



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

November 8, 2016

Edward L. Wilds, Jr., Ph.D., RSO, Acting Director
U.S. Environmental Protection Agency
National Center for Radiation Field Operations
4220 South Maryland Parkway, Building C
Las Vegas, Nevada 89119-7533

SUBJECT: U.S. ENVIRONMENTAL PROTECTION AGENCY, NATIONAL CENTER FOR
RADIATION FIELD OPERATIONS – NRC INSPECTION REPORT
030-06981/2016-001

Dear Mr. Wilds:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted September 26-29, 2016, at the facilities in Las Vegas, Nevada. The inspection also included a confirmatory survey of three buildings, which was performed by Oak Ridge Institute for Science and Education, an independent "third party." The NRC inspector discussed the results of this inspection with you on October 31, 2016. The inspection results are documented in the enclosure to this inspection report. No violations were identified and no response to this letter is required.

The NRC inspection examined decommissioning activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Specifically, a confirmatory survey was conducted by members of Oak Ridge Institute for Science and Education, under contract to the NRC. Based on the results of this inspection and confirmatory survey, the NRC determined that the three buildings as specified in the inspection report are considered acceptable for unrestricted use in accordance with the criteria established in 10 CFR 20.1402, "Radiological Criteria for Unrestricted Use."

In accordance with 10 CFR 2.390, "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

E. Wilds

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If you have any questions regarding this inspection report, please contact Rachel Browder at 817-200-1452, or the undersigned at 817-200-1549.

Sincerely,

/RA/

Lee E. Brookhart, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket: 030-06981
License: 27-05861-02
Control: 590907

Enclosure:
Inspection Report 030-06981/2016-001

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket No. 030-06981

License No. 27-05861-02

Report No. 030-06981/2016-001

Licensee: U.S. Environmental Protection Agency

Facility: U.S. Environmental Protection Agency
National Center for Radiation Field Operations

Location: Las Vegas, Nevada

Dates: September 26-29, 2016

Inspector: Rachel S. Browder, C.H.P., Senior Health Physicist
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Approved By: Lee E. Brookhart, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

REPORT DETAILS

Site Status

On May 17, 2016, the NRC received a license amendment request from the U.S. Environmental Protection Agency (EPA or licensee) for a partial site release of three buildings located at 944 East Harmon Avenue for unrestricted use in accordance with 10 CFR 20.1402 (ML16229A545). The EPA leases five separate buildings on a contiguous piece of property from the University of Nevada, Las Vegas (UNLV) at the Harmon Avenue Complex (HAC), which is a location of use on NRC materials license 27-05861-02 (Docket 030-06981). Specifically, EPA requested release of the Exposure Assessment Annex (EAX) and the Quality Analysis Laboratory (QAL) buildings in its entirety, and release of approximately one third of the Program Operations Support (POS) building. The buildings consisted of laboratories, offices, common areas, and a greenhouse.

1 Closeout Inspection and Survey (83890)

1.1 Inspection Scope

The inspectors evaluated whether the licensee conducted decommissioning activities and the final status survey program in accordance with the license and regulatory requirements. In addition, a confirmatory survey was performed by an independent "third-party" to verify the findings of the licensee's final status survey to support partial site release of three buildings from NRC Materials License number 27-05861-02.

1.2 Observations and Findings

a. Decommissioning Activities

The licensee is a Type A Broad Scope licensee under 10 CFR Part 33, which authorizes a radiation safety committee to review and approve all safety evaluations for proposed uses, as well as changes to the program and procedures as long as the changes satisfy regulatory requirements and do not change any existing license conditions or reduce the effectiveness of the radiation safety program. The inspector reviewed multiple radiation safety committee meeting minutes that demonstrated the committee had sufficient oversight of the characterization activities, decommissioning methodology implemented in accordance with NUREG-1757, "Consolidated Decommissioning Guidance" and the recommended changes to the Radiation Safety Manual. These changes supported the decommissioning activities at the Harmon Avenue Complex on the campus of the University of Nevada, Las Vegas (UNLV). The meeting minutes documented that the radiation safety committee approved that the partial site release should be treated as an NRC Group 2 classification as described in NUREG 1757, "Consolidated Decommissioning Guidance." In addition, the radiation safety committee meeting minutes documented that the committee approved the *Characterization Report* and *Final Status Survey* unanimously.

The licensee utilized a team approach for the decommissioning activities by assigning a Project Manager and using the resources of the Radiation Safety Officer under the NRC materials license. The licensee contracted with Booz Allen Hamilton (Booz Allen) to provide technical and administrative support to initiate final status survey activities following the characterization and decommissioning efforts. Booz Allen subsequently

contracted with Amec Foster Wheeler Environment & Infrastructure, Inc. (NRC Materials License 05-27748-01) to conduct the final status survey sampling and analyses. The NRC inspector reviewed the Sampling and Analysis Plan for the characterization process and determined that it adhered to the guidance provided in NUREG 1757, "Consolidated Decommissioning Guidance." The licensee developed Addendum 1 in January 2016, for the removal of the laboratory floor drain. In addition, procedures were developed to support the comprehensive sampling and analysis plan. These procedures included RPO-301, "Requirements for Radiological Surveys" dated March 1, 2013, and RPO-201, "Field Instrumentation Standard Operating Procedures" dated March 1, 2013. These procedures were also used for the demolition, excavation, and sampling of the floor drain and associated piping between laboratories QAL-35 and QAL-18. The procedures provided guidance on radiological measurements and the performance of surficial swipes and scans.

The subsequent surveys demonstrated that the actions were effective in reducing contamination to below the screening level values. The licensee ensured that radiological contamination controls were established such as the use of polyethylene sheeting and a fixative to control contamination on components. The NRC inspector concluded that the licensee maintained a close oversight of the contractor's activities during the survey and decommissioning activities in support of the final status survey for the partial site release.

Finally, Thomas Gray & Associates, Inc. was contracted as the carrier for all the packaging and shipping of low level radioactive wastes to licensed disposal facilities. The NRC inspector reviewed and confirmed that the individual performing packaging and radioactive surveys in support of the transportation activities had current hazmat training as required by 49 CFR Part 172, Subpart H. The NRC inspector reviewed the shipping papers and manifests and determined that the transportation activities were performed in accordance with the NRC and Department of Transportation regulations.

b. Final Survey Program

The NRC reviewed the historical uses of radioactive materials in the three buildings and the historical site summary and characterization data provided in the licensee's final status survey report. The radioactive materials used in the three buildings consisted of unsealed quantities of long-lived radionuclides, including radium, uranium, plutonium, lead, and americium. Based on the radionuclides evaluated, the licensee selected lead (Pb-210) as the beta radionuclide of concern and the most restrictive of the alpha emitters, americium (Am-241). The NRC concluded that the selection of these two radionuclides were representative of the facility and could be used in assessing the partial site release for unrestricted use. Based on the licensed radioactive materials and respective uses, and because the site met the screening criteria for unrestricted use, the site met the definition for a Group 2 decommissioning site as defined in NUREG 1757, Vol. 1, Rev 2, "Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees."

Table 1 below, provides the NRC screening values for each radionuclide of concern (excluding background) that was selected by the licensee. The derived concentration guideline levels - wide area average (DCGL_W) screening values are established in NUREG 1757, Vol. 2, Rev. 1, "Consolidated Decommissioning Guidance:

Characterization, Survey, and Determination of Radiological Criteria” and NUREG 5512, Vol. 3, “Residual Radioactive Contamination From Decommissioning.”

Table 1 – Derived Concentration Guideline Levels – wide area average (DCGL_w)	
Radionuclide	DCGL_w (dpm/100 cm²)
Pb-201 (beta)	550
Am-241 (alpha)	27

The licensee developed its methodology for characterizing the site based on NUREG-1575, Revision 1, “Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)”, NUREG-1757, Volume 2, Revision 1 “Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria” and EPA Quality Assurance QA/G-4, “Guidance for the Data Quality Objective Process.” The inspector determined that the licensee developed a methodical approach that was well documented for determining the survey units, sample size, and the classification of the survey units, that was consistent with NRC guidance documents specified above. The licensee used raw field alpha and beta data that was adjusted by the associated instrument backgrounds so that the net results could be directly compared to the surface DCGL_w for either alpha or beta.

Based on the licensee’s assessment following MARSSIM, it was determined there were two Class 1 survey units (i.e., QAL 35 and QAL 46) located in QAL, with the remainder of the building being either Class 2 or 3 survey units, or non-impacted areas. In building EAX, the licensee determined there were Class 2 or 3 survey units only, and in building POS, there were only Class 3 survey units or non-impacted areas. The licensee developed the survey unit sample size based on parameters that were acceptable by the NRC inspector, based on the criteria provided in NUREG-1575, Volume 1. Table 2 below, summarizes the MARSSIM class and rooms included in each of the final status survey - survey units (FSS SU).

Table 2– MARSSIM Class and Survey Units		
FSS Unit Number	MARSSIM Class	Rooms included in the FSS SU
FSS-QAL-1-1	1	QAL 35
FSS-QAL-1-2	1	QAL 46
FSS-QAL-2-1	2	QAL 2, 3, 4, 18, 19, 20, 21, 22, 25, 34, 47
FSS-EAX-2-1	2	EAX 1, 3, 4, 9, 11/12
FSS-POS-3-1	3	POS 2, 9, 10, 11, 12.1, 12.3, 13, 14, 15, 26/27, 28, 29, 30
FSS-QAL-3-1	3	QAL 1, 5, 6, 11, 12, 13, 14, 16.1, 17, 26/27, 28, 29/30, 31, 32, 33, 36, 39, 42.1, 45.1, 45.2

The licensee performed the required scan surveys and static surface activity measurements as described in the survey plan. The licensee performed the surveys with calibrated instruments consisting of Ludlum Model 2224-1 portable radiation survey instrument couple with the Ludlum Model 43-93 dual phosphor scintillation detector.

The licensee's final status survey results demonstrated that the results did not exceed the established DCGL_w for alpha and beta, with the exception of one surface activity measurement having beta residual activity equal to 556.3 dpm/100 cm². The licensee's Final Characterization and Decommissioning Report dated May 2016, states that the licensee collected a concrete sample and sent it to an off-site laboratory for gross alpha/beta analysis and gamma spectroscopy. The analytical results indicated the elevated measurements were due to the naturally occurring radioactive material (NORM) in the concrete. The licensee's plan provided that once each survey unit data was evaluated against the respective DCGL_w, then it was verified against the unity rule test, since there were two DCGLs. The subsequent data quality assessments performed indicated that the results met the data quality requirements and therefore was considered acceptable for use.

The licensee had developed and maintained a thorough spreadsheet that documented each building by room number that summarized the original room number and designation, most recent room number, radiological concerns in each room, MARSSIM classification, radiological and chemical characterizations, summary of the final status survey findings, and any mitigation or remedial actions. The detail provided a quick overall assessment for each building and room.

In addition, the licensee performed 54 soil samples and 16 water samples, which were analyzed by an offsite laboratory for the radionuclides of concern. The sample results were indistinguishable from background values.

c. Confirmatory Survey

The NRC contracted Oak Ridge Institute for Science and Education (ORISE) to perform confirmatory survey activities of the U.S. EPA Harmon Avenue Complex, on the UNLV campus because the licensee used unsealed radioactive materials with half-life greater than one-year. The ORISE independent confirmatory survey summary and results report dated November 3, 2016, is available in ADAMS at (ML16305A045). The confirmatory survey, performed September 26-29, 2016, included gamma scans, beta scans, alpha and beta direct measurements, and indirect measurements (smears) of the three buildings associated with the HAC.

ORISE performed the beta radiation surface scans at judgmentally selected locations using a Ludlum model 44-142 plastic scintillator coupled to a Ludlum Model 2221 ratemeter-scaler. Focus was given to areas that appeared to have a high potential for contamination (near floor drains, under sinks, discolored areas, etc.). Low to medium density gamma radiation scans of the floor and walls (up to 6 feet) were performed using a Ludlum model 44-10 sodium iodide (NaI) detector, coupled to a Ludlum Model 2221 ratemeter-scaler. Areas of elevated radiation, as indicated by an audible increase in output from the ratemeter-scaler, were marked for further investigation.

ORISE collected the alpha and beta surface activity measurements based on the licensee's final status survey random locations. Specifically, there were 89 direct measurements collected from the Class 1 and 2 survey units and were approximately in the same location as the licensee's direct measurement locations in order to perform a paired data comparison. In addition, there were five direct measurement locations selected based upon the surface scan results. There were material-specific background

measurements collected from non-impacted structures and surfaces, to the extent possible, of similar construction materials.

The direct measurements were made using a Ludlum model 43-92 zinc sulfide scintillation detector for alpha radiation and a Ludlum model 44-142 plastic scintillator for beta radiation. The detectors were coupled to Ludlum Model 2221 ratemeter-scalers. The count time for both confirmatory and background measurements was 5 minutes.

ORISE identified two direct measurement locations that exceeded the (Pb-210) DCGL_w, both judgmental locations in FSS EAX- 2-1, on the concrete pad in room 11/12. The licensee had previously evaluated this concrete pad through volumetric sampling. The analytical results indicated the elevated measurements were due to NORM in the concrete as documented in the licensee's Final Characterization and Decommissioning Report dated May 2016. ORISE also concluded that the two judgmental direct measurements, which exceeded the 550 dpm/100 cm² (Pb- 210) DCGL_w, were due to NORM identified in the concrete as previously discussed. The confirmatory survey did not identify any areas of residual contamination in excess of either the decommissioning criteria or the survey unit classification limits (excluding NORM).

The survey activities conducted by ORISE included gamma radiation surface scans, beta radiation surface scans, alpha and beta total and removable activity measurements. The majority of the areas scanned exhibited radiation levels indistinguishable from specific material type background and were uniform over the material. Table 3 below, is a summary of the data analyzed for alpha and beta.

Table 3 – Summary of Confirmatory Measurements		
	Total Surface Activity (dpm/100 cm ²)	Removable Surface Activity (dpm/100 cm ²)
Alpha	-163 to 17	0 to 4
Beta	-980 to 1800	-2 to 6

In addition to analyzing the confirmatory surveys, ORISE compared its results to the licensee's final status survey results using a two-sided sign tests for each FSS SU. It was determined the two populations were statistically different from one another. The licensee's data was biased high, such that the licensee reported higher activities than ORISE in all but one case, which was the Class 2 survey unit in the QAL building. ORISE graphed the data with Q-Q plots (quantile-quantile plot), which is available in its report, as Figures A6 through A9.

1.3 Conclusion

The licensee developed and implemented its decommissioning activities and final status survey in accordance with the guidance provided in NUREG-1575, Revision 1, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)" and NUREG-1757, Volume 2, Revision 1 "Consolidated Decommissioning Guidance: Characterization, Survey, and Determination of Radiological Criteria." The confirmatory survey did not identify any areas of residual contamination (excluding NORM) in excess of either the decommissioning criteria or the survey unit classification limits. ORISE

results confirm that the licensee's results demonstrate compliance with the release criteria for unrestricted use in accordance with 10 CFR 20.1402.

2 Exit Meeting Summary

On October 31, 2016, the NRC inspector presented the final inspection results to Mr. E. Wilds, Radiation Safety Officer. The inspector asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INSPECTION INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

E.Wilds, Jr., Radiation Safety Officer
B.McKim, Project Manager
C.Matthews, Assistant Radiation Safety Officer

INSPECTION PROCEDURES USED

IP 83890 Closeout Inspection and Survey

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened / Closed

None

Discussed

None

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
Am	Americium
CFR	<i>Code of Federal Regulations</i>
cpm	counts per minutes
dpm	disintegrations per minute
EAX	Exposure Assessment Annex
EPA	U.S. Environmental Protection Agency
FSS SU	final status survey – survey unit
HAC	Harmon Avenue Complex
MSL	Monitoring Systems Laboratory
NaI	sodium iodide
NORM	naturally occurring radioactive material
NRC	U.S. Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
Pb	Lead
POS	Program Operations Support
QAL	Quality Assurance Laboratory
ROC	radionuclide of concern
UNLV	University of Nevada, Las Vegas

If you have any questions regarding this inspection report, please contact Rachel Browder at 817-200-1452, or the undersigned at 817-200-1549.

Sincerely,

/RA/

Lee E. Brookhart, Chief
Fuel Cycle and Decommissioning Branch
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ADAMS ACCESSION NUMBER: ML16305A302

<input checked="" type="checkbox"/> SUNSI Review By: RSB	ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive	<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available	Keyword: NRC-002
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