



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4125

June 29, 2011

Department of the Air Force
ATTN: David A. Smith, Lt Col, USAF, BSC, PhD
Chief, Radiation Health
Chief, RIC Secretariat
AF/SGE (AFMSA/SG3PB)
ATTN: Radioisotope Committee
1780 AF Pentagon
Washington, DC 20330-1780

SUBJECT: NRC INSPECTION REPORT 030-28641/11-002

Dear Lt Col Smith:

This refers to the NRC inspection conducted on March 8-9, 2011, at Kirtland Air Force Base in Albuquerque, New Mexico. This inspection was an examination of activities conducted under your master materials license and your base permit as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license and base permit. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

Kirtland Air Force Base Permit NM-00548-00/01AFP authorizes the possession and characterization of residual contamination at Radioactive Waste Site RW-06. The inspector conducted a review of site remediation activities in progress at Site RW-06 pursuant to its decommissioning. As part of the inspection, the NRC inspector also conducted a confirmatory survey. The confirmatory survey included measurement of ambient gamma radiation levels and collection of soil samples. The Oak Ridge Institute for Science and Education analyzed the soil samples on behalf of the NRC.

The inspector discussed the preliminary inspection findings with your staff at the conclusion of the onsite inspection. The NRC received the soil sample results on March 25, 2011, and the inspector presented the sample results to members of your staff in a teleconference call held on March 30, 2011. The NRC discussed the final inspection findings with your staff by telephone on June 16, 2011. The results of this inspection are presented in the enclosed report.

In accordance with 10 CFR 30.36(j) requirements, the Air Force conducted a final status survey following completion of site remediation activities at Site RW-06. The inspector reviewed the draft final status survey report during the inspection. At the conclusion of the onsite inspection, the U.S. Air Force Radioisotope Committee had not approved the final status survey report.

In accordance with 10 CFR 30.36(k)(3) requirements, the NRC has the responsibility to ensure that the property is suitable for release in accordance with the criteria for decommissioning

specified in 10 CFR Part 20, Subpart E. As documented in our March 5, 1999, letter to the Radioisotope Committee, the NRC maintains the authority to review and to approve final status survey reports on a case-by-case basis. The NRC has elected to review the final status survey report for Site RW-06. Therefore, we request that you submit the final status survey report for Site RW-06 to the NRC for NRC review, after the Air Force Radioisotope Committee has reviewed and approved the report.

Further, the NRC has elected to conduct an environmental assessment of this decommissioning activity as allowed by 10 CFR 20.1405. During our review of the final status survey report, we may request additional information as necessary to allow us to complete the environmental assessment for this decommissioning project. We will perform the environmental assessment in accordance with the guidance provided in NUREG-1748, "Environmental Review Guidance for Licensing Actions Associated with NMSS Programs." The types of information that we may request from you are described in Sections 3 and 6 of NUREG-1748.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your responses will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Jacqueline Cook at 817-860-8132 or the undersigned at 817-860-8197.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B

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

Enclosure:
NRC Inspection Report 030-28641/11-002

cc w/Enclosure:
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**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Docket: 030-28641
License: 42-23539-01AF
Report: 030-28641/11-002
Licensee: Department of Air Force
Facility: Kirtland Air Force Base
Location: Albuquerque, New Mexico
Dates: March 8-9, 2011
Inspector: Robert J. Evans, PE, CHP, Senior Health Physicist
Repository and Spent Fuel Safety Branch
Approved by: D. Blair Spitzberg, PhD, Chief
Repository and Spent Fuel Safety Branch
Attachment: Supplemental Inspection Information

ENCLOSURE

EXECUTIVE SUMMARY

Kirtland Air Force Base, Radioactive Waste Site RW-06 NRC Inspection Report 030-28641/11-002

This inspection consisted of a review of site status and decommissioning activities at Radioactive Waste Site RW-06. The inspection included a confirmatory survey of the site.

Site Status

- Radioactive Waste Site RW-06 consisted of nine trenches located on a 4.5-acre tract of land situated next to the former riding stables. A decommissioning contractor began reclaiming the trenches during October 2009. After the excavation work was complete, the contractor conducted a final status survey to ensure that all radioactive wastes had been removed from the trenches. The survey results were documented in a final status survey report. At the end of the onsite inspection, the final status survey report was still under review by the licensee.

Decommissioning Inspection Procedure for Materials Licensees

- The licensee conducted decommissioning work in accordance with permit, license, and regulatory requirements (Section 1.2.a).
- An NRC-licensed contractor conducted the reclamation work on behalf of the licensee using its NRC-approved procedures in lieu of a decommissioning plan. The contractor conducted the final status survey in accordance with the licensee-approved final status survey plan. The draft final status survey results indicate that the contractor had effectively remediated Site RW-06 (Section 1.2.a).
- The NRC conducted a confirmatory survey of Site RW-06. The inspector measured ambient gamma radiation levels and collected five soil samples. The inspector submitted the soil samples to Oak Ridge Institute for Science and Education for analysis. The cesium-137 concentrations in all five samples were less than the wide-range derived concentration guideline level. One sample was analyzed for plutonium concentrations, and the plutonium-239 concentrations in this sample were less than the elevated measurement comparison derived concentration guideline level (Section 1.2.b).
- The NRC's confirmatory survey results suggest that the contractor had effectively remediated Site RW-06 (Section 1.2).

Report Details

Site Status

The Radiation Effects Laboratory operated from 1960 to 1971 at Kirtland Air Force Base. Wastes from laboratory operations were disposed in nine trenches located on a 4.5-acre tract of land situated next to the former riding stables. The licensee subsequently designated this area as Radioactive Waste Site RW-06. During the 1980s and 1990s, several limited investigations were conducted to determine the extent of the contamination in the trenches. Limited sampling was also conducted to determine the presence of non-radiological hazardous materials.

During 2006, the licensee conducted a Resource Conservation and Recovery Act Facility Investigation to further delineate the extent of contamination at Site RW-06. The licensee excavated exploratory trenches to investigate the contents and the sizes of the former disposal trenches. The licensee subsequently issued Permit NM-00548-00/01AFP to Kirtland Air Force Base for possession of the radioactive wastes located in the trenches.

The licensee identified nine trenches at Site RW-06. Four trenches were roughly 2 feet wide, 9 feet deep, and 50 feet long. The remaining five trenches were roughly 6 feet wide, 20 feet deep, and 100 feet long. The radionuclides of concern were suspected to be cesium-137, strontium-90, and radium-226.

A contractor for the licensee conducted additional radiological surveys during October 2008, including measurement of ambient gamma radiation levels on the surface of Site RW-06. The contractor identified small areas of cesium-137 contamination on the ground near the trenches. Based on this investigation and the site historical assessment, carbon-14 and americium-241 were added as radionuclides of concern.

The decommissioning contractor commenced with reclamation of the trenches during October 2009. The contractor staged the uncontaminated soil exhumed from the trenches in two areas located adjacent to RW-06. During reclamation, the contractor unexpectedly discovered a damaged drum containing approximately 5 kilograms of americium-241 and plutonium contamination. The licensee repackaged the damaged drum and moved the drum to an onsite storage building for temporary storage. During November 2010, the licensee updated the permit to include the possession of this additional americium-241 and plutonium material. At the time of this inspection, the licensee was still considering its options for permanent disposal of the repackaged drum.

After the contractor completed the excavation work, the contractor conducted a final status survey to ensure that all radioactive wastes had been removed from the trenches. Details about the final status survey are provided in Section 1.2.a below. In summary, the information provided in the draft final status survey report suggests that the contractor had effectively remediated Site RW-06.

At the time of the onsite inspection, the nine former burial trenches were still open. The contaminated wastes previously removed from the trenches were being stored onsite in 48 super-sacks, pending shipment to an out-of-state disposal facility. The target date for shipment of the wastes was late-April 2011. The contractor planned to refill the trenches in the near future, after the licensee had approved the final status survey report. Uncontaminated soil

removed from the trenches will be returned to the trenches. If the contractor needs more soil to refill the trenches, the contractor has access to fill material from a borrowed area located near the site.

1 Decommissioning Inspection Procedure for Materials Licensees (87104)

1.1 Inspection Scope

The inspector attempted to determine if decommissioning activities were being conducted in accordance with NRC requirements.

1.2 Observations and Findings

a. Decommissioning Activities

Regulation 10 CFR 30.36(g)(1) states, in part, that a decommissioning plan must be submitted if the procedures and activities necessary to carry out decommissioning of a site or separate building or outdoor area have not been previously approved by the NRC. The licensee elected to use an NRC-licensed contractor to conduct the decontamination, decommissioning, and remediation work. The contractor conducted the decommissioning work using its NRC-approved procedures; therefore, the licensee elected not to submit a decommissioning plan to the NRC for this project.

During April 2009, prior to conducting the fieldwork, the contractor submitted a quality program plan to the licensee. The quality program plan included a work plan, sampling and analysis plan, field sampling plan, quality assurance project plan, and site safety and health plan. The final status survey plan was included as Attachment II to the quality program plan. The licensee subsequently approved the quality program plan, and the contractor conducted the reclamation work in accordance with the approved work plan during October and November 2009.

The inspector reviewed the final status survey plan and discussed the plan requirements with site personnel. The inspector noted that the contractor had designed and implemented the final status survey based on guidance provided in NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)." The survey plan divided Site RW-06 into seven Class 1 survey units and one Class 2 survey unit. The survey plan also divided the uncontaminated soil removed from the trenches into four Class 1 survey units.

Regulation 10 CFR 30.36(j) states, in part, that as a final step in decommissioning, the licensee shall conduct a radiation survey of the premises where the licensed activities were carried out and will document the results in a survey report. Further, Permit Condition 18 states, in part, that a final status survey report had to be approved by the Air Force Radioisotope Committee prior to termination of the permit.

The contractor conducted a final status survey using the instructions provided in the final status survey plan. The final status survey consisted of systematic soil sampling, biased soil sampling and ambient gamma radiation measurements. The contractor conducted gamma radiation measurements, in part, to guide remediation efforts and to select locations for biased sampling. The contractor also collected background samples for comparison to onsite results. For its derived concentration guideline levels (DCGLs), the

licensee chose to use the NRC's screening values for soil as presented in Appendix B to NUREG-1757, "Consolidated Decommissioning Guidance," Volume 1, Revision 2.

During the performance of the final status survey, the contractor collected 30 background soil samples, 180 systematic soil samples, and 25 biased soil samples. The contractor also collected 13 composite samples from the bagged wastes to characterize the wastes for shipment and disposal. The results of the final status survey were documented in the draft final status survey report. The inspector reviewed the draft report during the inspection. The inspector confirmed that the contractor had collected a sufficient number of soil samples in each survey unit as recommended by MARSSIM guidance.

Soil sample results were less than the wide-range DCGLs, with four exceptions. In two situations, the contractor elected to conduct additional remediation followed by additional sampling. The results of this additional sampling will be included as an addendum to the draft final status survey report. The other two exceptions included one area with elevated carbon-14 concentrations and a second area with elevated plutonium-239 concentrations. The contractor reassessed these sample results using area factors as allowed by MARSSIM. When the area factors are included in the assessment, the two sets of results were less than the calculated elevated measurement comparison DCGLs. In summary, all survey results were less than the respective wide-range DCGLs or the elevated measurement comparison DCGLs. At the end of the onsite inspection, the licensee was still reviewing the draft final status survey report.

b. NRC Confirmatory Survey

The inspector conducted a confirmatory survey to ensure that the licensee had effectively remediated Site RW-06. The inspector measured ambient gamma radiation levels and collected five soil samples for offsite analysis. The gamma radiation levels were measured using a Ludlum Model 12 survey meter connected to a 2-inch by 2-inch sodium iodide detector (NRC No. 20888G, calibration due date of 11/25/11). The inspector submitted the soil samples to the NRC's contractor, Oak Ridge Institute for Science and Education (ORISE), for analysis.

Prior to conducting the gamma radiation survey, the inspector measured background levels at an offsite location, the same location used by the contractor for its background measurements. The inspector then measured the ambient gamma radiation levels within Site RW-06 to identify areas of elevated surface contamination and to locate areas for possible soil sampling. With a background of 10,000-12,000 counts per minute, the ambient gamma radiation levels within Site RW-06 ranged from background levels up to about 17,000 counts per minute. The areas with these slightly elevated ambient gamma radiation levels were located within the site boundary but outside of the trenches. A soil sample (NRC-3) was collected from one area exhibiting an elevated gamma radiation level. As described below, this sample was analyzed for gamma-emitting radionuclides.

As noted above, the inspector collected five soil samples for analysis. Sample NRC-1 was collected at the base of former burial Trench 3, while Sample NRC-2 was collected at the base of former burial Trench 1. Sample NRC-3 was collected from an area located within the Site RW-06 boundary but outside of the trenches. As described above, this sample was collected at a location indicating slightly elevated gamma

radiation levels. Sample NRC-4 was collected from a pile of soil that was staged for return to the open trenches. Finally, Sample NRC-5 was also collected from soil staged for return to the trenches. This particular area was selected for sampling because the contractor had previously identified slightly elevated levels of plutonium-239 in this area.

The five soil sample results were submitted to ORISE for analysis. The samples were analyzed by gamma spectroscopy. All five soil samples contained cesium-137 in concentrations that were comparable to background levels. No other previously licensed gamma-emitting radionuclide was identified in the samples.

Sample NRC-5 was collected from an area that contained measurable quantities of plutonium-239; therefore, this sample was analyzed by alpha spectroscopy to quantify the plutonium-239 concentrations. The five soil sample results are provided below:

Soil Sample Results, in units of pCi/g

Sample	Location	Cesium-137	Plutonium-239
NRC-1	Base of burial pit 3	0.04 ± 0.02	
NRC-2	Base of burial pit 1	0.06 ± 0.02	
NRC-3	Border of survey units FSS-10 and 11	0.08 ± 0.02	
NRC-4	Stockpiled soil from FSS-SU03/SU04	0.03 ± 0.07	
NRC-5*	Survey unit FSS-SU01	0.04 ± 0.05	9.10 ± 0.70 8.44 ± 0.66

*Two aliquots of sample NRC-5 were analyzed for plutonium-239

Table B.2, "Screening Values of Common Radionuclides for Soil Surface Contamination Levels," from NUREG-1757, Volume 1, Revision 2, provides the NRC-approved wide-range DCGLs used by the licensee. The wide-range DCGL for cesium-137 is 11 pCi/g, while the wide-range DCGL for plutonium-239 is 2.3 pCi/g. The NRC's soil sample results indicate that the cesium-137 concentrations were well below the wide-range DCGL in all five samples, while the plutonium-239 concentrations were above the wide-range DCGL.

However, as allowed by MARSSIM, the contractor calculated area factors for various radionuclides, including plutonium-239. Based on the size of the survey unit, the area factor was calculated to be 5.71, and the resultant elevated measurement comparison DCGL was calculated to be 13.1 pCi/g. Both sample results for sample NRC-5 were below the elevated measurement comparison DCGL of 13.1 pCi/g. In summary, the residual radioactivity in Sample NRC-5 meets the release criteria, and the survey unit does not have to be remediated by the licensee. The final status survey results and the confirmatory survey results suggest that the soil can be used to backfill the excavated trenches.

In summary, the confirmatory survey results suggest that the licensee's contractor had effectively remediated Site RW-06.

1.3 Conclusions

The licensee conducted decommissioning work in accordance with permit, license, and regulatory requirements. An NRC-licensed contractor conducted the reclamation work on behalf of the licensee using its NRC-approved procedures in lieu of a decommissioning plan. The contractor conducted the final status survey in accordance with the licensee-approved final status survey plan. The draft final status survey results indicate that the contractor had effectively remediated Site RW-06.

The NRC conducted a confirmatory survey of Site RW-06. The inspector measured ambient gamma radiation levels and collected five soil samples. The inspector submitted the soil samples to Oak Ridge Institute for Science and Education for analysis. The cesium-137 concentrations in all five samples were less than the wide-range derived concentration guideline level. One sample was analyzed for plutonium concentrations, and the plutonium-239 concentrations in this sample were less than the elevated measurement comparison derived concentration guideline level. In summary, the NRC's confirmatory survey results suggest that the contractor had effectively remediated Site RW-06.

2 Exit Meeting Summary

The NRC inspector presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on March 9, 2011. The inspector discussed the soil sample results by telephone with representatives of the licensee on March 30, 2011. The final exit briefing was conducted by telephone on June 16, 2011. During the inspection, the licensee did not identify any information reviewed by the NRC inspector as proprietary information.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

W. Bitner, Chief, Environmental Restoration
S. Clark, Project Manager
Capt. K. Haines, Radiation Safety and Protection Chief
T. Mason, Contract Health Physicist
G. Miller, Project Manager
L. Paulus, Contract Health Physicist
J. Pike, Chief, Environmental Management

New Mexico Environment Department

M. Ortiz, Chief, Radiation Control Bureau
S. Rodriguez, Inspections and Licensing

INSPECTION PROCEDURE USED

IP 87104 Decommissioning Inspection Procedure for Materials Licensees

ITEMS OPENED, CLOSED, AND DISCUSSED

Open

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

CFR	<i>Code of Federal Regulations</i>
DCGL	derived concentration guideline level
IP	NRC Inspection Procedure
ORISE	Oak Ridge Institute for Science and Education
pCi/g	picocuries of radioactivity per gram of soil
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575)