



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 E. LAMAR BLVD
ARLINGTON, TX 76011-4511

September 19, 2017

MEMORANDUM TO: Docket File 030-28641

THRU: Vivian H. Campbell, Chief **/RA/**
Materials Licensing & Inspection Branch
Division of Nuclear Materials Safety

FROM: Robert Evans, PhD, Senior Health Physicist **/RA/**
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

SUBJECT: SAFETY EVALUATION REPORT
FOR PROPOSED DECOMMISSIONING OF BUILDING 181
AT ROBINS AIR FORCE BASE, GEORGIA

The Department of the Air Force (the licensee) submitted a proposed Decommissioning Plan (DP) to the U.S. Nuclear Regulatory Commission (NRC) by Memorandum dated March 21, 2017, as amended on June 13, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17094A481 and ML17167A421). The licensee planned to use the instructions provided in the DP to remediate residual depleted uranium from Building 181 at Robins Air Force Base, Georgia.

The NRC staff developed the enclosed Safety Evaluation Report (SER) to evaluate the safety-related impacts of the proposed activity. This SER was developed using the guidance provided in Appendix G, "Safety Evaluation Report Outline and Template," from NUREG-1757, Volume 1, Revision 2, Consolidated Decommissioning Guidance Decommissioning Process for Materials Licensees.

Based on the results of the NRC's analysis as presented in the enclosure to this Memo, the staff concludes that the proposed action—the decommissioning of Building 181—will not have a significant impact on worker and public safety. Accordingly, the staff recommends that Master Materials License 42-23539-01AF be amended to approve the DP.

Docket: 030-28641
License: 42-23539-01AF

Enclosure:
Safety Evaluation Report

CONTACT: Robert Evans, RIV/DNMS/FCDB
817-200-1234

ROBINS AFB SAFETY EVALUATION REPORT DATED SEPTEMBER 19, 2017

DISTRIBUTION:

RIV Regional Administrator (Kriss.Kennedy@nrc.gov)
 RIV Deputy Regional Administrator (Scott.Morris@nrc.gov)
 DNMS Director (Mark.Shaffer@nrc.gov)
 DNMS Deputy Director (Linda.Howell@nrc.gov)
 FCDB Branch Chief (Ray.Kellar@nrc.gov)
 FCDB Senior Health Physicist (Robert.Evans@nrc.gov)
 FCDB Health Physicist (Linda.Gersey@nrc.gov)
 MLIB Branch Chief (Vivian.Campbell@nrc.gov)
 NMSS Senior Risk Analyst (David.Esh@nrc.gov)
 NMSS Branch Chief (Christopher.McKenney@nrc.gov)

DOCUMENT NAME: Robins AFB Safety Evaluation Report – Memo to Docket File.docx

ADAMS ACCESSION NUMBER: **ML17193A222**

SUNSI Review ADAMS: Non-Publicly Available Non-Sensitive Keyword:
 By: RJE Yes No Publicly Available Sensitive

OFFICE	FCDB	C:FCDB	C:MLIB	
NAME	RJEvans	RLKellar	VHCampbell	
SIGNATURE	/RA/	/RA/	/RA/	
DATE	08/28/17	08/28/17	09/13/17	

OFFICIAL RECORD COPY

SAFETY EVALUATION REPORT
FOR DECOMMISSIONING OF BUILDING 181
AT ROBINS AIR FORCE BASE, GEORGIA
MATERIALS LICENSE 42-23539-01AF, DOCKET 030-28641

I. EXECUTIVE SUMMARY

The Department of the Air Force (the licensee) submitted a proposed Decommissioning Plan (DP) to the U.S. Nuclear Regulatory Commission (NRC) by Memorandum dated March 21, 2017, as revised on June 13, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML17094A481 and ML17167A421). The licensee planned to use the instructions provided in the DP to remediate residual depleted uranium (DU) from within Building 181 at Robins Air Force Base (AFB), Georgia. The licensee's DP also included a final status survey plan and derived concentration guideline level (DCGL) evaluation. The NRC staff announced the receipt of the draft DP in the *Federal Register* on May 3, 2017 (82 FR 20639).

A DP is supposed to provide a detailed description of the activities that a licensee intends to use to: (1) assess the radiological status of its facility; (2) remove radioactivity attributable to licensed operations at its facility to levels that permit release of the site in accordance with NRC's regulations and termination of the license; and (3) demonstrate that the facility meets NRC's requirements for release. The NRC staff conducted a detailed technical review of the licensee's draft DP, in part, to ensure compliance with the regulatory requirements of Title 10, *Code of Federal Regulations* (CFR) Part 20, Subpart E, Radiological Criteria for License Termination, and 10 CFR 30.36, Expiration and Termination of Licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas. This Safety Evaluation Report is the NRC staff's evaluation of the radiological and safety consequences of the licensee's proposed action.

In summary, the licensee's proposed DP demonstrates that the licensee has adequately assessed the radiological status of the facility, will safely remove the radioactivity to levels that permit the release of the site, and will demonstrate through performance of a final status survey that the facility meets the NRC's requirements for unrestricted release.

The NRC staff prepared this SER using the guidance provided in NUREG-1757, Volume 1, Revision 2, Consolidated Decommissioning Guidance (Accession No. ML063000243), Appendix G, "Safety Evaluation Report Outline and Template." The NRC also conducted an environmental assessment of this decommissioning project, and the results of this assessment are provided in a separate document (Accession No. ML17207A232). The results of this safety evaluation and the conclusion of the environmental assessment will be used by the NRC in support of its licensing decision to approve or disapprove the DP.

II. FACILITY OPERATING HISTORY

Building 181 was originally used to test aircraft engines. The building was later repurposed for other uses. Portions of the building, specifically Cells 5 and 6, were used for a period of time for removal of oxidation products from aircraft counterweights containing DU. The oxidation was removed by scraping and scrubbing the counterweights. The counterweights were then cleaned before being encased in an aluminum screen. The licensee could not easily ascertain when activities involving radioactive material were conducted in the building. The licensee was unable to locate records of spills, prior onsite burials, or previous decommissioning activities for this decommissioning project.

III. FACILITY DESCRIPTION

Building 181 is located within the boundary of Robins AFB. Other structures and paved roads are located around the property. An airfield and tarmac are located nearby. Building 181 is a three-story building that consists of 12 cells, interconnected rooms, and a center section. The building footprint is about 70,000 square feet (6,500 square meters). After decommissioning and final surveying, the licensee plans to demolish Cells 1-8 and interconnected rooms. The footprint of the building scheduled to be demolished is approximately 64,000 square feet (5,950 square meters). After partial demolition, Cells 9-12 will continue to be used for non-radiological work.

The licensee provided some information about the local geological and hydrogeological conditions. The building is located at an outcrop of the Providence aquifer. The Providence aquifer consists of upper Cretaceous age fine to coarse grained sand with interlayered silt and clay. Based on sample results collected from vicinity wells in April 2014, the unsaturated zone is approximately 25-feet (7.6 meter) thick in the area of the building. Soil borings from nearby wells indicate that the unsaturated zone consists of sand, silty sand, and clayey sand. Based on the depth of the unsaturated zone (25 feet/7.6 meters) and the thickness of the floor (5-6 feet/1.5-1.8 meters), the licensee concluded that it was unlikely that DU contamination within Building 181 has migrated into the groundwater beneath the building. There are no surface waters in the vicinity of the building.

The NRC staff reviewed the information presented in the proposed DP for Building 181 using the guidance provided in NUREG-1757, Volume 1, Sections 16.2 and 16.3. Based on this review, the NRC staff has determined that the licensee provided sufficient information to aid the staff in its evaluation of the radiological status of the facility and the licensee's planned decommissioning activities, to ensure that site decommissioning can be conducted in accordance with NRC requirements.

IV. RADIOLOGICAL STATUS OF FACILITY

The radionuclides of concern include uranium-238, uranium-235, and uranium-234. Depleted uranium is distinguished from natural uranium by lower relative concentrations of uranium-234 and uranium-235. The activity of DU is roughly 60-percent the activity of natural uranium.

A radiological scoping survey was conducted after operations involving DU had been permanently discontinued. A scoping survey is a type of survey that is conducted to identify the radionuclide contaminants, relative radionuclide ratios, and general levels and extent of contamination. The scoping survey results are presented in Attachment A, "Historical Radiological Survey Results," to Appendix A of the DP. The survey consisted of measurement of alpha and beta particulate contamination at various locations around Cell 5, Cell 6, and interconnected rooms. The survey included 46 fixed point measurements. The survey results indicate that elevated beta particulate contamination, above 5,000 disintegrations per minute per 100 square centimeters (dpm/100 cm²), was identified in Cell 6 and the adjacent storage room. The licensee's contractor was unable to clearly ascertain the date of this survey.

A second scoping survey was performed by the licensee's contractor in August 2015, in part, to corroborate the previous sample results. The results of this survey are also presented in Attachment A, "Historical Radiological Survey Results." These survey results identified the presence of DU contamination in Cell 6.

To determine the site-specific ratio of the uranium isotopes at Building 181, the licensee collected and analyzed three sets of samples from the building in August 2015. These samples included paint chips and metal shavings. The analytical results were averaged, and ratios were established between the three different radioisotopes. These analytical results are summarized in Table 1 of the DP, "Summarized Analytical Results." This information was used in the licensee's development of DCGLs for the building surfaces and soil beneath the building.

The licensee's contractor conducted a detailed baseline (characterization) survey of the building in November-December 2015 to delineate the extent of radioactive contamination throughout the building. The results of these baseline surveys are summarized in Section 3.0 of the DP, "Baseline Survey Results." Details of the surveys, including maps and individual data points, are provided in the DP, Attachment 2, "Completed Baseline Surveys." The baseline surveys included scans, direct measurements, and smears of surfaces and equipment located throughout the building. A limited number of surveys were conducted on outdoor surfaces including the roof and ventilation system.

The results of the baseline survey are summarized in Section 4.2, "Building Areas Requiring Decontamination." In general, decontamination efforts are necessary in Cells 5 and 6 for both DU and lead-based paint. Some areas located immediately adjacent to these two cells require limited amounts of decontamination. The licensee's contractor also identified contaminated carpet, tiles, and equipment during the building surveys. These items have been packaged and staged for future shipment as radioactive waste material.

During the baseline survey, approximately 160 gallons of standing water was identified in Room 5A, Room 5B, and Cell 7. The water was assumed to be rainwater that had leaked into the building. The licensee's contractor collected the water, sampled the water, and compared the sample results to the effluent concentration limits presented in 10 CFR 20, Appendix B, Table 2. The water sample results are presented in Tables 16 and 18 of the DP. Based on these sample results, Air Force base staff decided to release the water for disposal. The water was filtered prior to discharge, and the collected solids will be handled as low level radioactive waste. The water was transferred to the base industrial wastewater treatment plant for disposal.

After the interior of the building has been decontaminated, the licensee plans to conduct a final status survey of the remediated areas. Details about the final status survey are provided in the DP, Section 5.0, "Final Status Survey Plan." The licensee plans to use the results of the final status survey, and the results of the baseline characterization survey in areas where contamination was not identified above the DCGL, to release the building structure for unrestricted use. After unrestricted release, the licensee plans to partially demolish the building.

The licensee has not sampled the soil beneath the building. The licensee does not expect to find contamination under the building slab, but as a precaution, the licensee's contractor will monitor the soil during building demolition. After completion of demolition, the licensee plans to conduct a final status survey of the building footprint underneath Cells 5 and 6, to demonstrate that the soil meets the release criteria. The details for this portion of the final status survey are provided in Section 5.2 of the DP.

The NRC staff reviewed the information in the DP for Building 181 using the guidance provided in Section 16.4 of NUREG-1757, Volume 1. Based on this review, NRC staff determined that the licensee has described the types and activities of radioactive material contamination sufficiently to allow the NRC staff to evaluate: the potential safety issues associated with remediating the facility; whether the remediation activities and radiation control measures

proposed by the licensee are appropriate for the type of radioactive material present at the facility; whether the licensee's waste management practices are appropriate; and whether the licensee's cost estimates are plausible, given the amount of contaminated material that will need to be removed or remediated.

V. DOSE MODELING

This project was designated as a Group 4 decommissioning project using the guidance provided in NUREG-1757, Volume 1, Revision 2. Group 4 facilities have residual radiological contamination present in building surfaces and soils, the licensee chooses to use site-specific release criteria, and the groundwater beneath the site is not contaminated.

By Memorandum dated March 21, 2017, as amended (Accession Nos. ML17094A481 and ML17167A420), the licensee submitted a draft DP to the NRC for review and approval. The licensee elected to conduct dose modeling using site-specific criteria to demonstrate compliance with the 25-millirem (0.25 mSv) per year limit specified in regulation 10 CFR 20.1402. The licensee's modeling results are presented in Appendix B to the DP, "RESRAD Memo."

Using RESRAD Version 7.0 and the resident farmer scenario, the licensee proposed a surrogate DCGL of 4.6 picocuries per gram for uranium-238 in the soil beneath the building. The licensee proposed a surrogate DCGL in lieu of a combined DCGL. Since the licensee proposed a surrogate DCGL, the licensee does not plan to use the sum of fractions methodology (also called unity rule) as acceptance criteria.

Using RESRAD-BUILD Version 3.5, the licensee proposed a combined building surface DCGL of 2,570 dpm/100 cm². This proposed DCGL refers to total beta-gamma contamination versus alpha or alpha + beta contamination. The licensee assumed a 10-percent removable fraction, and the licensee concluded that the use of a combined surface DCGL eliminated the need for use of the sum of fractions methodology.

The licensee expects all final status survey sample results to be less than the DCGLs; thus, the licensee is not proposing to use area factors and elevated measurement comparisons for localized radioactive hot spots.

In summary, the NRC staff conducted a detailed review of the licensee's proposed, site-specific DCGLs. The results of the staff's review are presented in an internal Memorandum dated June 29, 2017 (Accession No. ML17166A370, not publicly available). The staff evaluated the licensee's analyses to demonstrate compliance with 10 CFR 20.1402 using the guidance for evaluation of dose modeling as provided in NUREG-1757, Volume 2, Revision 1, Consolidated Decommissioning Guidance Characterization, Survey, and Determination of Radiological Criteria (Accession No. ML063000252) focusing on the source term, exposure scenarios, conceptual and mathematical model, parameter selection, and uncertainty evaluation. The staff were able to verify the licensee's proposed DCGLs for the building occupancy and resident farmer scenarios. The NRC staff concluded that the DCGLs developed by the licensee provided reasonable assurance that exposures to residual radioactivity remaining at Building 181 after remediation will ensure that exposures to individuals will comply with the radiological criteria specified in 10 CFR Part 20.1402.

VI. ENVIRONMENTAL INFORMATION

The results of the NRC's environmental assessment review are provided in a separate document (Accession No. ML17207A232) and is not included in this safety evaluation.

VII. ALARA ANALYSIS

Regulation 10 CFR 20.1402 requires licensees to reduce residual radioactivity to levels that are as low as reasonably achievable (ALARA). Regulation 10 CFR 20.1101(b) requires licensees to implement radiation protection programs to achieve doses to workers and the public that are ALARA. The ALARA program requirements are provided in the contractor's radiation safety program, Section 3.4. (The radiation safety program is provided in Appendix A to the DP.) The ALARA program will include procedures and other administrative controls. The contractor's radiation safety officer is responsible for implementing the ALARA practices during decommissioning. This individual is also responsible for establishing ALARA goals for individuals and the work project.

The licensee and its contractor incorporated the principles of ALARA in the following radiation protection program attributes:

- The contractor will not use the elevated measurement comparison process when applying the DCGLs; that is, no individual sample point will exceed the DCGLs resulting in actual doses being less than allowed
- Areas identified above the DCGLs will be remediated, potentially resulting in the remaining contamination being less than the DCGLs during final status surveys
- The routine audit program will include a review of the ALARA program
- Training will include the ALARA philosophy
- All workers have stop work authority, including situations where work conditions do not meet the ALARA philosophy
- The contractor will implement administrative limits to ensure that the regulatory dose limits are not exceeded
- Investigations will be conducted if any administrative limit is exceeded

Based on its review, the NRC staff has determined that the licensee and its contractor have provided sufficient information to conclude that the licensee's radiation protection program will comply with the ALARA requirements specified in 10 CFR Part 20.

VIII. PLANNED DECOMMISSIONING ACTIVITIES

Details about building decontamination and demolition are provided in Section 4.0 of the DP. Site decommissioning will include remediation of building surfaces and subsurface soil, as necessary. The work will be conducted by a licensed service provider on behalf of the licensee. The service provider's radiation safety program is included in Appendix A to the DP, "Project Related Procedures." As recommended by NUREG-1757, Volume 1, Appendix K, "Licensing Site Remediation Contractors for Work at Temporary Job Sites," the contractor executed a written agreement with the Air Force prior to conducting work. This agreement is included in Attachment 4 to the DP, "NRC License Agreements." The agreement specifies the responsibilities for both the Air Force and the service provider.

Within the building, the areas scheduled to be remediated include Cell 5, Cell 6, and several adjacent areas. Lead-based paint will also be abated during the decommissioning process.

Radioactive contamination on the concrete floor and walls will be removed by scabbling or similar surface removal methods. The removed material will be packaged for shipment. Prior to shipment, the lead-based paint and radioactive contamination will be sampled. The classification of the wastes (radioactive, hazardous, or mixed) will depend on the results of the sample analyses.

Previous surveys have identified some contaminated equipment within the building including pallets, carpeting, and tiles. This material is currently in storage but will eventually be size-reduced, packaged, and shipped for disposal as low-level radioactive waste.

Once decontamination efforts are complete inside the building, the remediated surfaces will be resurveyed to demonstrate compliance with the surface DCGL. After completion of the survey, the building will be partially demolished. During demolition activities, the licensee's contractor plans to monitor the soil underneath the building to ensure that the soil is not contaminated with radioactive DU. After building demolition is complete, the licensee plans to conduct a final status survey in the vicinity of the area where Cells 5 and 6 were previously located. If contaminated soil is identified in concentrations above the DCGL, it will be remediated, packaged, and disposed. The building rubble will be disposed as construction debris.

Figure 4 of the DP provides the schedule for decommissioning and final status survey activities for Building 181, Cells 5 and 6. This figure displays the major work activities and proposed timeline for the work. From beginning to end, the project is expected to last almost one year.

The NRC staff has reviewed the proposed decommissioning activities described in the DP according to the guidance provided in NUREG-1757, Volume 1, Section 17.1, "Planned Decommissioning Activities." Based on this review, the NRC staff has determined that the licensee provided sufficient information to allow the NRC staff to evaluate the licensee's planned decommissioning activities, to ensure that the decommissioning can be conducted in accordance with NRC requirements.

IX. PROJECT MANAGEMENT AND ORGANIZATION

The decommissioning management organization is described in Section 4.3 of the DP and is shown in Figure 3, "Decommissioning Organization." Project management will include both Air Force (licensee) staff and contractor staff. The Air Force's Radioisotope Committee retains overall responsibility for the project. The Robins AFB project manager is responsible for providing local oversight of the decommissioning work.

Robins AFB possesses the radioactive DU material under Permit GA-00462-03/01AFP issued by the Air Force Radioisotope Committee. The Robins AFB radiation safety officer has responsibility for oversight of the radioactive material. The base radiation safety officer will also be responsible for oversight of the contractors' radiation safety work practices.

The licensee's contractor will be responsible for management of the field work. The work will be conducted under the contractor's service provider license (NRC Materials License No. 17-29441-01). The contractor's responsibilities include health and safety of the decontamination workforce.

The contractor's work force reports to its project manager, who in turn reports to the Robins AFB project manager. The decontamination manager, contractor radiation safety officer, and site safety, health and quality officer will report to the contractor's project manager. The waste

manager, decontaminators, and paint abatement personnel will report to the decontamination manager. Radiation safety technicians will report to the contractor's radiation safety officer. The contractor's radiation safety officer will be responsible for radiation safety during decommissioning. Finally, the site safety, health and quality officer is responsible, in part, for ensuring that work and project activities are executed in accordance with established regulatory requirements and the contractor's program, plans, and procedures.

In summary, the DP provides a clear chain of command for the work to be conducted. The radiation protection support and industrial safety functions are clearly defined. The number of positions appears appropriate for the work to be conducted.

The NRC staff has reviewed the description of the decommissioning project management organization, position descriptions, management and safety position qualification requirements, and the manner in which the licensee will use contractors during decommissioning, according to the guidance provided in NUREG-1757, Volume 1, Section 17.2, "Project Management and Organization." Based on this review, the NRC staff has determined that the licensee has provided sufficient information to allow the NRC staff to evaluate the licensee's decommissioning project management organization and structure to determine if the decommissioning can be conducted safely and in accordance with NRC requirements.

X. RADIATION SAFETY AND HEALTH PROGRAM DURING DECOMMISSIONING

The contractor's health and safety program requirements are provided in Sections 4.4 and 4.5 of the DP. Details of the program requirements are provided in the contractor's radiation safety program (Appendix A to the DP). The contractor will develop work plans that specify the work tasks as well as the hazards associated with the work. The contractor will also develop hazardous work permits as needed to specify the required radiological, industrial hygiene, and industrial safety requirements for the tasks to be completed. The contractor plans to discuss the work plans and hazardous work permits on a daily basis during morning toolbox meetings. All workers will have stop work authority to address, minimize, and mitigate safety concerns. All workers have a responsibility to follow the instructions provided in the hazardous work permits.

As discussed in Section 4.4.1 of the DP, "Decontamination/Decommissioning Work Tasks Description," the contractor plans to scrape, sand, brush, and wipe building surfaces as needed to remove any contamination greater than the surface DCGL. These decontamination efforts will include the use of surface scabbling units. These scabbling units will be equipped with high-efficiency particulate air filters. The contractor will conduct personnel, area, and environmental sampling as needed for any work that creates an airborne hazard. In addition, a subcontractor will remove lead-based paint and asbestos from Cells 5 and 6. In-process surveys may be necessary during remediation to identify any contamination potentially above the DCGL.

Section 4.5 of the DP, "Worker and Environmental Monitoring," and the contractor's radiation safety plan provide the details for radiation protection of workers. The administrative program requirements include the development and implementation of policy instructions, routine audits, ALARA program, design control, and written procedures. The radiation protection practices to be implemented include occupational and administrative dose limits, posting requirements, worker exposure monitoring, contamination control, access control, training, and recordkeeping. The contractor will conduct radiation and radioactivity monitoring using calibrated survey instruments and air samplers.

Details about the contractor's radiation safety program are provided in Appendix A to the DP. To begin with, the contractor will conduct external and internal dose monitoring. All workers, with the exception of visitors, will be assigned personal dosimeters. Air monitoring will be conducted, and the sample results will be used to assigned internal doses, as needed. Air samples may be collected using a combination of portable air samplers or breathing zone samplers. These air sample results will be used to determine if respiratory protection is required. The contractor does not plan to conduct bioassays, depending on air sample results. Contamination controls will be established in accordance with instructions provided in contractor procedures. Access controls will be provided including use of signs, barricades, and administrative controls. The contractor will provide calibrated instrumentation and air samplers as needed to implement the radiation protection program. Training will be provided to workers commensurate with the potential radiological conditions present in the work place.

The contractor's radiation safety program is subject to audit and inspection, in part, to comply with the regulatory requirements of 10 CFR 20.1101(c). The audit program requirements are included in Section 3.2 of the contractor's radiation safety program. These requirements include frequency of audits, model audit program (audit checklist), and recordkeeping requirements.

The NRC staff has reviewed the information presented in the DP using the guidance provided in NUREG-1757, Volume 1, Section 17.3, "Radiation Safety and Health Program during Decommissioning." Based on this review, the NRC staff has determined that the licensee has provided sufficient information to demonstrate that the proposed radiation protection program complies with the requirements specified in 10 CFR Part 20.

XI. ENVIRONMENTAL MONITORING AND CONTROL PROGRAM

Section 4.5 of the DP, "Worker and Environmental Monitoring," discusses the environmental monitoring requirements. The decommissioning of Cells 5 and 6 may result in particulate airborne and waterborne effluents. The DP indicates that the licensee and its contractor will implement controls to prevent spread of airborne and waterborne contamination.

The DP notes that the work will be conducted indoors, which should minimize the potential for releases to the environment. Particulate air monitoring will be conducted inside of the building for worker protection. Particulate air monitoring will be performed outside of the building to ensure that effluents remain below the action level. The contractor plans to use stationary pumps located within weather-protected enclosures. The air monitors are expected to be used during each work shift. The sample results will be compared to an action level based on the effluent concentration limits provided in 10 CFR Part 20, Appendix B, Table 2, for uranium-238. The likely monitoring locations will be adjacent to the building bay doors. The bay doors will normally be open, to minimize the buildup of airborne radioactivity in the work area. If the environmental air sample results exceed 10-percent of the effluent concentration limit, the contractor will close the bay doors to minimize the airborne effluents. As noted in Section 3.4 of the licensee's radiation safety program, the ALARA program includes a commitment to provide a constraint on air emissions to the environment as required by 10 CFR 20.1101(d).

The contractor will try to prevent waterborne effluents by preventing water from exiting the building. The contractor will plug building drains during decommissioning work. If the buildup of water occurs, the contractor will install containments at exit points, such as doorways, to prevent potentially contaminated water from leaving the building.

The contractor does not plan to measure ambient gamma radiation exposure rates outside of the building, because the exposure rates within the building are expected to be extremely low throughout the decommissioning process.

The demolition of the building will be conducted by a different contractor. Before demolition, the building is expected to be released for unrestricted use. The demolition contractor is expected to use typical environmental protections such as dust suppression during the demolition process. As noted earlier, the licensee's contractor will conduct radiological surveys to ensure that the soil underneath the building has not been contaminated. In the unlikely situation that soil contamination is identified, the contractor is expected to excavate the soil in a controlled manner to minimize the spread of airborne and waterborne contamination.

The NRC staff has reviewed the information presented in the DP using the guidance provided in NUREG-1757, Volume 1, Section 17.4, "Environmental Monitoring and Control Program." Based on this review, the NRC staff has determined that the licensee has provided sufficient information to conclude that the effluent and environmental monitoring program will comply with the regulatory requirements provided in 10 CFR Part 20.

XII. RADIOACTIVE WASTE MANAGEMENT PROGRAM

The sources of radioactive waste may include contaminated material and equipment, wastewater solids, building surface scrapings, and soil. In summary, the licensee's contractor will collect samples of the waste material for analysis, and the contractor will package and ship the wastes based on these sample results. These sample results will also be used to classify the waste material for disposal.

Section 2.3.7 of the DP describes how material and equipment will be surveyed for contamination. These surveys included wooden pallets and office furnishings. The licensee's contractor identified contaminated equipment including pallets, carpeting, and tiles during previous surveys. Contaminated material and equipment will be segregated, packaged, and disposed as radioactive wastes.

During the baseline (characterization) survey, the contractor encountered standing water in three rooms. The water was sampled and subsequently released through the base industrial wastewater treatment plant. The water sample results are presented in Tables 16 and 18 of the DP. The solids that were mixed with the water were filtered out and will be conservatively disposed as low level radioactive waste.

As part of decommissioning, the licensee's contractor plans to remove contaminated building surface material from several areas in and around Cells 5 and 6. This removed material may contain both radiological contamination and lead-based paint. The licensee plans to sample the collected waste material, to classify the material as radioactive, hazardous, or mixed wastes for both shipment and disposal.

During building demolition, the licensee's contractor will survey the soil underneath the building slab. Following completion of building demolition, the contractor will conduct a final status survey of the soil. Any soil that exceeds the DCGL will be removed and disposed as radioactive wastes. The contractor does not expect to find soil with radioactivity greater than the DCGL, in part, because of the thickness of the slab in the vicinity of Cells 5 and 6.

Although the DP did not include a detailed transportation plan, the Air Force's Master Materials License 42-23539-01AF requires the licensee to implement programmatic procedures which include radioactive material management and disposal instructions. In addition, the licensee's contractor is expected to have a plan or procedure in place to manage the storage, shipment, and disposal of wastes. The Robins AFB radiation safety officer has responsibility for ensuring that radioactive wastes are safely shipped for disposal. The NRC plans to review the licensee's shipment and disposal activities during future inspections.

The NRC staff has reviewed the licensee's descriptions of its radioactive waste management program in accordance with NUREG-1757, Volume 1, Section 17.5, "Radioactive Waste Management Program." Based on this review, the NRC staff determined that the licensee's program for the management of radioactive waste generated during decommissioning operations will help ensure that the waste material will be managed in accordance with NRC requirements and in a manner that is protective of public health and safety.

XIII. QUALITY ASSURANCE PROGRAM

The NRC staff reviewed the licensee's proposed quality assurance (QA) program. The program includes instrumentation, personnel, data, and administrative requirements. To begin with, the quality of survey instrumentation used during the baseline (characterization) survey is briefly discussed in Section 2.7 of the DP. This section discussed survey instrumentation calibration, functional checks, and recordkeeping that were used to ensure confidence in the ability of the instrumentation to detect radioactivity.

The position of site safety, health and quality officer is described in Section 4.3.5 of the DP. One responsibility of this individual is to ensure that all work and project activities are executed in accordance with regulatory requirements and established programs, plans, and procedures. As noted earlier, the site safety, health and quality officer reports to the contractor's project manager.

Section 5.2.4 of the DP provides the decontamination support and final status survey QA assurance requirements. These instructions include the instrumentation, sampling, and documentation requirements to ensure that data quality is maintained. This section also includes a discussion of responsibilities for maintaining data quality. In addition, the contractor plans to maintain the quality of the data through use of data quality objectives. As discussed in Section 2.3 of the DP, "Radiological Survey Design," the licensee's contractor will use a data quality objective (DQO) process with a graded approach to assure defensible data with cost effectiveness.

The contractor's radiation safety program, provided in Attachment 1 to the DP, includes the requirements for audits. Sections 3.2 and 3.3 of the radiation safety program provide the detailed instructions for audits, including responsibilities and timing of audits. In particular, the radiation safety program is subjected to routine audits. The completed audits will be reviewed by the NRC as part of the inspection program.

The NRC staff has reviewed the QA program for the site according to the guidance provided in NUREG-1757, Volume 1, Section 17.6, "Quality Assurance Program." Based on this review, the NRC staff has determined that the licensee's QA program is sufficient to ensure that information submitted to support the decommissioning of its facility should be of sufficient quality to allow the staff to determine if the licensee's planned decommissioning activities can be conducted in accordance with NRC requirements.

XIV. FACILITY RADIATION SURVEYS

A limited scoping survey was originally conducted by Air Force staff in Cells 5 and 6. As noted earlier, the licensee is unsure of the date of this survey. The results were compared to the release limits provided in Table 1, "Acceptable Surface Contamination Levels," as provided in Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors. (This Regulatory Guide was subsequently withdrawn by the NRC in August 2016; see *Federal Register* Notice 81 FR 53507.) This survey identified contamination primarily in Cell 6 and the adjacent storage room. The survey results are presented in the DP, Attachment 2.

The licensee's contractor conducted a second scoping survey in August 2015. The focus of this survey was Cell 6 including painted surfaces, unpainted surfaces, and residual DU identified in a trash can. These survey results are also presented in Attachment 2 of the DP.

The licensee's contractor conducted a detailed baseline (characterization) survey using the guidance provided in Section 2.0, Baseline Survey Plan, of the DP. The survey plan followed the general guidance of NUREG-1575, Revision 1, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), and NUREG-1575, Supplement 1, Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME). In this section of the DP, the licensee described the survey design, data quality objectives, radiation detection instrumentation, minimum detectable activities (MDA), proposed MARSSIM classifications and survey units, data requirements, survey grid design, and survey techniques and sampling methods. Section 2.0 also provided the methods used to survey material and equipment for contamination.

The proposed survey unit classifications for the baseline survey were presented in Table 3, "Baseline Survey Plan-Survey Units." The contractor conducted baseline surveys in Cells 1-8 and portions of the outdoor area. Cells 9-12 were not surveyed because the licensee concluded that these areas were unimpacted by prior operations involving radioactive material.

The results of the baseline survey are presented in Section 3.0 of the DP, "Baseline Survey Results." As noted earlier, contamination was found in Cells 5 and 6 and some of the interconnected rooms, including Room 3A. These areas will be remediated and subsequently resurveyed as part of the final status survey. The data for surveys conducted in Rooms 3D and 3E were lost, and the roof and building vents were not surveyed. These areas are expected to be surveyed or resurveyed as part of the final status survey to obtain the missing data.

The contractor conducted surveys of equipment using the guidance provided in MARSAME. Some contaminated material was identified including carpet, wooden pallets, and tiles. These items were packaged and will be disposed as radioactive wastes.

The proposed final status survey plan is provided in Section 5.0 of the DP, "Final Status Survey Plan." The interior surveys will include scan surveys, swipe surveys, and fixed point measurements for comparison to the combined surface contamination DCGL. The survey design is supposed to meet the guidance provided in MARSSIM and NUREG-1757, Volume 1. Table 20, "Final Status Survey Design," provides a comparison between the proposed final status survey and the recommended attributes provided in Appendix D to NUREG-1757, Volume 1, "DP Evaluation Checklist." Further, Table 21 of the DP, "Building 181 MARSSIM Final Status Survey Plan Summary," provides the proposed MARSSIM survey classes for the final status survey based on the baseline (characterization) survey results.

Background measurements will be collected in Cells 1-4 for comparison to measurements collected in areas to be remediated. The background measurements will be obtained in Cells 1-4 because the results of the baseline survey indicate that Cells 1-4 are not contaminated, and the construction materials are the same in Cells 1-4 as found in Cells 5-6.

After the building interior has been decommissioned and the interior and exterior areas have been radiologically surveyed or resurveyed as part of the final status survey, the licensee plans to demolish portions of the building. During building demolition, the contractor plans to survey the soil underneath the building, specifically in the area of Cells 5 and 6, to ensure that the soil is not contaminated. This in-process survey is briefly discussed in Section 4.1 of the DP.

After building demolition, the contractor plans to perform a final status survey of the soil underneath Cells 5 and 6. Details of this survey are provided in Section 5.0 of the DP. The contractor will scan the surface soil using a Field Instrument for Detection of Low Energy Radiation (FIDLER). The results of these scans will be compared to background measurements collected in a reference area. Soil samples will be collected in a systematic and biased manner, as necessary, for comparison to the soil DCGL and background sample results.

The licensee did not propose to use the elevated measurement comparison methodology, as described in Section 5.5 of MARSSIM, "Final Status Surveys," to demonstrate compliance for small areas of elevated radioactivity. Therefore, all sample points must be less than or equal to the surface and soil DCGLs for release of the property for unrestricted use.

The NRC reviewed the licensee's proposed DCGL to the MDA of the measuring equipment. As described in Section 2.2 of the DP, the licensee's contractor calculated a combined surface DCGL of 2,570 dpm/100 cm². As recommended by MARSSIM, Section 4.7.1, "Selection of Instruments," it is generally considered a good practice to select a measurement system with an MDA between 10 to 50-percent of the DCGL. In Section 1.0 of the DP, the DP indicates that the survey was designed to allow for detection of contamination levels from 10 to 50 percent of the DCGL (257 to 1,285 dpm/100 cm²). The contractor indicated that it will select instrumentation for the final status survey that should meet the MARSSIM recommendation for MDA. The licensee's selection of instrumentation will be reviewed during a future inspection or during review of the completed final status survey report.

In accordance with Section 31.b of the Memorandum of Understanding between the NRC and the Air Force (Accession No. ML14262A340), the Air Force committed to submit final status survey reports to the NRC for approval for all decommissioning projects categorized as Group 3 or above as defined in NUREG-1757, Volume 1. The Robins AFB project is categorized as a Group 4 decommissioning project; therefore, the Air Force is expected to submit the completed final status survey report to the NRC for review and approval.

The NRC staff consulted with the Georgia Department of Natural Resources, Radioactive Materials Program, regarding the safety evaluation of the proposed action (Accession No. ML17193A244). By email dated August 14, 2017 (Accession No. ML17227A184), the State requested that once demolition is complete and soil contamination surveys are accomplished, if these surveys reveal any soil contamination, a groundwater survey should be conducted. In the past, the State has seen instances of groundwater contamination, for example, around a contaminated vault that had to be remediated. While there is no evidence of soil contamination beneath Building 181, the State believes that sampling of the groundwater is prudent if the soil is contaminated. The NRC staff informed the licensee of the State's comments, and the NRC plans to review the results of the licensee's soil survey.

The NRC staff have reviewed the information provided in the DP using the guidance provided in NUREG-1757, Volume 2, Section 4.4, "Final Status Survey Design." Based on this review, the NRC staff have determined that the final status survey design is adequate to demonstrate compliance with radiological criteria for license termination.

XV. FINANCIAL ASSURANCE

The Department of the Air Force submitted updated financial assurance documents to the NRC in January 2013. (Due to the sensitive nature of this information, these financial assurance records are not publicly available.) The records include a statement of intent (SOI) dated January 11, 2013. The statement of intent certified that funding is or would be available for decommissioning. The NRC conducted an acceptance review of the licensee's submittal in March 2013. The NRC forwarded the results of the acceptance review, including several potential deficiencies, to the licensee in January 2016. In February 2017, the NRC staff discussed the status of the licensee's financial assurance information during a non-public meeting. During this meeting, the licensee agreed to provide an updated SOI and associated support documents to the NRC by June 2017 (Accession No. ML17193A252, not publicly available).

By Memorandum dated June 19, 2017 (Accession No. ML17193A250), the licensee requested an extension for delivery of the SOI from June 2017 until August 31, 2017. The licensee's financial assurance records will be formally reviewed by the NRC staff when submitted in late-August 2017. Although the licensee's updated SOI and supporting documents have not been reviewed by the NRC for this particular project, the NRC staff concludes that the licensee has sufficient funding for decommissioning of its various projects based on the information provided in the 2013 SOI and supporting documents.

In summary, the NRC staff reviewed the financial assurance mechanism for the decommissioning of Building 181 at Robins AFB using the guidance provided in NUREG-1757, Volume 3, Consolidated Decommissioning Guidance; Financial Assurance, Recordkeeping, and Timeliness, Section 4.3, "Financial Assurance Mechanisms" (Accession No. ML12048A683). Based on this review, the NRC staff has determined that the financial assurance mechanism previously proposed by the licensee is adequate to ensure that sufficient funds will be available to carry out all required decommissioning activities. If the updated SOI and associated documentation is determined to be insufficient, the licensee is expected to provide the amount of funding necessary to complete decommissioning at Robins AFB.

XVI. RESTRICTED USE/ALTERNATE CRITERIA

The Department of the Air Force did not request the release of Building 181 at Robins AFB under restricted conditions or alternate criteria for license termination, as allowed by regulations 10 CFR 20.1403 and 20.1404, respectively. Accordingly, the NRC did not conduct technical reviews of these areas.

XVII. REFERENCES

The following references are available for inspection at NRC's Public Electronic Reading Room at <http://www.nrc.gov/reading-rm/adams.html> (with accession number in parentheses):

State of Georgia, "State of Georgia's Review and Comments on Proposed EA and SER for Robins AFB, Georgia," August 14, 2017 (ML17227A184)

- U.S. Department of the Air Force, "Memorandum for Record, Minutes of Post RICS Meeting Discussions," March 10, 2017 (ML17193A252, not publicly available)
- U.S. Department of the Air Force, "Review of the Decommissioning Plan (DP) of the Building 181 at Robins AFB GA," March 21, 2017 (ML17094A481)
- U.S. Department of the Air Force, "Decommissioning Plan for Robins Air Force Base, Building 181," June 13, 2017 (ML17167A420)
- U.S. Department of the Air Force, "Request for Extension of the Statement of Intent of Financial Assurance Letter," June 19, 2017 (ML17193A250)
- U.S. Nuclear Regulatory Commission, NUREG-1575, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), Revision 1, August 2000 (ML003761445)
- U.S. Nuclear Regulatory Commission, NUREG-1757, Consolidated Decommissioning Guidance Decommissioning Process for Materials Licensees, Volume 1, Revision 2, September 2006 (ML063000243)
- U.S. Nuclear Regulatory Commission, NUREG-1757, Consolidated Decommissioning Guidance Characterization, Survey, and Determination of Radiological Criteria, Volume 2, Revision 1, September 2006 (ML063000252)
- U.S. Nuclear Regulatory Commission, NUREG-1575, Supplement 1, Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (MARSAME), January 2009 (<https://www.epa.gov/radiation/marsame-manual-and-resources>)
- U.S. Nuclear Regulatory Commission, NUREG-1757, Consolidated Decommissioning Guidance Financial Assurance, Recordkeeping, and Timeliness, Volume 3, Revision 1, February 2012 (ML12048A683)
- U.S. Nuclear Regulatory Commission, "Understandings Between the United States Air Force and the United States Nuclear Regulatory Commission," September 19, 2014 (ML14262A340)
- U.S. Nuclear Regulatory Commission, "Acceptance Review of Decommissioning Plan for Building 181 at Robins Air Force Base, Georgia," April 11, 2017 (ML17096A802)
- U.S. Nuclear Regulatory Commission, "Review of the Derivation of Dose Concentration Guideline Levels for Cleanup of Depleted Uranium Inside and Underneath Building 181," June 29, 2017 (ML17166A370, not publicly available)
- U.S. Nuclear Regulatory Commission, "Request for Comments on Draft Environmental Assessment and Safety Environmental Report for Proposed Decommissioning Project at Robins Air Force Base, Georgia," July 24, 2017 (ML17193A244)
- U.S. Nuclear Regulatory Commission, "Environmental Assessment for Proposed Decommissioning of Building 181 at Robins Air Force Base, Georgia," September 19, 2017 (ML17207A232)