UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

January 30, 2020

Edward L. Wilds, Jr., Director
National Center for Radiation
Field Operations
U.S. Environmental Protection Agency
4220 S. Maryland Parkway, Bldg. C
Las Vegas, NV 89119-7533

SUBJECT: NRC INSPECTION REPORT 030-06981/2019-002 AND NOTICE OF VIOLATION

Dear Dr. Wilds:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on November 18-21, 2019, at your U.S. Environmental Protection Agency (EPA) facility in Las Vegas, Nevada. The purpose of the inspection was to perform a confirmatory survey of four structures that you want to release from the license. A confirmatory survey is a radiological survey conducted by the NRC, in part, to verify the results of a licensee's final status survey. The enclosed report presents the results of this inspection.

This inspection examined activities conducted under your license as they relate to public health and safety, the common defense and security, and to confirm 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. A preliminary exit briefing was held with you and other members of your staff at the end of the onsite inspection on November 21, 2019. A final exit briefing was provided to you and your staff on January 29, 2020, after the NRC staff completed its technical review of the confirmatory survey results.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred with two examples. The violation involves your failure to obtain prior NRC approval for decommissioning procedures and activities that could have increased the potential health and safety impacts to workers or the public. The violation was evaluated in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at (http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html). The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited in the Notice because it was identified by the NRC and because the corrective actions to prevent recurrence have not been presented to the NRC. You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider, you may provide it in your

response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

The enclosed report presents the results of the confirmatory survey. The results of the survey indicate that the Sunrise Avenue warehouse meets the NRC's criteria for release for unrestricted use as provided in regulations and NRC guidance documents. However, the inspectors were unable to verify the results of your final status survey for the buildings located at East Harmon Avenue, because the final status survey report for these buildings was not available for review at the time of the onsite inspection. The NRC will review the results of your final status survey for these three buildings when the associated report is submitted to the NRC.

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

Should you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234 or the undersigned at 817-200-1156.

Sincerely,

/RA/

Heather J. Gepford, PhD, CHP, Chief
Materials Licensing and Decommissioning Branch
Division of Nuclear Materials Safety

Docket No.: 030-06981
License No.: 27-05861-02

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 030-06981/2019-002

cc w/encl:
J. Sejour, EPA
K. Beckley, Nevada DPBH

NOTICE OF VIOLATION

U.S. Environmental Protection Agency
Las Vegas, NV

Docket No. 030-06981
License No. 27-05861-02

During an NRC inspection conducted on November 18-21, 2019, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> Title 10 to the *Code of Federal Regulations* 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 the site or separate building have not been previously approved by the Commission and these procedures could increase potential health and safety impacts to workers or to the public, such as in any of the following cases:
>
> (i) Procedures would involve techniques not applied routinely during cleanup or maintenance operations; or
>
> (iii) Procedures could result in significantly greater airborne concentrations of radioactive materials than are present during operation.
>
> Contrary to above, in August 2019, the licensee failed to submit a decommissioning plan for procedures and activities necessary to carry out decommissioning of the site or a separate building that had not been previously approved by the Commission, and these procedures could have increased potential health and safety impacts to workers or the public. Specifically, the licensee's contractor conducted decommissioning activities in Rooms 41 and 68 of the Chemistry Laboratory Building (CHL) using procedures that involved techniques not applied during routine cleanup or maintenance operations, without submitting these procedures in the form of a decommissioning plan to the NRC, although these activities could have resulted in significantly greater airborne concentrations of radioactive material than were present during operation. These procedures and activities included destructive removal (scabbling) of fixed contamination from the floor in Room CHL 41 and the sump wall and floor in Room CHL 68, a decommissioning technique not applied routinely during cleanup or maintenance operations. In addition, a high-efficiency particulate air filtered vacuum was used during decommissioning of Room CHL 41, an indication of the potential for greater airborne concentrations of radioactive materials than are present during routine operations.

This is a Severity Level IV violation (Section 6.3).

Pursuant to the provisions of 10 CFR 2.201, U.S. Environmental Protection Agency, National Center for Radiation Field Operations, is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified

in this Notice, an order or a Demand for Information may be issued requiring information as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response will be made available electronically for public inspection in the NRC Public Document Room or in the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC 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. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information).

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days of receipt.

Dated this 30th day of January 2020

U.S. NUCLEAR REGULATORY COMMISSION
Region IV

Docket No.:	030-06981
License No.:	27-05861-02
Report No.:	030-06981/2019-002
Licensee:	U.S. Environmental Protection Agency
Facility:	National Center for Radiation Field Operations
Location:	4220 S. Maryland Parkway, Building C Las Vegas, NV 89119-7533
Inspection Dates:	November 18-21, 2019
Inspectors:	Robert Evans, PhD, PE, CHP, Senior Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
	Michelle Simmons, Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
Accompanied By:	Austin Roberts, Health Physicist Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
Approved By:	Heather J. Gepford, PhD, CHP, Chief Materials Licensing and Decommissioning Branch Division of Nuclear Materials Safety
Attachments:	Supplemental Inspection Information Confirmatory Survey Measurements

EXECUTIVE SUMMARY

U.S. Environmental Protection Agency
NRC Inspection Report 030-06981/2019-002

This U.S. Nuclear Regulatory Commission (NRC) inspection was a routine, announced inspection of licensed activities being conducted at the U.S. Environmental Protection Agency (EPA) facility in Las Vegas, Nevada. The inspection included a radiological confirmatory survey of four structures that the licensee plans to release for unrestricted use. In summary, the licensee conducted decommissioning activities in accordance with license and regulatory requirements, with one exception as described below.

Decommissioning Inspection Procedure for Materials Licensees

- The inspectors reviewed the licensee's final status survey plan for the Harmon Avenue complex and confirmed that the details of the plan and proposed release criteria were consistent with NRC guidance. The licensee's final status survey report for the Harmon Avenue complex was not available for review during the inspection and will be reviewed at a later date by NRC staff. (Section 1.2)

- A violation was identified related to the licensee's failure to obtain prior NRC approval for procedures and activities that were implemented during decommissioning that were not routinely used during operations or maintenance that could have increased the potential health and safety impacts to workers or the public. (Section 1.2)

- The inspectors reviewed the characterization/final status survey report for the Sunrise Avenue warehouse and concluded that the survey design was consistent with NRC guidance, and the survey results were less than the NRC's screening values. (Section 1.2)

Closeout Inspection and Survey

- The inspectors' confirmatory survey results indicated that the Harmon Avenue complex and the Sunrise Avenue warehouse did not contain licensed radioactivity above the respective derived concentration guideline levels, indicating that the licensee had effectively remediated the buildings. Although a few data points exceeded the derived concentration guideline levels, the overall averages for each survey unit were less than the derived concentration guideline levels. The exceedances were attributed to naturally occurring radioactive material in the surface materials. (Section 2.2)

- The inspectors were unable to compare the confirmatory survey results to the licensee's final status survey results for the Harmon Avenue complex, because the final status survey report for this location was not ready for NRC review. (Section 2.2)

Report Details

Site Status

The EPA possesses radioactive material under a Type A research and development broad scope license at its facilities in Las Vegas, Nevada. The licensee previously decided to consolidate its activities involving radioactive material and permanently discontinue operations at several buildings. In 2016, the licensee requested approval to release two buildings and a portion of a third building at East Harmon Avenue in Las Vegas from the license. After the NRC conducted a confirmatory survey and reviewed the licensee's final status survey results, the NRC amended the license in November 2016 to remove the requested areas from the license.

In January 2018, the licensee notified the NRC that it planned to decommission two additional buildings and the remainder of the third building at East Harmon Avenue, with the goal of removing the buildings from the license. In addition, the licensee notified the NRC that it planned to request the removal of a warehouse located on Sunrise Avenue in Las Vegas from the license.

At the time of the inspection, the three buildings at East Harmon Avenue were empty and had been final status surveyed. The results of these surveys were not available for review at the time of the inspection. The Sunrise Avenue warehouse was in use, but the EPA was actively working to clear the warehouse.

1 Decommissioning Inspection Procedure for Materials Licensees (Inspection Procedure 87104)

1.1 Inspection Scope

The purpose of this portion of the inspection effort was to determine if licensed decommissioning activities were being conducted in a manner that will protect health and safety of workers and the general public, and to determine if decommissioning activities were being conducted in accordance with license and regulatory requirements.

1.2 Observations and Findings

Materials License 27-05861-02 allows EPA to conduct certain decommissioning activities without prior NRC approval. The licensee's Radiation Safety Manual provides the NRC-approved instructions for decommissioning. The Radiation Safety Manual was attached to the license renewal letter dated February 27, 2017, and the letter is referenced in License Condition 27.A.

The East Harmon Avenue complex consisted of laboratories, offices, common areas, and a greenhouse. The licensee conducted decommissioning of the complex in two parts. Part 1 decommissioning efforts were conducted in the Exposure Assessment Annex (EAX), Quality Analysis Laboratory (QAL), and portions of the Program Operations Support (POS) building. The NRC amended the license in November 2016 to release the EAX and QAL buildings, part of the POS building, and surrounding land areas from the license (ADAMS Accession No. ML16321A509).

In accordance with 10 CFR 30.36(d), on January 11, 2018, the licensee notified the NRC that it planned to decommission the buildings at the East Harmon Avenue complex. The

buildings included the Executive Center (EXC), Chemistry Laboratory (CHL), and the remainder of the POS building that was not released in 2016. In the January 2018 letter, the licensee also informed the NRC that it would be requesting the release of the Sunrise Avenue warehouse from the license. The NRC acknowledged the licensee's notifications by letter dated February 5, 2018 (ADAMS Accession No. ML18036A620).

The licensee's contractor developed radiological characterization and final status survey plans for decommissioning of the three Harmon Avenue structures. The plans described the radionuclides of concern, proposed derived concentration guideline levels (DGCLs), and survey unit design. The three buildings were divided into 10 survey units. The areas of each survey unit ranged from 25 to 704 square meters (m^2). The survey units were classified using NRC guidance based on potential radiological impacts. The classifications ranged from Class 1 (the most restrictive classification) to non-impacted.

The radionuclides of concern included both alpha and beta emitting radionuclides. The licensee chose to use DCGLs based on the most limiting alpha and beta emitting radionuclides (americium-241 and lead-210, respectively) from the list of radionuclides of concern. The concentration limits for the two DCGLs were obtained from Table 5.19 of NUREG/CR-5512, Vol. 3, "Residual Radioactive Contamination From Decommissioning: Parameter Analysis." The DCGL for alpha emitters was 27 disintegrations per minute per 100 square centimeters (dpm/100 cm^2), the screening value for americium-241; while the DCGL for beta emitters was 550 dpm/100 cm^2, the screening value for lead-210. The DGCLs do not include background, meaning that the release limits are above background values.

The inspectors reviewed the characterization and final status survey plans during the inspection. The inspectors determined the proposed plans were consistent with the guidance provided in NUREG-1757, Volume 1, Revision 2, "Consolidated Decommissioning Guidance: Decommissioning Process for Materials Licensees," and NUREG-1575, Revision 1, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)."

The Harmon Avenue buildings were constructed in 1966-1967. The buildings were constructed with some asbestos-containing material. As part of decommissioning, the licensee had to remediate asbestos material from the buildings, in addition to the radioactive material. The licensee started decommissioning activities of the three buildings in November 2018 with the goal of permanently releasing the buildings from the license by September 2020. The licensee's contractor conducted characterization surveys at the Harmon Avenue complex in February-July 2019. The contractor conducted surface scans, fixed-point measurements, swipe sampling, and volumetric surface material sampling.

The characterization survey identified three areas that had contamination at levels greater than the DCGLs:

- CHL Room 41 floor tiles, mastic coatings, countertops, sink, and chemical fume hood
- CHL Room 42 sink and fume hood base
- CHL Room 68 acid waste drain line, sump, and surrounding soils

The licensee's contractor remediated the three areas using procedures developed under the licensee's broad scope license. These three areas were remediated in August 2019.

The licensee's records indicate that destructive techniques were used at two locations. These techniques included scabbling of the floor in Room CHL 41 and scabbling of the sump wall and floor in Room CHL 68. The licensee's failure to obtain prior NRC approval for these two activities was a violation of 10 CFR 30.36(g)(1) requirements (VIO 030-06981/1902-01). Specifically, the licensee implemented decommissioning procedures at a separate building that had not been previously approved by the Commission, and these procedures could have increased potential health and safety impacts to workers in the following cases:

- The procedures involved techniques not applied routinely during cleanup or maintenance operations, and
- The procedures could have resulted in significantly greater airborne concentrations of radioactive materials than are present during operation.

In other words, the scabbling of the concrete surfaces was a technique that was not applied routinely during cleanup or maintenance operations, and the work activity could have increased airborne concentrations of radioactive materials to levels greater than the levels present during operation. In addition, a high-efficiency particulate air filtered vacuum was used during decommissioning of Room CHL 41, an indication of the potential for greater airborne concentrations of radioactive materials than are present during routine operations. The licensee's Radiation Safety Manual did not provide instructions for destructive techniques, and the contractor was not conducting the work under a service provider license.

After the three buildings at the Harmon Avenue complex were decommissioned, the licensee's contractor conducted a final status survey of the buildings. The final status survey was completed in September 2019. During site tours, the inspectors noted that several rooms in the three buildings had overhead crawl spaces that did not appear to have been surveyed as part of the characterization and final status surveys. A licensee representative stated that these areas were not surveyed because contamination was not identified on upper walls and ceiling areas. The licensee plans to address the upper wall areas, ceilings, and crawl spaces as part of its final status survey report.

The inspectors reviewed the status of the licensee's environmental sampling program for the exterior areas of the Harmon Avenue complex. The licensee conducted environmental sampling to support Part 1 decommissioning activities. The results of the sampling were provided in the licensee's document, "Final Characterization and Decommissioning Report," dated May 2016. The licensee's environmental sampling program included seven groundwater sampling points and 26 surface/subsurface soil sampling points including background locations. The results of the onsite samples were comparable to background results. Some minute quantities of radioactive material, including transuranics, were identified in all samples at levels consistent with naturally occurring radioactive material and fallout from previous outdoor nuclear weapons tests. Because the NRC had already approved Part 1 decommissioning in 2016, the inspectors did not collect outdoor environmental samples during the inspection.

By letter dated October 17, 2019 (ADAMS Accession No. ML19365A045), received on November 13, 2019, the licensee submitted an amendment request to release the Sunrise Avenue warehouse from the license. The 300-square meter warehouse was previously used for shipping and receiving of radioactive material; although, the warehouse had not been used for these activities in the last few years.

The licensee's contractor conducted the radiological survey of the warehouse in June 2017 and submitted a report to the licensee dated September 2017. This report was attached to the licensee's October 2019 submittal. The warehouse was classified as a Class 3 area using the guidance provided in MARSSIM. The licensee and its contractor chose to use the same DCGLs at the warehouse that were used at the Harmon Avenue complex.

The licensee's contractor conducted radiological scan surveys, direct measurements, swipe sampling, and media sampling. The Visual Sampling Plan computer code was used to calculate the number of direct measurement samples required to be collected. The licensee's contractor concentrated its surveys in areas where radioactive material may have been received, shipped, or stored with less emphasis on other areas of the warehouse. The contractor recorded direct measurements for total (fixed and removable) contamination and collected swipe samples for removable contamination at 14 random locations within the warehouse. The contractor also collected media (concrete) samples at each location.

The scan surveys were conducted, in part, to identify areas of elevated radioactively for additional investigation. The scan survey coverage, estimated to be about 30 percent, exceeded MARSSIM requirements for Class 3 areas. No areas were identified for additional investigation. In addition, no direct measurement result exceeded the associated alpha and beta DCGLs, and the results were comparable to background measurements. The swipe sample results were at or less than 10 percent of the respective DCGLs and were comparable to background measurements. Although the licensee did not establish DGCLs for the media samples, the warehouse sample results were generally comparable to the background sample results.

Since the characterization survey was designed using MARSSIM guidance, the characterization survey data was adopted by the licensee as final status survey data to demonstrate that the warehouse met the criteria for release from the license. The inspectors reviewed the characterization survey report and concluded that the survey design met MARSSIM requirements for final status surveys, and the licensee's records indicate that no sample result exceeded the NRC's screening criteria that was adopted by the licensee.

At the time of the inspection, the radioactive wastes collected during decommissioning continued to be staged for future shipment. Therefore, the inspectors did not review the licensee's shipping papers. The licensee plans to address the waste as part of its future request to release the remainder of the Harmon Avenue complex from the license.

1.3 Conclusions

The inspectors reviewed the licensee's final status survey plan for the Harmon Avenue complex and confirmed that the details of the plan and proposed release criteria were consistent with NRC guidance. The licensee's final status survey report for the Harmon Avenue complex was not available for review during the inspection and will be reviewed at a later date by NRC staff.

A violation was identified related to the licensee's failure to obtain prior NRC approval for procedures and activities that were implemented during decommissioning that were not

routinely used during operations or maintenance that could have increased the potential health and safety impacts to workers or the public.

The inspectors reviewed the characterization/final status survey report for the Sunrise Avenue warehouse and concluded that the survey design was consistent with NRC guidance, and the survey results were less than the NRC's screening values.

2 Closeout Inspection and Survey (Inspection Procedure 83890)

2.1 Inspection Scope

The scope of this portion of the inspection was to ensure that final status surveys had been performed as stated in the license and to verify that the four buildings had been decontaminated to acceptable radiological levels for unrestricted use. The goal of this inspection procedure was to conduct sufficient confirmatory surveys and sampling so that the NRC can conclude that the licensee's final status survey program was implemented in a manner that provides confidence in the survey results.

2.2 Observations and Findings

The NRC inspectors conducted confirmatory surveys to verify the conclusions of the licensee's final status surveys. The surveys included the Part 2 decommissioning areas at the Harmon Avenue complex (Buildings EXC, CHL, and the remainder of the POS) and the Sunrise Avenue warehouse. The inspectors also conducted limited surveys of the roof of the POS building. The surveys included ambient gamma radiation measurements, limited surface scans, and static measurements of surfaces for total (fixed and removable) radioactivity.

a. Measurement of Ambient Gamma Radiation Levels

The inspectors measured the ambient gamma radiation levels within the four structures primarily to locate areas of elevated radioactive contamination for fixed-point surface measurements. The inspectors used the licensee's action level of three times background as the acceptance criteria. The surveys were conducted using a Ludlum Model 19 survey meter (Serial Number 84259, calibration due date of 9/18/20) and a Radeye SX survey meter connected to a SPA-3 detector (instrument Serial Number 52210, detector Serial Number 19212, calibration due date of 3/3/20).

Prior to each survey, the inspectors measured background levels in an unimpacted area. All rooms in the four buildings, with two exceptions, were measured for ambient gamma radiation levels. The two areas were fenced areas located outdoors. These areas were not expected to have surface contamination because they were constantly exposed to the environment. The results of the survey are presented in Attachment 2, Table 1, "Ambient Gamma Radiation Levels," in units of microRoentgen per hour (μR/hr).

In summary, the exposure rates of all areas were below the action level, with two exceptions. The first area was the bathrooms of the CHL building (Survey Unit CHL-3-1). These elevated measurements were attributed to naturally occurring radioactive material in the bathroom tiles. The second area was CHL Room 68 (Survey Unit CHL-1-3), the outdoor area where the acid waste drain line, sump, and surrounding soils were remediated. The inspectors attributed the elevated exposure rates to

naturally occurring radioactive material in the soil adjacent to the sump. The inspectors subsequently collected fixed-point measurements at these locations, in part, to further identify and delineate the sources of the elevated measurements.

b. Measurements of Surface Contamination Levels

The inspectors conducted limited scan surveys for alpha and beta contamination using Eberline E-600 survey meters connected to SHP-380AB alpha-beta probes (Serial Nos. 00763/01108, 00790/00907, and 02463/00906 with calibration due dates of 11/7/20, 4/20/20, and 11/7/20, respectively). The inspectors also conducted 1-minute, fixed-point measurements in almost all rooms in the four buildings, including unimpacted areas.

Prior to conducting the scan surveys and fixed-point measurements, the inspectors measured background levels in an unimpacted office for calculation of instrument critical levels. The inspectors also conducted background measurements in selected reference areas, areas where radioactive material had not been used or areas proven to be contamination-free during Part 1 decommissioning activities. These reference areas were used for material-specific background measurements. These material-specific surfaces included laboratory countertops, floor tiles, drywall, and concrete. Background measurements were necessary for comparison of the NRC's fixed-point measurements to the associated DCGLs for each material type.

During the surveys, the inspectors encountered certain material surfaces that were not present in the reference areas including glass, metal, wood, and carpet. For these materials, the inspectors chose to use backgrounds based on similar contamination potential. Materials that do not normally contain naturally occurring radioactive material, such as wood, glass, and metal, were grouped together as one material type.
The inspectors conducted limited scan surveys primarily in the MARSSIM Class 1 survey units. No areas of elevated radioactivity were identified during scan surveys. Because no area was identified with elevated radioactivity, the scan survey results were not recorded. Fixed point measurements were collected in all Class 1-3 areas as well as the unimpacted rooms within the POS, EXC, CHL, and Sunrise Avenue warehouse, except for one area. This area was an outdoor storage area adjacent to the CHL that consisted of a concrete slab enclosed within a fence. The inspectors determined that this Class 3 area most likely did not have licensed radioactive contamination because the area was constantly exposed to the environment. The results of the fixed-point measurements are presented in Attachment 2, Table 2, "Summary of Surface Activity Measurements," in units of dpm/100 cm^2.

The Sunrise Avenue warehouse was classified as a single Class 3 survey unit. The licensee collected total and removable alpha and beta radioactivity measurements from 14 locations in the warehouse. The inspectors collected total alpha and beta activity measurements from 20 randomly selected locations in the warehouse. The inspectors collected a total of 40 measurements. The majority (90 percent) of these measurements were below background levels or exceeded background by less than the respective DCGLs, and the average alpha and beta activities were less than the respective DCGLs. The four measurements that exceeded background by more than the DCGL were concrete floor measurements, and these exceedances were attributed to the presence of naturally occurring radioactive material in the concrete.

After the on-site portion of the inspection, the inspectors performed a comparative statistical test of the NRC's confirmatory survey results with the licensee's final status survey results, submitted to the NRC by application dated October 17, 2019 (ADAMS Accession No. ML19365A045). The inspectors concluded that the two data sets had different mean values. The NRC's mean value was slightly higher than the licensee's mean value. This discrepancy was attributed to the NRC's short count times (1 minute) and/or radon interference. It should be noted that the inspectors' confirmatory survey results in the warehouse were generally comparable to the measured background levels outside of the warehouse.

The inspectors collected alpha and beta activity measurements at 395 randomly selected locations within the Harmon Avenue complex. In addition to the 10 defined survey units, the inspectors collected measurements from unimpacted areas adjacent to the survey units. The majority (94 percent) of the inspectors' fixed-point alpha and beta activity measurements were either below background levels or exceeded background by less than the respective DCGLs.

The inspectors reviewed the measurements that did exceed the licensee's DCGLs and noted that these corresponded to surface types that typically contain naturally occurring radioactive material, such as concrete and the bathroom tiles mentioned above. The licensee did not calculate DCGLs for the elevated measurement comparison test, a method of comparing small areas of elevated activity to a higher value DCGLs as allowed by MARSSIM. Thus, the inspectors could not compare these exceedances to calculated elevated measurement comparision values.

The limited scope of the NRC inspectors' confirmatory survey did not allow for rigorous statistical comparison of the survey unit measurements to the background/reference area measurements, such as would be conducted for a final status survey. However, the NRC's measured survey unit averages were less than the respective DCGLs. Further, the confirmatory survey results indicated that the alpha and beta surface activity levels were generally comparable with background and reference area measurements.

As noted earlier, the NRC staff will evaluate the licensee's final status survey results for the Harmon Avenue complex when the licensee submits the final status survey report to the NRC for review and approval.

2.3 Conclusions

The inspectors' confirmatory survey results indicated that the Harmon Avenue complex and the Sunrise Avenue warehouse did not contain licensed radioactivity above the respective DCGLs, indicating that the licensee had effectively remediated the buildings. Although a few data points exceeded the DCGLs, the overall averages for each survey unit were less than the DCGLs. The exceedances were attributed to naturally occurring radioactive material in the surface materials.

The inspectors were unable to compare the confirmatory survey results to the licensee's final status survey results for the Harmon Avenue complex, because the final status survey report for this location was not ready for NRC review.

3 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the licensee's staff at the end of the onsite inspection on November 21, 2019. The inspectors provided updated confirmatory survey information in a teleconference call with the licensee's staff on January 29, 2020. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

Partial List of Persons Contacted

Licensee

R. Andrews, Facility Manager
J. Davis, Senior Health Physicist, Radiation Safety & Control Services
H. Downey, Radiological Services Manager, Radiation Safety & Control Services
B. McKim, Civil Engineer
J. Sejour, Radiation Safety Officer
E. Wilds, Director

Inspection Procedures (IPs) Used

IP 83890	Closeout Inspection and Survey
IP 87104	Decommissioning Inspection Procedure for Materials Licensees

Items Opened, Closed and Discussed

Opened

030-06981/1902-01	VIO	Failure to obtain prior NRC approval for remediation techniques

Closed

None

Discussed

None

List of Acronyms Used

ADAMS	Agencywide Documents Access and Management System
CHL	Chemistry Laboratory Building
CFR	*Code of Federal Regulations*
DCGL	derived concentration guideline level
dpm/100 cm^2	disintegrations per minute per 100-square centimeters
EAX	Exposure Assessment Annex
EPA	U.S. Environmental Protection Agency
IP	NRC Inspection Procedure
µR/hr	microroentgen per hour
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
m^2	square meters
NRC	U.S. Nuclear Regulatory Commission
POS	Program Operations Support
QAL	Quality Analysis Laboratory
VIO	Violation

CONFIRMATORY SURVEY MEASUREMENTS

Table 1: Ambient Gamma Radiation Measurements

Survey Unit	Area (m^2)	MARSSIM Class	# Rooms Surveyed[1]	Survey Meter[2]	Background (μR/hr)	Range (μR/hr)
CHL 1-1	25	1	1	Ludlum Radeye	20 4	19-20 4-5
CHL 1-2	90	1	1	Ludlum Radeye	20 4	12-20 3-5
CHL 1-3	50	1	1	Ludlum Radeye	20 4	24-60 5-11
CHL 2-1	423	2	12	Ludlum Radeye	20 4	11-39 3-9
CHL 2-2	365	2	8	Ludlum Radeye	20 4	10-25 3-5
EXC 2-1	180	2	8(8)	Ludlum Radeye	20 4	1-20 0-8
POS 2-1	80	2	1(1)	Ludlum Radeye	18 4	7-20 6-8
POS 2-2	580	2	14	Ludlum Radeye	18 4	13-27 3-8
CHL 3-1	704	3	32(18)	Ludlum Radeye	20 4	10-43 3-12
POS 3-2	516	3	9(3)	Ludlum Radeye	18 4	15-42 3-11
Sunrise Warehouse	306	3	3	Ludlum Radeye	20 4	10-15 3-4

[1] The number of unimpacted rooms that were surveyed are included in parentheses

[2] Ludlum Model 19 survey meter (serial number 84259, calibration due date of 9/18/20) and Radeye SX survey meter connected to SPA-3 detector (instrument serial number 52210, detector serial number 19212, calibration due date of 3/3/20)

Table 2: Summary of Surface Activity Measurements

Survey Unit	Description	No. of Survey Points	No. of Points that Exceeded DCGL	Net Alpha (dpm/100cm^2)	Average Net Alpha (dpm/100cm^2)	Net Beta (dpm/100cm^2)	Average Net Beta (dpm/100cm^2)
CHL-1-1	CHL Lab 41	20	0	-44 to 11	-21.7	-748 to 178	-342
CHL-1-2	CHL Lab 42	70	4	-58 to 62	-15.5	-1515 to 1297	-462
CHL-1-3	CHL outdoor pen, acid waste line trench, pH neutralization sump	6	2	-11 to 11	0.0	177 to 806	515
CHL-2-1	CHL labs	204	18	-58 to 30	-18.8	-1625 to 2669	-308
CHL-2-2	CHL labs	106	2	-48 to 19	-18.1	-952 to 1528	-458
EXC-2-1	EXC Vault	32	1	-49 to -6	-25.5	-1797 to 733	-1053
POS-2-1	POS Lab 18	30	6	-58 to 62	-15.7	-2131 to 743	-529
POS-2-2	POS labs and workshops	158	10	-54 to 55	-20.1	-1784 to 2233	-710
CHL-3-1	CHL corridors, offices, restrooms	76	5	-65 to 22	-22.3	-1241 to 4267	-143
POS-3-2	POS corridors and offices	88	2	-54 to 22	-17.9	-1655 to 848	-531
Sunrise Warehouse	EPA warehouse on Sunrise Ave	40	4	-57 to 63	-10.9	-1415 to 1279	-497

NRC INSPECTION REPORT 030-06981/2019-002 AND NOTICE OF VIOLATION DATED – JANUARY 30, 2020

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ADAMS ACCESSION NUMBER: ML20028D820

■ SUNSI Review By: RJE	ADAMS: ■ Yes ☐ No	☐ Non-Publicly Available ■ Publicly Available	■ Non-Sensitive ☐ Sensitive	Keyword: NRC-002

OFFICE	DNMS:MLDB	MLDB	MLDB	C:MLDB
NAME	REvans	ARoberts	MSimmons	HGepford
SIGNATURE	*/RA/*	*/RA/*	*/RA/*	*/RA/*
DATE	1/29/2020	1/29/2020	1/29/2020	1/30/2020

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