NA--LASO-LANL-TA55-2020-0012 FINAL

Occurrence Report

After 2017 Redesign

Plutonium Proc & Handling Fac

(Name of Facility)

Plutonium Processing and Handling

(Facility Function)

Los Alamos National Laboratory Los Alamos National Laboratory

(Laboratory, Site, or Organization)

Name: Stuart McKernan

Telephone No.: (505) 665-6643

(Facility Manager/Designee)

Name: HUNSINGER, MARK W

Telephone No.: (505) 665-1496

(Originator/Transmitter)

Name: Chastity Kolar **Date:** 06/16/2020

(Authorized Classifier (AC))

1. Occurrence Report Number: NA--LASO-LANL-TA55-2020-0012

Skin Contamination and Positive Nasal Smears Detected on One Employee after Airborne Release at TA-55 Building 4

2. Report Type and Date: FINAL

	Date	Time
Notification:	06/16/2020	18:59 (ETZ)
Initial Update:	06/16/2020	18:59 (ETZ)
Latest Update:	06/16/2020	18:59 (ETZ)
Final:	06/16/2020	18:59 (ETZ)

Report Level: L

4. Division or Project: WP/AMPP-DO/AMPP-1

5. Secretarial Office: NA - National Nuclear Security Administration

6. System, Bldg., or Equipment: TA-55-4 glovebox glove

7. UCNI?: No

Reviewed for Public Release:

8. Plant Area: TA-55/TA-55-4

9. Date and Time Discovered: 06/08/2020 12:00 (MTZ)

10. Date and Time Categorized: 06/08/2020 13:30 (MTZ)

11. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

12. Other Notifications:

Date	Time	Person Notified	Organization
06/08/2020	13:30 (MTZ)	Jessica Hartman	DOE-NNSA

13. Subject or Title of Occurrence:

Skin Contamination and Positive Nasal Smears Detected on One Employee after Airborne Release at TA-55 Building 4

---

14. Reporting Criteria:

6D(3) - Identification of onsite personnel or clothing contamination (excluding anti contamination clothing provided by the site for radiological protection) that exceeds 10 times the total contamination values identified in 10 CFR Part 835, Appendix D. The contamination level must be based on direct measurement and not averaged over any area. This criterion does not apply to tritium contamination.

---

15. Description of Occurrence:

MANAGEMENT SYNOPSIS: On Monday, June 8, 2020, at approximately 1215, at Technical Area 55, Building 4 (TA-55-4), a portable Continuous Air Monitor (CAM) alarmed after an Actinide Material Processing and Power, Heat Source Technologies (AMPP-1) employee (E1) had exited the glovebox gloves he had been working in and was securing the glovebox gloves together. The 14 employees in the room at the time of the alarm immediately exited to the corridor. As the employees exited the room additional CAMs alarmed.

Radiological Control Technicians (RCTs) immediately responded, surveyed all employees, and detected contamination on E1's anti-contamination (anti-C) coveralls. No Detectable Activity (NDA) was found on the other 13 employees who were in the room. RCTs immediately placed another set of anti-C coveralls on E1 to contain the contamination. Further surveys detected contamination on E1's neck (500,000 disintegrations per minute (dpm) alpha) and on the back of E1's head (1,500,000 dpm alpha). RCTs took E1 to the decontamination room and the contamination was removed to NDA with soap and water. RCTs also obtained nasal swipes from all 14 employees. E1's results were 224 / 544 dpm alpha. All other nasal swipes were NDA. E1 was taken to the Laboratory's Occupational Medicine facility (Occ-Med) to consult with an internal dosimetrist.

A radiological survey of the corridor where the employees had exited the room detected 200,000 dpm alpha contamination. The area was decontaminated to NDA.

RCTs secured the access to the contaminated room, and per standard procedure, posted the entrance with a red signal beacon that indicated access to the room was restricted pending further hazard monitoring, analysis, and mitigation (i.e., "red-lit" the room). All 14 employees were issued a special bioassay kit and they were restricted from access to TA-55-4 pending the results of the bioassays. A 15th bioassay kit was issued to an employee who had left the room approximately 30 seconds before the CAMs alarmed.

BACKGROUND:
The large glovebox involved in this event is equipped with three tiers of glovebox gloves and is used for multiple types of operations. In November 2019, maintenance upgrades were performed on the glovebox that included replacing all the glovebox gloves. The glovebox has standard 8 inch glove ports. Some of the ports have been modified with 7 inch inserts to accommodate Central Research Laboratories (CRL) push-through glove ports and gloves to maintain containment, provide faster and safer glove changes, and minimizing the risk of the spread of contamination. Employees stated the CRL gloves also have a different tactile feel and provide more dexterity than regular 30 ml leaded glovebox gloves. The CRL gloves are rated for several years of use. The gloves have an orange layer that is designed to be invisible when the gloves are new but will appear when the gloves become worn, which helps to indicate that they should be replaced.

Experience has shown that based on the working environment, the amount of use, the involved materials, and the operations being performed, the service life of the CRL gloves ranges from 2 to 4 months to multiple years. The operators stated that how the gloves feel changes as they are used and an operator can detect when the gloves are wearing out and should be scheduled for replacement before the orange starts to show. Because the gloves wear out faster in some places than others, replacement is based on use and operator input rather than a specific time schedule. Changes are based on how the gloves feel and if any wear (orange) is seen. If there is an indication of excessive wear or imminent failure the glovebox gloves will be taken out of service immediately and scheduled for replacement at the earliest opportunity. If the gloves are still operable but beginning to feel worn they will be left in service and scheduled for replacement at the earliest opportunity.

The glovebox gloves are inspected daily before the start of work and frequently throughout the work day as they are used. Procedures also require operators to survey their hands for radiological contamination whenever they remove their hands from glovebox gloves.

Event Sequence:
Between, June 1, 2020 and June 2, 2020 operators identified 14 glovebox gloves in the box that were starting to feel worn but were still operable. The gloves were scheduled for replacement on Tuesday, June 9, 2020.

On Monday, June 8, 2020, 6 employees were working in the glovebox doing various tasks and there were 9 other employees in the room doing work other work (not in this glovebox). Personal Protective Equipment (PPE) worn for the work included anti-C coveralls, shoe covers (booties), anti-contamination gloves and safety glasses. All employees were also wearing COVID-19 face coverings. During the work the operators had periodically removed their hands from the glovebox gloves and performed radiological surveys as required. No contamination was detected.

At approximately 1200, all employees were finishing up and preparing to exit the room. One employee had just left the room and 14 were still in the room, but all except E1 were no longer using the glovebox gloves. E1 removed his hands, which were still protected with anti-C gloves, from the glovebox gloves he had been using and was in the process of securing the gloves outside the box by clipping them together when a portable CAM in the room alarmed. At the sound of the alarms the 14 employees in the room immediately exited to the corridor. As the employees exited the room additional CAMs alarmed.

RCTs immediately responded, performed direct surveys of all employees, and detected alpha contamination on E1's coveralls. Results of the direct surveys for the other employees were NDA. RCTs immediately placed another set of

coveralls on E1 to contain the contamination. Further direct surveys detected 500K dpm-alpha on E1's neck and 1,500,000 dpm-alpha on the back of E1's head. RCTs took E1 to the decontamination room and successfully removed the skin contamination to NDA with soap and water. RCTs also obtained nasal swipes from all 14 employees. E1's results were 224 / 544 dpm-alpha. All other nasal swipes were NDA. E1 was taken to Occ-Med to consult with an internal dosimetrist. RCTs also "red-lit" the contaminated room.

All 14 employees were issued a special bioassay kit and were restricted from access to TA-55-4 pending bioassay results.
A 15th bioassay kit was issued to an employee who left the room approximately 30 seconds before the CAMs alarmed.

On June 6, 2020, after verifying that all CAM readings in the room that were remotely monitored via the TA-55 Facility Control System (FCS) were less than 50 Derived Air Concentration hours (DAC-h), RCTs, all whom were wearing appropriate PPE (including respirators), made an initial entry into the room to begin determining the extent of contamination. The room is also equipped with portable CAMs that are not remotely monitored by the FCS. The RCTs were instructed to immediately leave the room if portable CAM readings exceeded 100 DAC-h. Upon entry into the room, RCTs noted that one of the portable CAMs read 370 DAC-h, so all RCTS immediately exited the room. The Deployed Environment, Safety and Health (ESH)-TA55 Group Leader then monitored the CAM readings in the Facilities Control System (FCS) starting at 12:39 until 13:15. Based on the declining CAM readings, at 13:15 on June 6, the DESH-TA-55 Group Leader determined the release was over and RCTs reentered the room and changed out all filters on the CAMs and Fixed head Air Samplers (FASs) in the room. The highest air monitoring result was 1139 DAC-h (M-class) on a FAS filter. Contamination on the floor of the room ranged from 1,000 dpm to 15,000 dpm-alpha. Large area Maslin surveys of the floor under the location of the breached glove indicated 1,000,000 dpm-alpha. After changing the filter media, RCTs exited and secured the room.

RCTs entered the room again on June 10, 2020 to determine the source of the contamination. RCTs subsequently detected contamination on four glovebox gloves and a breach was identified on the thumb area of a left hand glove that E1 had used just before the CAMs alarmed. The contaminated gloves were changed out.

The room remained red lit as of Tuesday, June 16, 2020, and initial surveys to characterize the room were performed.

A fact finding was held on Thursday, June 11, 2020. A path forward and an operations recovery plan will be developed.

A formal investigation will be performed. Any corrective actions identified will be entered in the LANL Issues Management (IM) system.

IM number 2020-0712.

---

16. Is Subcontractor Involved? No

---

19. Immediate Actions Taken and Results:

All 14 employees exited the room.

The room was red lit.

RCTs responded and surveyed all employees. Contamination was detected on one employee; E1. RCTs placed another set of coveralls on E1. E1 was taken to the decontamination room and decontaminated to NDA.

A radiological survey of the corridor where the employees had exited the room detected 200,000 dpm alpha contamination. The area was decontaminated to NDA.

Nasal swipes were taken from all 14 employees in the room. The nasal swipes were negative except for E1 whose results were 224 / 544 dpm alpha. E1 was taken to Occupational Medicine to consult with an internal dosimetrist.

A fact finding was held on Thursday, June 11, 2020. A path forward and an operations recovery plan will be developed.

A formal investigation will be performed and any corrective actions identified will be entered in the LANL Issues Management (IM) system.

---

20. ISM:

---

21. Cause Code(s):

---

22. Description of Cause:

---

25. Corrective Actions

(* = Date added/revised since final report was approved.)

---

26. Lessons Learned:

---

27. Similar Occurrence Report Numbers:

NA--LASO-LANL-TA55-2018-0013

---

30. HQ Keyword(s):

01I--Inadequate Conduct of Operations - Safety System Actuation/Evacuation
06A--Radiological - Clothing Contamination
06B--Radiological - Facility/Equip/Site Contamination
06C--Radiological - Skin Contamination
06D--Radiological - Airborne Radiological Release
06G--Radiological - Intake
12N--EH Categories - Radiological Skin Contaminations/Uptakes/Overexposures
14L--Quality Assurance - No QA Deficiency

---

31. HQ Summary:

On June 8, 2020, at Technical Area 55, Building 4, a portable Continuous Air Monitor (CAM) alarmed after an Actinide Material Processing and Power, Heat Source Technologies employee (E1) exited the glovebox they were working in. The 14 employees in the room immediately exited to the corridor, as the employees exited the room, additional CAMs alarmed. Radiological Control Technicians (RCTs) responded, surveyed all employees, and detected contamination on E1's coveralls. No Detectable Activity (NDA) was found on the other 13 employees. RCTs immediately placed another set of coveralls on E1 to contain the contamination. Further surveys detected contamination on E1's neck (500,000 disintegrations per minute (dpm) alpha) and on the back of E1's head (1,500,000 dpm alpha). RCTs took E1 to the decontamination room and the contamination was removed to NDA with soap and water. RCTs obtained nasal swipes from the 14 employees. E1's results were 224/544 dpm alpha and the other nasal swipes were NDA. E1 was taken to Occupational Medicine to consult with an internal dosimetrist. RCTs secured access to the contaminated room, and per standard procedure, posted the entrance with a red signal beacon. On June 10, RCTs entered the room to determine the

source of the contamination and subsequently detected contamination on four glovebox gloves as well as a breach on the thumb area of a left-hand glove that E1 had. A fact-finding meeting was held and an investigation will be performed.