEAR 970.5223-1, in four work observations, SRMC did not ensure that all hazard controls documented in approved construction subcontractor WPPs were sufficient and/or implemented as written. (See **Deficiency D-SRMC-5**.) Workers are at increased risk of injury and illness when activity-level hazard controls are not sufficient or not implemented as defined in WPPs. Specifically:
  - Heat stress controls implemented by subcontractors at the H Tank Farm Handi House demolition project were inconsistent with the heat stress requirements of section V of the *Heat Stress Program* appendix of the subcontractor's SRMC-approved WPP. The TSP for this observed work activity identified the potential heat stress hazard and recommended controls of "fluids being available for employees" and a "cool down area." However, in addition to these controls, the subcontractor's WPP required that "the Safety Director decide prior to the beginning of the project whether 1) Personal Monitoring will be utilized or 2) Work/Rest Cycle based on Wet Bulb Globe Temperature will be utilized." During the observed work activity, neither of these heat stress worker monitoring methods were applied.
  - Neither the SRMC subcontractor nor the lower-tier subcontractor performing asbestos work at the H Tank Farm Handi House demolition project maintained a daily log of the name and signature of every individual entering the regulated area as required by the subcontractor's WPP *Asbestos Management* appendix.

- The subcontractor did not ensure that full-shift noise dosimetry was conducted in the SDU-10 tank in accordance with the subcontractor's WPP, appendix N, section 5.5.2, even though sound-level monitoring performed by the subcontractor measured wide fluctuations in sound levels (with some measurements exceeding 85dB) during a work shift.
- Even though the technical amendment to 10 CFR 851, which became effective in January 2018, requires compliance with the 2016 American Conference of Governmental Industrial Hygienists threshold limit values, the H Tank Farm Handi House demolition subcontractor's WPP, subpart Z, section III, only requires compliance with the 1970 threshold limit values.

Performing Work Within Controls

Observed work was generally performed without incident and within defined hazard controls, with some exceptions, and planned work was effectively scheduled and authorized. For example, work performed by an SRMC construction subcontractor to install the SDU-10 electric pole was conducted in a safe manner and in accordance with TSP requirements. The STR appropriately conducted a pre-job briefing using the hazards review checklist and obtained the work release prior to the start of work. The STR sought engagement from subcontractor personnel by asking them to describe the tasks to be completed to ensure their understanding of the appropriate actions in performing the work. Subcontractor personnel wore the appropriate PPE and conducted activities in a safe manner.

Further, the observed LOTO of energy sources in support of a service subcontractor work order at H Tank Farm in a pump room demonstrated effective coordination between SRMC Operations personnel and the subcontractor. SRMC Operations personnel de-energized the appropriate pressure and electrical systems and hung the administrative LOTO tags. This was accomplished while being observed by the subcontractor, who then performed the zero-energy verification. Subsequently, the final lock was properly attached by SRMC Operations personnel.

Stop work authority was evidenced by subcontractor supervisors and workers during the observed performance of activity-level work. In one instance, during observed demolition work at the H Tank Farm Handi Houses by a lower-tier subcontractor, work commenced prior to workers donning the required asbestos monitoring sampling pumps. When the subcontractor supervisor was informed of this non-compliance, he immediately stopped work and did not resume work until the sampling pumps were worn by the appropriate workers. In another instance, an SRMC subcontractor maintenance technician preparing to execute a LOTO in the 704Z motor control center appropriately stopped work when he noticed that the identifying numbers on the administrative LOTO tag did not match what was labeled on the panel; this issue was immediately conveyed to the Shift Operations Manager for corrective action.

Observed construction pre-job briefings and completion of STARRT cards were effective in communicating the extent of activity-level work, potential hazards, and hazard controls to workers. The construction subcontractor at SDU-10 requires the completion of STARRT cards by each craft work group prior to commencing work. The reviewed STARRT cards adequately identified the work activities, appropriate TSPs, and potential hazards and controls. STARRT cards are prepared by craft workers to encourage involvement of all workers in the identification of hazards and controls. The SRMC STR conducted an effective pre-job briefing for the monthly inspection of the Defense Waste Processing Facility freight elevator. The subcontractor appropriately obtained the work release from the Shift Operations Manager prior to performing the inspection. The subcontractor provided evidence of current qualified elevator inspector certification and was exceptionally knowledgeable in the operation, equipment, and safety features of the elevator.

Although construction pre-job briefings were effective, the first observed service subcontractor pre-job briefing did not follow the pre-job briefing checklist and did not discuss work hazards and controls. These briefings improved during the assessment, but as discussed in section 3.1 of this report, the service subcontractor briefings did not include a discussion of the appicable TSPs covering the work orders or the hazard and controls delineated in the applicable TSPs.

While some observed work activities were performed within the hazard controls established in work orders and TSPs, contrary to DEAR 970.5223-1, SRMC did not ensure that all of its subcontractors performed their work within the controls defined in TSPs and work order task instructions. (See **Deficiency D-SRMC-6**.) Not performing work within established work documents and TSP controls places workers at increased risk of injury and illness. Specifically:

- During the completion of the *SS Group Z 6 Month HVAC Inspection*, one of the five work order instructions for completing the maintenance on each HVAC unit to "Verify proper charge and perform refrigerant leak check" was not followed and completed as required.
- During the troubleshooting of an HVAC unit at F Tank Farm Trailer 241-127F, subcontractor workers did not de-energize the running HVAC unit prior to accessing the internal components and testing refrigerant pressure levels, as required by the following work control documentation:
    - The manufacturer's hazard warning labels affixed to the doors, stated that "all power must be disconnected before servicing and do not enter this section while unit is operating."
    - Task 3 of the TSP requires hazardous energy sources to be isolated and controlled in accordance with Manual 8Q, Procedure 32, *Hazardous Energy Control*, prior to beginning work to verify that the equipment has been isolated and/or de-energized.
    - The subcontractor's WPP states that "unless absolutely necessary, all work performed, which may contain hazardous energy, shall be performed with equipment in the de-energized state, and that any exemption from LOTO will be documented." However, no documentation was prepared to support the performance of energized work as required.
- An excavation checklist required by the subcontractor's TSP was not completed for observed work on the SDU-10 power pole riser.
- Several electrical requirements were missed during the performance of corrective maintenance for an air dryer, which required the subcontractor to perform a LOTO observation of SRMC operators performing the LOTO and an independent zero-energy verification by the subcontractor. While the zero-energy verification was generally conducted properly, the voltage-rated gloves worn by the subcontractor were last tested in June 2023, beyond the required recall/testing frequency. In addition, the voltmeter used for the zero-energy verification was not tested to a known energy source either before or after the zero-energy verification, contrary to National Fire Protection Association 70E, *Standard for Electrical Safety in the Workplace*.
- The subcontractor performing a Defense Waste Processing Facility freight elevator monthly inspection did not meet the designated PPE requirements for a Level 0 arc flash hazard (i.e., long-sleeved cotton coveralls and safety glasses). The subcontractor's PPE included safety glasses and non-rated gloves but did not include long-sleeved cotton overalls. Additionally, SRMC was unable to demonstrate that the subcontractor was a qualified electrical worker.

Providing Feedback

STRs, SRMC safety and health specialists/representatives, and subcontractor safety representatives provide a continual source of work performance feedback to subcontractors through MFOs, TBOs, and safety inspections conducted by SRMC subcontractors. During the period of January 1, 2024, through

August 14, 2024, the two SRMC STRs assigned as oversight for the construction subcontractor at SDU-10 conducted 120 TBOs. Safe work observation data sheets are completed and documented weekly by the subcontractor safety representative during the asbestos abatement and demolition of the H Tank Farm Handi Houses.

Work Planning and Control Implementation Conclusions

SRMC and subcontractor implementation of WP&C institutional programs, including the five core functions of ISM, for subcontracted work at the liquid waste facilities was generally adequate. SRMC is generally effective in managing work associated with HVAC service, asbestos abatement, construction, and demolition. However, weaknesses were identified with work documents associated with defining work scopes, identifying and analyzing hazards, developing and implementing hazard controls, and performing work within specified controls, including some significant performance issues related to implementation of hazardous energy and electrical safety controls.

3.3 Contractor Assurance System

This portion of the assessment evaluated the effectiveness of SRMC's contractor assurance system (CAS) to plan and conduct risk-based assessments, analyze WP&C issues, manage corrective actions, review performance, and share lessons learned regarding subcontracted work.

Contractor Assurance System Program Description

SRMC has established a generally effective CAS. SRMC's CAS provides adequate corporate processes, assessments, issues management tools, and periodic performance reports. In accordance with DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, SRMC received DOE-SR approval of its initial CAS description. The CAS program description appropriately requires the flowdown of organizational and facility implementing procedures to subcontractors.

While the SRMC CAS program description generally meets the requirements of DOE Order 226.1B, attachment 1, section 2.c, it does not, in part, "clearly define processes, key activities, and accountabilities" for managing subcontractor activities. For example, the SRMC CAS does not address specific elements, such as assessment results, corrective actions, and lessons learned, with respect to subcontractor work performance. (See **OFI-SRMC-1**.)

Assessments

SRMC has developed an adequately structured assessment program (Manual 12Q, *Assessment*, Procedure SA-1, *Self-Assessment*). Assessment performance objectives and criteria across 27 functional areas are identified, including quality assurance, maintenance, occupational safety and health, procurement, and WP&C, with associated lines of inquiry. In accordance with DOE Order 226.1B, attachment 1, section 1, SRMC employs a multi-pronged approach to assess subcontractor safety and health performance by using integrated independent evaluations (IIEs), facility self-assessments, construction subcontract self-assessments, MFOs, and TBOs. Manual 12Q, Procedure SA-1, requires SRMC to develop annual self-assessment schedules, resulting in integrated assessment plans. Integrated assessment plans from 2021 to 2024 included a performance objective requiring SRMC to "ensure subcontractors working within SRMC facilities are assessed to validate safe performance of work." A review of available IIEs, self-assessments, MFOs, and TBOs demonstrates that there is an ongoing effort by SRMC to meet this performance objective.

Issues Management

SRMC has established a generally adequate issues management program for subcontractor performance. SRMC's CAS has a comprehensive corrective action program, as evidenced by its STAR system and associated procedures (Contractor Assurance System Manual 22Q, Procedure CAP-1, *Corrective Action Program*, and Manual S13, section 5.5, *Corrective Action Program Supplement*). Procedure CAP-1 appropriately identifies the issues management process for distinguishing between findings and OFIs and how to address them during the corrective action process. For self-assessments and IIEs, SRMC generally implements Procedure CAP-1 in the STAR system appropriately.

While the SRMC issues management system is generally adequate, contrary to DOE Order 422.1, *Conduct of Operations*, attachment 2, appendix A, section 2.a.(3), SRMC does not consistently track and correct subcontractor issues identified through MFOs and TBOs. (See **Deficiency D-SRMC-7**.) Inconsistently applying the formal issues management process to MFOs and the lack of treatment of TBOs in the issues management process could result in inadequate resolution of issues and missed opportunities for identifying and correcting trends related to subcontractor activities. Specifically:

- Procedure CAP-1 does not define a formal issues management process for issues identified in TBOs.
- MFO 2024-MFO-003128, *Blue Star Rental Subcontractor - Pre Job Briefing*, documents an STR acting as a spotter for a construction subcontractor to ensure that there is no oncoming vehicle or pedestrian traffic to interfere with the loading of equipment onto a vehicle. STRs are not responsible or authorized to perform this subcontractor activity per Manual S28, *LW Subcontract Management Program*, Procedure 1.2, *LW Subcontract Technical Representative (STR)*, section 5.8. This issue was not entered into the STAR system.
- MFO 2024-MFO-001834, *Trailer Roofing Observation*, documents a violation of worker safety requirements (inadequate fall protection) by an SRMC construction subcontractor. The actions taken did not include entering any corrective actions (Commitment Tracking System (CTS) item) in the STAR system.
- MFO 2024-MFO-004511, *Extent of Condition for Rigging and Transport via Overland Transport*, documents an extent-of-condition review for construction subcontractor rigging and transportation practices following an event in L-Area involving a 20-ton cask becoming unsecured and rolling from the bed of a flatbed truck during transit. The MFO did not include an evaluation of subcontractor training with respect to rigging, loading, and securing loads or state whether the subcontractors were trained to site-specific requirements.
- MFO 2024-MFO-011127, *SDU Weekly Safety Walkdown*, documents a construction subcontractor not meeting TSP requirements. Corrective actions were identified but not tracked or corrected through the formal issues management process in STAR (i.e., no CTS items were generated).
- Thirteen MFOs documenting monthly construction TBO summaries from June 2023 through June 2024 identified deficiencies without identifying findings, OFIs, or COTS ("corrected on the spot") and without any indication of issues being entered into the STAR system.

Performance Review, Feedback and Improvement, and Lessons Learned

SRMC has established a generally adequate set of procedures for performance review, feedback and improvement, and lessons learned in Manual 22Q. Procedures addressing these CAS elements include PA-A1, *LWO Performance Analysis*, and OE-1, *Operating Experience Program*, which appropriately include subcontractors within their scope. SRMC has appropriately implemented these procedures by instituting the management-level Executive Safety and Quality Board (ESQB) charter to review impactive programmatic and facility issues on an ongoing basis. Issues are tracked, trended, and reported to the

SRMC ESQB. Reviewed ESQB meeting minutes demonstrate that the ESQB meets monthly as per established requirements. The STAR system appropriately documents ESQB meetings, including the ESQB meeting slides and action items. Reviewed ESQB action items were appropriately assigned responsible persons and completion dates. However, even though the SRMC Quality Assurance Management Plan, CAS description, ISMS description, and SRMC *Roles, Responsibilities, Accountabilities, and Authorities* manual identify specific needs to address performance of subcontractor activities, performance analysis reports do not specifically highlight overall performance of subcontractor activities. (See **OFI-SRMC-2**.)

The CAS appropriately includes a process for developing and disseminating lessons learned. A review of the STAR system for 2024 showed several reports that originated from SRMC-related activities, with a few of those addressing subcontractor-related activities. The CAS has appropriately assigned a Lessons Learned Coordinator to manage the SRMC lessons learned program. The coordinator appropriately disseminates lessons learned from the DOE Operating Experience Program to SRMC functional area program managers. The system shows that 77 SRMC lessons learned were issued during the period of 2020 to 2024. Reviewed STAR actions identified four examples of lessons learned distributed to subcontractors.

Contractor Assurance System Conclusions

SRMC has established a generally effective CAS that provides adequate corporate processes, assessments, issues management tools, and periodic performance reports. However, a weakness was identified with tracking, trending, and correcting subcontractor issues through MFOs and TBOs.

3.4 Federal Oversight

This portion of the assessment evaluated DOE-SR's oversight of WP&C for SRMC's CAS related to subcontractor work activity, as well as specific DOE-SR programs, including integrated oversight, issues management, the Facility Representative (FR) program, the technical qualification program (TQP), the operating experience and lessons learned (OE/LL) program, and the ECP.

Oversight

DOE-SR Waste Disposition Operations Division (WDOD) FRs and Office of Safety and Quality Assurance (OSQA) SMEs conduct effective oversight of SRMC and provide information on SRMC's CAS performance. DOE oversight is performed using SRM 226.1, *Integrated Performance Assurance Manual (IPAM)*. Documented oversight products (e.g., operational awareness, program assessments, and MFOs) are detailed, thorough, and cover safety and health-related areas/topics, including reviews of SRMC's CAS program. Interviews with FRs and SMEs reflected strong engagement between the two groups, and staff work collaboratively to share information on contractor programs, implementation, field observations, and events. WDOD personnel and the SDU Federal Project Deputy Director work closely to oversee activities at the SDU construction site, which is primarily operated by subcontractors. The DOE-SR Federal Project team identified the need to have additional oversight at SDU and hired a support contractor. OSQA SMEs recently performed two assessments, evaluating SRMC's oversight of subcontractors, which identified issues with the flowdown and implementation of safety and health requirements to lower, sub-tier contractors.

Issues Management

DOE-SR personnel document oversight activities and transmit results (e.g., findings, OFIs, other feedback) to SRMC via monthly letters and through the STAR system. Monthly subjective feedback is

developed by each division, with staff input, and presented to SRMC. Findings, deficiencies, and OFIs, primarily identified through oversight, are documented within the STAR system and are transmitted to SRMC to undergo issue screening and action following the contractor's issues management process. DOE-SR oversight staff have access to STAR and effectively search and trend by functional area, contractor, and facility, as well as follow up on actions and supporting evidence for issue closure. Interviews with DOE-SR staff confirmed that staff use STAR to assist in monitoring progress on corrective actions and trending of issues. In addition, the Performance Assurance Division prepares a quarterly status report on open concerns, findings, corrective action plans, deficiencies, and corrective actions. DOE-SR also conducted an assessment identifying weaknesses with SRMC's MFO process. A separate DOE-SR dashboard is accessible and can display various types of data, including how many assessments were performed of SRMC by functional area, the list of findings identified from those assessments, breakout data by sub-categories within functional areas (such as hazard controls or subcontractor safety and health), and also by category codes (such as human performance less than adequate, design/engineering problem, or training deficiency).

Facility Representative Program

DOE-SR and WDOD implement a generally effective FR program that meets the requirements of DOE-STD-1063-2021, *Facility Representatives*. DOE-SR's SRIP 430.1, *Facility Representative Program*, is consistent with DOE-STD-1063-2021 and adequately describes FR duties, responsibilities, and authorities. DOE-SR prepares quarterly performance indicator reports, completes FR staffing analyses, and completed a self-assessment of its FR program in September 2021. The staffing analyses identified the need for 13 FRs for WDOD; the division is currently understaffed by 1 full-time equivalent, sitting at 12 FRs: 6 fully qualified and 6 undergoing qualifications. In comparison to the fiscal year 2024 analysis, completed in November 2023, WDOD has added three full-time equivalents. Interviewed FRs described conducting monthly operational awareness assessments that include a combination of the following: facility tours, document reviews, observing meetings, field work, observing control room activities, and surveillance requirements.

Technical Qualification Program

DOE-SR has established and implemented a generally effective TQP meeting the requirements of DOE Order 426.1B, *Department of Energy Federal Technical Capabilities*. SRIP 426.1, *Technical Qualification Program*, identifies and documents DOE-SR's process; specific roles and responsibilities; continuing training requirements; compensatory measures and mitigations when undergoing initial qualification or failure to maintain qualification; assignment of required qualification standards; development, review, and maintenance of organization- and site-specific standards; and records management. DOE-SR completed its TQP self-assessment in March 2023, which identified two findings and three OFIs, which were addressed and closed in STAR. The TQP Coordinator compiles records and maintains information in eTQP, reviews position descriptions, and works with line management to ensure that positions requiring TQP are identified and assigned. Review of qualification and progress trackers for WDOD FRs, OSQA Safety and Health SMEs, and senior technical safety managers and an interview with the TQP Coordinator demonstrated that the program is implemented in accordance with local program requirements and DOE Order 426.1B.

Lessons Learned and Operating Experience Program

A revision of the DOE-SR OE/LL program, SRIP 200, chapter 210.2, *Department of Energy Savannah River Operating Experience (OE) and Lessons Learned (LL) Program*, was completed and issued in April 2022. DOE-SR established an independent DOE-SR-only lessons learned component, within the OPEXShare database, which allows DOE-SR users to submit and the DOE-SR OE/LL Coordinator to

independently manage (review, approve, and enter) operating experiences and share with the broader DOE Complex. The DOE-SR OE/LL Coordinator attends monthly Office of Environmental Management Headquarters OE/LL meetings, observes SRS contractor sitewide OE/LL monthly meetings, and disseminates information from OPEXShare to DOE-SR staff, as applicable. However, while the program has improved, DOE-SR has not fully implemented an effective OE/LL program. Contrary to SRIP 200, chapter 210.2, DOE-SR has not planned or scheduled assessments to evaluate the DOE-SR OE/LL program and its effectiveness. (See **Deficiency D-DOE-SR-1**.) Not evaluating the effectiveness of the OE/LL program limits the understanding of how information from internal and external past events, lessons learned, and operating experience are shared and used to improve future operational and safety performance.

Federal Oversight Conclusions

DOE-SR has established a generally comprehensive, integrated process for Federal line oversight. DOE-SR has a robust TQP, adequately documents operational awareness and programmatic assessments, conducts contractor assurance analyses, and effectively communicates issues from oversight activities to SRMC. However, DOE-SR has not conducted an assessment of its OE/LL program, so the program remains not fully implemented.

4.0 BEST PRACTICES

No best practices were identified during this assessment.

5.0 FINDINGS

No findings were identified during this assessment.

6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. Deficiencies that did not meet the criteria for findings are listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

Savannah River Mission Completion, LLC

Deficiency D-SRMC-1: SRMC did not ensure that applicable TSPs for service subcontractor work were formally identified in eight reviewed work orders governing the work, nor did the work orders contain the task-specific hazards and required controls. (DEAR 970.5223-1 and SRMC-ESH-2022-00001, sec. 4.2 and app. A)

Deficiency D-SRMC-2: SRMC has not ensured that its construction subcontractors have developed sufficient detail in TSPs for routine work activities involving concrete, such that silica hazards can be identified and analyzed, and the appropriate controls implemented. (SRMC-ESH-2022-00001, sec. 4.2 and app. A)

Deficiency D-SRMC-3: SRMC and SRMC subcontractors did not adequately identify, document, and/or analyze the hazards in some subcontracted work tasks associated with noise, confined space, and mold hazards. (10 CFR 851.21 and SRMC 8Q33)

Deficiency D-SRMC-4: SRMC does not ensure that all hazard controls documented in subcontractor TSPs are sufficient to control the identified hazard or are implemented effectively. (DEAR 970.5223-1 and SRMC-ESH-2022-00001, sec. 4.2 and app. A)

Deficiency D-SRMC-5: SRMC does not ensure that all hazard controls documented in approved construction subcontractor WPPs are sufficient and implemented as written. (DEAR 970.5223-1 and SRMC-ESH-2022-00001, sec. 4.2 and app. A)

Deficiency D-SRMC-6: SRMC does not ensure that all of its subcontractors perform their work within the controls defined in TSPs and work order task instructions. (DEAR 970.5223-1 and SRMC-ESH-2022-00001, sec. 4.2 and app. A)

Deficiency D-SRMC-7: SRMC does not consistently track or correct subcontractor issues identified through MFOs and TBOs. (DOE Order 422.1, att. 2, app. A, sec. 2.a.(3))

DOE Savannah River Operations Office

Deficiency D-DOE-SR-1: DOE-SR has not planned or scheduled assessments to evaluate the DOE-SR OE/LL program and its effectiveness. (SRIP 200, chapter 210.2)

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified the OFIs shown below to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports, they may also address other conditions observed during the assessment process. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

Savannah River Mission Completion, LLC

OFI-SRMC-1: Consider specifying the applicability of CAS description elements to subcontractors.

OFI-SRMC-2: Consider incorporating subcontractor performance data in performance analysis reports.

Appendix A
Supplemental Information

Dates of Assessment

July 18 to September 5, 2024

Office of Enterprise Assessments (EA) Management

John E. Dupuy, Director, Office of Enterprise Assessments
William F. West, Deputy Director, Office of Enterprise Assessments
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments
Thomas E. Sowinski, Director, Office of Nuclear Safety and Environmental Assessments
Kimberly G. Nelson, Director, Office of Worker Safety and Health Assessments
Jack E. Winston, Director, Office of Emergency Management Assessments
Brent L. Jones, Director, Office of Nuclear Engineering and Safety Basis Assessments

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