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

December 16, 2019

EA-19-128

Dr. James D. Polk
Chief Health and Medical Officer
National Aeronautics and Space Administration
NASA Headquarters
300 E. Street SW
Washington, DC 20546

SUBJECT: NRC INSPECTION REPORT 999-90004/2019-001

Dear Dr. Polk:

This letter refers to the announced special inspection conducted on September 23, 2019, at your facility in New Orleans, Louisiana. The purpose of the inspection was to assess the facts, circumstances, and timeline related to: (1) the facility's failure to apply for a U.S. Nuclear Regulatory Commission (NRC) specific license; (2) the facility's loss of a generally licensed device by transfer to a third-party recycling company; (3) the facility's failure to provide a timely report following identification of the loss of the generally licensed device; and (4) the use and storage of the remainder of the facility's possessed radioactive material. The enclosed report presents the results of the inspection.

Within these areas, the inspection consisted of a selected examination of procedures and representative records, independent radiation measurements, observation of facilities and remaining sources possessed, and interviews with personnel. The preliminary inspection findings were discussed with eight National Aerospace and Science Administration (NASA) technical staff and management representatives (Section 5 of the enclosure) at the conclusion of the onsite portion of the inspection on September 23, 2019. A final exit briefing was conducted telephonically with the same staff referenced above and Mr. Roy Malone, Director, Office of Center Operations, Marshall Space Flight Center, on December 10, 2019.

Based on the results of this inspection, the NRC has determined that three apparent violations were identified and are being considered for escalated enforcement action 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 apparent violations involved: (1) the failure to possess an NRC specific materials license authorizing possession of certain byproduct materials; (2) the loss of control of a generally licensed source, which is believed to have been transferred to a third-party recycling company; and (3) the failure to provide a timely notification following identification of the missing radioactive source. Apparent violations (1) and (3) were identified by the NRC leading up to and during the September 23, 2019, inspection. Apparent violation (2) was identified by NASA on August 15, 2018.

The NRC considers the apparent violations of concern. The possession of quantities and forms of radioactive material without a corresponding valid NRC license precludes the NRC from performing its necessary regulatory oversight. The transfer of radioactive material to unlicensed third parties provides a pathway for radioactive material to enter the public sphere and unnecessarily expose members of the public to radiation. Finally, the failure to provide a timely notification to the NRC inhibits the NRC's response functions and precludes the NRC from performing a timely assessment of the facts, circumstances, and actual or potential consequences of the event, including radiation exposures to members of the public.

Before the NRC makes its enforcement decision, we are providing you an opportunity to: (1) respond in writing to the apparent violations addressed in the inspection report within 30 days of the date of this letter, (2) request a predecisional enforcement conference (PEC), or (3) request alternative dispute resolution (ADR). If a PEC is held, it may be open for public observation and the NRC may issue a press release to announce the time and date of the conference. If you decide to participate in a PEC or pursue ADR, please contact Ms. Patricia Silva at 817-200-1455 within 10 days of the date of this letter. A PEC should be held within 30 days and an ADR session within 45 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as a "Response to Apparent Violations in NRC Inspection Report 999-90004/2019-001; EA-19-128" and should include for each apparent violation: (1) the reason for the apparent violation or, if contested, the basis for disputing the apparent violation; (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 previously docketed correspondence, if the correspondence adequately addresses the required response. Additionally, your response should be sent to the NRC, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy mailed to Michael C. Hay, Director, Division of Nuclear Materials Safety, Region IV, 1600 East Lamar Boulevard, Arlington, Texas, 76011, within 30 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a PEC does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned.

In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful in preparing your response. You can find the Information Notice on the NRC website at: http://www.nrc.gov/docs/ML0612/ML061240509.pdf.

In lieu of a written response or PEC, you may also request ADR with the NRC in an attempt to resolve this issue. ADR is a general term encompassing various techniques for resolving conflicts using a neutral third party. The technique that the NRC has decided to employ is mediation. Mediation is a voluntary, informal process in which a trained neutral (the "mediator") works with parties to help them reach resolution. If the parties agree to use ADR, they select a mutually agreeable neutral mediator who has no stake in the outcome and no power to make decisions. Mediation gives parties an opportunity to discuss issues, clear up misunderstandings, be creative, find areas of agreement, and reach a final resolution of the issues.

Additional information concerning the NRC's program can be obtained at http://www.nrc.gov/about-nrc/regulatory/enforcement/adr.html. The Institute on Conflict Resolution (ICR) at Cornell University has agreed to facilitate the NRC's program as a neutral third party. Please contact ICR at 877-733-9415 within 10 days of the date of this letter if you are interested in pursuing resolution of this issue through ADR.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room and 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.

If you have any questions concerning this matter, please contact Ms. Patricia Silva of my staff at 817-200-1455.

Sincerely,

/RA/

Michael C. Hay, Director
Division of Nuclear Materials Safety

Docket: 999-90004
License: General License under 10 CFR 31.5

Enclosure:
NRC Special Inspection
Report 999-90004/2019-001

cc w/enc:
State of Louisiana Radiation Control Program

State of Florida Radiation Control Program

Angel Plaza, Headquarters, Senior Environmental Health Officer
Johnson Space Center
National Aerospace and Science Administration
2101 E NASA Pkwy
Houston, TX 77058

Robert Champion, Michoud Assembly Facility (MAF), Director,
Keith Savoy, MAF, Manager, Operations Office
Sam Engelhard, MAF, Industrial Hygiene, Health Physics Manager
Michoud Assembly Facility
National Aerospace and Science Administration
13800 Old Gentilly Road
New Orleans, LA 70129

Roy Malone, Director, Office of Center Operations, Marshall Space Flight Center (MSFC)
David Thaxton MSFC, Occupational Health Officer
Farley Davis, MSFC, Manager, Environmental Engineering and Occupational Health Office
Marshall Space Flight Center, AS10
National Aerospace and Science Administration
Marshall Space Flight Center, AL 35812

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	999-90004
License:	General License Under 10 CFR 31.5
Report:	2019-001
EA No:	EA-19-128
Licensee:	National Aeronautics and Space Administration Michoud Assembly Facility
Location Inspected:	13800 Old Gentilly Road, New Orleans, Louisiana
Inspection Dates:	Onsite September 23, 2019, with in-office review through November 14, 2019
Exit Meeting Date:	December 10, 2019
Inspectors:	Jason vonEhr, Health Physicist Materials Inspection Branch Division of Nuclear Materials Safety
Approved By:	Patricia A. Silva, Chief Materials Inspection Branch Division of Nuclear Materials Safety
Attachment:	Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

National Aeronautics and Space Administration
Michoud Assembly Facility
NRC Inspection Report 999-90004/2019-001

On September 23, 2019, the U.S. Nuclear Regulatory Commission (NRC) performed an announced special inspection at the National Aeronautics and Space Administration's Michoud Assembly Facility in New Orleans, Louisiana, with in-office reviews through November 14, 2019. The scope of the inspection was to assess the facts, circumstances, and timeline related to: (1) the facility's failure to apply for a NRC specific license; (2) the facility's loss of a generally licensed device by transfer to a third-party recycling company; (3) the facility's failure to provide a timely report following identification of the loss of the generally licensed device; and (4) assess the use and storage of the remainder of the facility's possessed radioactive material.

Within these areas, the inspection consisted of a selected examination of procedures and representative records, independent radiation measurements, observation of facilities and remaining sources possessed, and interviews with personnel.

Program Overview

The National Aeronautics and Space Administration had eight separate specific materials licenses with the NRC which authorized a wide variety of byproduct materials at facilities across the United States. The Michoud Assembly Facility at the time of the inspection possessed 26 generally licensed devices, and prior to its transfer for disposal on July 30, 2019, a cesium-137 calibration source that was required to be specifically licensed. The Michoud Assembly Facility and its inventory of radioactive materials were not authorized in part or in whole on any of the eight separate NRC licenses possessed by the National Aeronautics and Space Administration. (Section 1)

Inspection Findings

During the announced special inspection, three apparent violations were identified. These apparent violations involved: (1) the failure to possess an NRC specific materials license authorizing possession of certain byproduct materials; (2) the loss of control of a generally licensed source, which is believed to have been transferred to a third-party recycling company; and (3) the failure to provide a timely notification following identification of the missing radioactive source. (Section 3)

Corrective Actions

The licensee determined that the cesium-137 source, the sole radioactive source requiring possession under a specific license, was surplus to the needs of NASA and transferred it to an authorized and licensed entity on July 30, 2019. Following this transfer, the licensee possessed only generally-licensed devices under 10 CFR 31.5. In addition, the licensee made commitments to properly secure the remaining materials until all remaining radioactive material onsite could be transferred to one or more authorized entities. (Section 5)

REPORT DETAILS

1. Program Overview (87103 & 87126)

1.1. Program Scope

The National Aeronautics and Space Administration (NASA) had eight separate specific materials licenses with the U.S. Nuclear Regulatory Commission (NRC) as of September 2019 which authorized a wide variety of byproduct materials at facilities across the United States. These NASA licenses included: (1) Ames Research Center (license 04-07845-04) in Moffett Field, California; (2) George C. Marshall Space Flight Center (license 01-06571-10) in Huntsville, Alabama; (3) John H. Glenn Research Center (license 34-00507-16) in Cleveland, Ohio; (4) Langley Research Center (license 45-01052-21) in Hampton, Virginia; (5) John F. Kennedy Space Center (license 09-11149-03) outside of Orlando, Florida; (6) Goddard Space Flight Center (license 19-05748-02 & 19-05748-03) in Greenbelt, Maryland; and (7) Lyndon B. Johnson Space Center (license 42-09388-01) in Houston, Texas. Each of these facilities are located in Agreement States. The Michoud Assembly Facility and its inventory of radioactive materials were not authorized in part or in whole on any of the eight separate NRC licenses possessed by NASA.

At the time of the inspection, the Michoud Assembly Facility possessed 26 generally licensed devices, all self-luminous tritium (hydrogen-3) exit signs. Prior to the transfers conducted on July 30, 2019, the facility also possessed a 115 millicurie cesium-137 calibration source that required a specific license, six americium-241 and five radium-226 generally licensed Alnor Dew Point devices, and four sub-microcurie laboratory reference sources (two natural thorium, one uranium-238, and one uranyl acetate under Title 10 of the *Code of Federal Regulations* (10 CFR) 40.22 “Small quantities of source material”). In addition, the facility had also transferred six additional generally licensed tritium self-luminous exit signs to a licensed tritium recycling company. All the above materials were specifically listed on a State of Louisiana license issued to the NASA Michoud Assembly Facility.

1.2. Inspection Scope

On September 23, 2019, the NRC performed an announced special inspection at the NASA Michoud Assembly Facility in New Orleans, Louisiana, with in-office reviews through November 14, 2019. The scope of the inspection was to assess the facts, circumstances, and timeline related to (1) the facility’s failure to apply for a NRC specific license, (2) the licensee’s loss of a generally licensed device by transfer to a third-party recycling company, (3) the licensee’s failure to provide a timely report following identification of the loss of the generally licensed device, and (4) assess the use and storage of the remainder of the facility’s possessed radioactive material.

The inspector was accompanied during the onsite inspection by Ms. Elizabeth Levy of the State of Louisiana Department of Environmental Quality, Office of Environmental Compliance, Emergency and Radiological Services Division.

2. Background

2.1. Historical Background

Following discussions and review with the State of Louisiana, the NRC concluded that one or more commercial contractors of NASA involved in the Space Shuttle Program had initially possessed the radioactive material at the Michoud Assembly Facility and the associated State of Louisiana license until approximately October 2010. With the winding down of the Space Shuttle Program in 2010 and reorientation to the tenant-based model for NASA's facilities, the commercial contractor made plans to withdraw from the Michoud Assembly Facility. Prior to this withdrawal, NASA determined that the sources may still be useful to its mission and sought to transfer the sources to NASA. Therefore, NASA Michoud Assembly Facility applied with the State of Louisiana to have the existing license with its corresponding authorizations transferred from the commercial contractor to NASA.

2.2. May 2019 Initial Identification

The NRC's Region IV office was informed that NASA's Michoud Assembly Facility possessed a specific license by the State of Louisiana on May 10, 2019. On May 10, 2019, Event 54058 was received by the NRC, which described NASA Michoud Assembly Facility's loss of a small generally-licensed americium-241 device and which was submitted under the State of Louisiana license LA-2319-L01A. The NRC's Region IV office contacted the State of Louisiana for clarification and received copies of the State of Louisiana license and supporting documents.

2.3. NRC Contact to NASA on May 16, 2019

Representatives with the NRC's Region IV Division of Nuclear Materials Safety contacted NASA representatives in the NASA Headquarters' Office of the Chief Health and Medical Officer to discuss the situation and to request for information to make a determination of who possessed the radioactive material; whether it was truly possessed by NASA or by a contractor working with or under NASA, the status of licensure of the possessing entity, and the potential for noncompliances of NRC regulatory requirements.

2.4. June 10, 2019, NASA Response to May 16, 2019 Request

NASA Michoud Assembly Facility Operations Office Manager informed the NRC in a letter dated June 10, 2019 (NRC's Agency Document Access Management System (ADAMS) Accession ML19322A025), that following a review of the facility operations and the radioactive material, NASA definitively determined that the radioactive material was possessed solely by NASA, and not a contractor or other third-party.

The letter further stated that NASA had evaluated its current and anticipated future demands for the radioactive material and determined that NASA's Space Flight Mission did not require the use of the 115 millicurie cesium-137 source. Since all the remaining sources possessed by NASA's Michoud Assembly Facility were generally licensed, NASA intended to dispose of the cesium-137 through an authorized third-party company and remain, at least temporarily, under a general NRC license via 10 CFR 31.5.

3. Observations and Findings

On September 23, 2019, the inspector reviewed the licensee's current inventory of radioactive materials, records and documentation, and conducted interviews. The reviews were conducted to assess the transfer of the specifically-licensed cesium-137 source and the facts and circumstances related to the loss/inadvertent transfer of the 35 microcurie americium-241 generally licensed device.

During the inspector's review of the above, three apparent violations were identified which involved: (1) the failure to possess an NRC specific materials license authorizing possession of certain byproduct materials; (2) the loss of control of a generally licensed source, which is believed to have been transferred to a third-party recycling company; and (3) the failure to provide a timely notification following identification of the missing radioactive source.

3.1. Possession of Byproduct Material Without an NRC License

The inspection confirmed that NASA's Michoud Assembly Facility possessed specifically-licensed byproduct material starting approximately in October 2010 and did not possess the corresponding NRC license authorizing this possession and use of the radioactive material. The NASA's Michoud Assembly Facility's State of Louisiana radioactive material license was invalid on the basis that the Agreement State did not have the authority to license and regulate a federal entity.

Specifically, the 115 millicurie cesium-137 calibration device was possessed beginning with the transfer of all radioactive material from a commercial contractor in approximately October 2010. The cesium-137 source's Sealed Source and Device Registry entry was NO-300-S-887-S; the final "S" in a Sealed Source and Device Registry code corresponds to a radioactive source or device that can only be possessed by or distributed to specific NRC or Agreement State licensees. The radioactive source was listed on the Louisiana License, Amendment 35, as authorized for "storage only." The inspector confirmed that for at least the last several years, and potentially since taking possession of the cesium source, NASA had not used the radioactive source.

On July 30, 2019, a third-party licensee (Qal-Tek Associates, LLC, NRC License 11-2760-01) authorized to conduct source removals, packaged and transferred the cesium-137 source for shipment to the third-party licensee's principle facility in Idaho Falls, Idaho. The associated paperwork was reviewed and determined to adequately document the source transfer, and the inspector independently confirmed receipt by the third-party licensee in Idaho Falls.

During the period under which NASA's Michoud Assembly Facility was improperly licensed by the State of Louisiana, the State of Louisiana conducted two inspections of NASA's facility, including both the State-regulated x-ray portions of the NASA program and the radioactive materials under the State of Louisiana license. The inspections were conducted on September 14, 2017, and September 26, 2013, and did not identify any violations of NASA's Louisiana license or Louisiana regulatory requirements. These inspection and licensing activities formed a basis of confidence that, though without oversight by the NRC, NASA conducted its radioactive materials program at the Michoud Assembly Facility to a reasonable degree of safety.

This noncompliance was determined to be an apparent violation and is described below:

> 10 CFR 30.3(a) requires, in part, that no person shall receive, acquire, own, possess, or use byproduct material except as authorized in a specific license issued in accordance with the regulations in 10 CFR Chapter I.
>
> Contrary to the above, from October 2010 through July 30, 2019, NASA Michoud Assembly Facility received, acquired, owned, and possessed byproduct material without authorization under a specific license issued in accordance with the regulations in 10 CFR Chapter I. Specifically, NASA Michoud Assembly Facility possessed a Gamma Industries VD cesium 137 calibration source, serial number B090 (sealed source and device registry NO 300-S-887-S), a device requiring an NRC specific license to acquire, own, or possess, from October 2010 until the source was transferred to an authorized third-party on July 30, 2019. (999-90004/2019-001-01)

3.2. Loss of Control of a Generally-Licensed Device.

The licensee's initial report to the State of Louisiana that brought the licensing issue to the NRC's attention was with regards to the loss of a 35-microcurie americium-241 generally-licensed device. NASA provided a written report dated May 14, 2019, describing its investigation into the lost source to the State of Louisiana. This report was later provided to the NRC by the State of Louisiana and is available for review in the NRC's ADAMS, with the Accession ML19322A026.

According to the initial notification by NASA to the State of Louisiana on May 9, 2019, NASA's Michoud Assembly Facility identified on August 15, 2018, that a radioactive source had been sent to a recycling center for disposal (UNICOR Recycling Factory in Marinna, Florida) on September 26, 2013. The source was a 35 microcurie americium-241 source within an Alnor Instrument Company Type 7000U Dew Point Determination device (serial number 25829).

The inspector conducted interviews and reviewed records and documentation surrounding the loss of the Alnor device and confirmed to the extent possible the licensee's documented perspective of the events. However, the inspector and the licensee were unable to verify the licensee's conclusion that the recycling entity's hazardous material segregation process likely isolated the radioactive source and thereby would have properly disposed of the radioactive source. Given the known facts, and the lack of available records showing an identification by the recycling company, it could not be concluded that the recycling company would have identified and segregated a radioactive source without any corresponding record generated, and then disposed of the material without any corresponding record generated.

The Michoud Assembly Facility had not reached out to the State of Florida's Department of Health, Bureau of Radiation Control for potential follow-up at the recycling facility. Based on the inspector's review of correspondences between NASA and the recycling facility, the recycling facility appeared to not have conducted a thorough search of archived records in consideration for the anticipated effort and resources required to do so. As a result, the matter of the lost source may yet be resolved by further reviews of records by the recycling company. The inspector reminded the NASA Michould Assembly Facility staff and management of their obligation under 10 CFR 20.2201(d) to

provide a new written report should new substantive information related to the lost source be discovered or learned by NASA.

In the NRC's review of this issue, the NRC determined that the licensee's loss of radioactive material was an apparent violation of NRC requirements for control under 10 CFR Part 20. The NRC takes the loss of radioactive material seriously, as it provides a conduit by which radioactive material may enter into the public domain.

This noncompliance was determined to be an apparent violation and is described below:

> 10 CFR 31.5(c)(8) requires, in part, that any person who acquires, receives, possesses, uses, or transfers byproduct material in a device pursuant to the general license in 10 CFR 31.5(a) shall transfer or dispose of the device containing byproduct material only: (1) by export as provided in 10 CFR 31.5(c)(7); (2) by transfer to another general licensee as authorized in 10 CFR 31.5(c)(9); (3) by transfer to a person authorized to receive the device by a specific license issued under 10 CFR Part 30 and 32, or 10 CFR Part 30 that authorizes waste collection, or equivalent regulations of an Agreement State; or (4) as otherwise approved under 10 CFR 31.5(c)(8)(iii).
>
> Contrary to the above, on September 9, 2013, NASA Michoud Assembly Facility possessed a device under a general license issued in accordance with 10 CFR 31.5(a) and transferred the device by a method not authorized in 10 CFR 31.5(c)(8). Specifically, NASA Michoud Assembly Facility possessed an Alnor Instrument Co. Type 7000U Dew Point Determination device, serial number 25829, a generally licensed device (sealed source device registry IL 8215-D-800-G) which contained 35 microcuries of americium-241 and transferred the device inadvertently on September 9, 2013, in a shipment to a recycling company which did not hold a specific license. (999-90004/2019-001-02)

3.3. Timeliness of Reporting of the Lost Source

The considerable gap between the August 15, 2018, identification by NASA and the May 9, 2019, notification to the State of Louisiana was reviewed by the inspector. The inspector concluded that a combination of managerial delays and turnover of key personnel allowed for the reporting issue to be suspended without apparent resolution for an extended length of time. The NRC requirement for reporting of a lost source of the type and radiological activity described in Section 3.2 above requires an immediate notification to be provided in accordance with 10 CFR 20.2201(a)(i). In accordance with 10 CFR 31.5(c)(10), general licensees are not exempted from this reporting requirement in 10 CFR Part 20.

The inspector's interview with the Michoud Assembly Facility radiation safety officer (RSO) demonstrated that the RSO knew of the reporting requirement, though under the mistaken impression that the report was to be provided to the State of Louisiana rather than the NRC, as a result of the circumstances described above in Section 3.1. The RSO informed his then-management of the reporting requirement and the circumstances of the identification of the missing source.

Facility management directed that a thorough review precede any outside reporting, which in addition to a legal review by NASA, created the delays in reporting the missing source. These decisions and delays appear to have been out of an over-abundance of caution to prevent the reporting of unconfirmed or speculative information. Following the retirement of the key management figure handling this issue, the review of the reporting requirement appears to have been lost within NASA's organization and not followed-up with until May of 2019, when the RSO briefed the new facility management of the issue and received immediate approval and direction to contact the State of Louisiana without delay.

This noncompliance was determined to be an apparent violation and is described below:

> 10 CFR 31.5(c)(10) requires, in part, that any person who acquires, receives, possesses, uses, or transfers byproduct material in a device pursuant to the general license in 10 CFR 31.5(a) shall comply with the provisions of 10 CFR 20.2201 for the loss of licensed material.
>
> 10 CFR 20.2201(a)(i) requires, in part, that each licensee shall report by telephone immediately after its occurrence becomes known to the licensee, any lost, stolen, or missing licensed material in an aggregate quantity equal to or greater than 1,000 times the quantity specified in 10 CFR Part 20 Appendix C under such circumstances that it appears that an exposure could result to persons in unrestricted areas.
>
> 10 CFR Part 20 Appendix C specifies a quantity of 0.001 microcuries for americium-241. The Alnor Instrument Co. Type 7000U Dew Point Determination device, serial number 25829, contained 35 microcuries of americium-241, and therefore represented greater than 1,000 times the 10 CFR Part 20 Appendix C quantity.
>
> Contrary to the above, on August 15, 2018, NASA Michoud Assembly Facility identified the loss of a device containing byproduct material in equal to or greater than 1,000 times the quantity specified in 10 CFR Part 20 Appendix C under such circumstances that it appeared that an exposure could result to persons in unrestricted areas and failed to report by telephone immediately after its occurrence became known to the licensee.
>
> Specifically, on August 15, 2018, NASA Michoud Assembly Facility identified the loss of a 35 microcurie generally licensed device possessed under 10 CFR 31.5, and failed to provide a report by telephone to any regulatory body until May 9, 2019, when the State of Louisiana was contacted. The radioactive source had been inadvertently transferred to an unlicensed third-party recycling company, and therefore could have resulted in radiation exposure to persons in unrestricted areas. (999-90004/2019-001-03)

3.4. Present Control and Accountability of Radioactive Material Inventory

During the September 23, 2019, inspection, the inspector toured NASA's Michoud Assembly Facility and interviewed responsible individuals using or having oversight over the remaining inventory of radioactive material at the facility. Since NRC began contact with NASA in May 2019, NASA's Michoud Assembly Facility has contracted the disposal

or transfer of nearly all radioactive material that was possessed onsite. With the exception of the self-luminous tritium exit signs, the licensee has successfully transferred the entire inventory to authorized entities.

The licensee was arranging for additional funding to provide the replacement of the self-luminous tritium exit signs with non-radioactive phosphorus exit signs and proper disposal of the existing inventory. The RSO anticipated this process may be completed by the September 2020 timeframe.

The inspector was concerned with the gap in records to provide a solid basis for the inventory of self-luminous exit signs onsite. While the State of Louisiana license had authorized up to 46 of these signs to be possessed, the licensee was aware of only 32 signs that were onsite since the RSO took his position in late 2018. Without an accurate inventory predating the RSO, it was impossible to determine if additional signs were present but unaccounted for. Underlining this observation was the licensee's discovery of two signs that were unknown in late 2018 installed in a contractor's wing of the facility.

The challenge of these self-luminous signs was emphasized to the licensee by the site's maintenance staff removing and replacing six of the signs (with non-radioactive models) without notification to the health physics or industrial hygiene staff, thereby preventing adequate communication of the applicable requirements. Fortunately, the RSO observed the different signs in a timely fashion and prevented the maintenance staff from disposing of the radioactive signs as non-hazardous trash. Since this incident, the RSO has established a working relationship and procedure with the maintenance staff to provide confidence that future maintenance activities involving the signs will not result in the improper disposal of the devices.

In conclusion, the inspector's observations and findings provided a basis for confidence that the facility RSO and applicable management understood and will comply with the general license requirements under 10 CFR Part 31, and other corresponding NRC regulations as they apply to general licensees, until all remaining radioactive material is properly transferred off-site.

4. Corrective Actions

NASA and the Michoud Assembly Facility took timely and comprehensive actions to address the information requests made by the NRC and to make arrangements for the removal of the cesium-137 calibration source and the generally licensed devices at the facility.

Furthermore, prior to the NRC's involvement in May 2019, the facility RSO took several actions to implement program enhancements to address deficiencies that were identified during the investigation conducted following the August 2018 initial identification by NASA of the missing radioactive source. These included (1) revisions to the NASA Michoud Assembly Ionizing Radiation Safety Procedures, (2) establishing procedures related to the maintenance staff on-site to recognize and report any activities related to the self-luminous tritium exit signs, (3) establish regular physical inventories and documentation for the inventory of radioactive material on-site, and (4) establishing a plan to properly transfer all radioactive material held on-site, having determined they were surplus to the needs of NASA and the Michoud Assembly Facility.

5. Exit Meeting Summary

At the conclusion to the on-site inspection, the NRC inspector provided the preliminary inspection findings to on-site management. NASA was represented at the preliminary exit meeting, in person or telephonically by:

- Keith Savoy – Michoud Assembly Facility (MAF), Manager, Operations
- Sam Engelhard, CIH (Certified Industrial Hygienist), CSP (Certified Safety Professional), NRRPT (National Registry of Radiation Protection Technologists) – MAF, Industrial Hygiene, Health Physics, and Environmental Health Manager, Facility Radiation Safety Officer
- Robert French – Stennis and Michoud Facilities, SHEMA (Safety, Health, Environment, and Mission Assurance) Manager
- Christopher Cambre, LEM-B (Louisiana Emergency Manager – Basic) – MAF Emergency Management Specialist
- Farley Davis – Marshall Space Flight Center (MSFC) Manager, Environmental Engineering and Occupational Health Office
- David Thaxton – MSFC, Occupational Health Officer
- Angel Plaza, DrPH (Doctor of Public Health) – NASA Headquarters, Senior Environmental Health Officer, Office of the Chief Health and Medical Officer
- Jamie Gurney, CLSO (Certified Laser Safety Officer) – NASA Headquarters, Health Physicist, NASA Occupational Health Contract Team

Also present for the preliminary exit meeting representing the State of Louisiana was Ms. Elizabeth Levy of the Department of Environmental Quality, Office of Environmental Compliance, Emergency and Radiological Services Division.

On December 10, 2019, the NRC and NASA conducted a final telephonic exit briefing. NASA was represented by all the individuals listed above, in addition to Mr. Roy Malone, Director, Office of Center Operations, Marshall Space Flight Center.

The licensee acknowledged the inspection findings and did not dispute any of the details presented during the call.

Supplemental Inspection Information

PARTIAL LIST OF PERSONS CONTACTED

Roy Malone – Marshall Space Flight Center (MSFC), Director, Office of Center Operations
Keith Savoy – Michoud Assembly Facility (MAF), Manager, Operations
Sam Engelhard, CIH (Certified Industrial Hygienist), CSP (Certified Safety Professional), NRRPT (National Registry of Radiation Protection Technologists) – MAF, Industrial Hygiene, Health Physics, and Environmental Health Manager, Facility Radiation Safety Officer
Robert French – Stennis and Michoud Facilities, SHEMA (Safety, Health, Environment, and Mission Assurance) Manager
Christopher Cambre, LEM-B (Louisiana Emergency Manager – Basic) – MAF Emergency Management Specialist
Farley Davis –MSFC Manager, Environmental Engineering and Occupational Health Office
David Thaxton – MSFC, Occupational Health Officer
Angel Plaza, DrPH (Doctor of Public Health) – NASA Headquarters, Senior Environmental Health Officer, Office of the Chief Health and Medical Officer
Jamie Gurney, CLSO (Certified Laser Safety Officer) – NASA Headquarters, Health Physicist, NASA Occupational Health Contract Team
Elizabeth Levy, Environmental Scientist, State of Louisiana Department of Environmental Quality, Office of Environmental Compliance, Emergency and Radiological Services Division

INSPECTION PROCEDURES USED

87126 – Industrial/Academic/Research Programs
87103 – Inspection of Materials Licensees Involved in an Incident or Bankruptcy Filing

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

999-90004/2019-001-01	AV	Failure to possess a Nuclear Regulatory Commission specific license authorizing possession of certain byproduct materials. (10 CFR 30.3(a))
999-90004/2019-001-02	AV	Failure to appropriately transfer a generally licensed source. (10 CFR 31.5(c)(8))
999-90004/2019-001-03	AV	Failure to provide a timely notification following identification of the missing radioactive source. (10 CFR 20.2201(a)(i))

Closed

None

Discussed

None

Attachment

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ADR	Alternative Dispute Resolution
AV	Apparent Violation
CFR	*Code of Federal Regulations*
MAF	Michoud Assembly Facility
MSFC	Marshall Space Flight Center
NASA	National Aeronautics and Space Administration
NRC	Nuclear Regulatory Commission
PEC	Pre-decisional Enforcement Conference
RSO	Radiation Safety Officer

NRC INSPECTION REPORT 999-90004/2019-001- DATED DECEMBER 16, 2019

ADAMS ACCESSION NUMBER: ML19351D412

☒SUNSI Review: By: JEV | ADAMS: ☒ Yes ☐ No | ☐ Non-Publicly Available ☒ Publicly Available | ☒ Non-Sensitive ☐ Sensitive | Keyword: NRC-002

OFFICE	DNMS:MLIB	DNMS:C:MIB	RIV:ACES	RC	D:DNMS	
NAME	JEvonEhr	PASIlva	J_Groom	DCylkowski	MCHay	
SIGNATURE	***/RA/***	/RA/	/RA/	/RA/	/RA/	
DATE	11/26/19	11/26/19	12/11/19	12/12/19	12/16/19	

OFFICIAL RECORD COPY