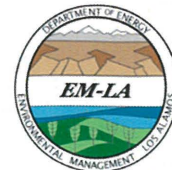




**N3B-Los Alamos**  
1200 Trinity Drive, Suite 150  
Los Alamos, New Mexico 87544  
(505) 257-7690



**Environmental Management**  
Los Alamos Field Office  
1200 Trinity Drive, Suite 400  
Los Alamos, New Mexico 87544  
(240) 562-1122

*Date:* December 8, 2023  
*Refer To:* N3B-2023-0437

Ricardo Maestas, Acting Bureau Chief  
Hazardous Waste Bureau  
New Mexico Environment Department  
2905 Rodeo Park Drive East, Building 1  
Santa Fe, NM 87505-6303

**Subject: Second Response to Request for Information, Potential Employee Exposure at Technical Area 54, Area G, Dome 230**

Reference(s): 1. Letter N3B-2023-0241, R. Edwards and B. Harcek to R. Maestas, "Response to Request for Information, Employee Exposure at Technical Area 54, Area G, Dome 230," dated July 14, 2023

Dear Mr. Maestas:

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) has prepared the documentation requested by New Mexico Environment Department (NMED), following the meeting on Tuesday, September 26, 2023, to discuss the response to the request for information at Technical Area 54 (TA-54), Area G, Dome 230 (Reference 1).

**NMED Request #1:** Additional relevant and related documentation, policies and procedures generated and/or updated following the Dome 230 Response.

1. HPAL [Health Physics Analysis Laboratories] Analysis Report File #29165566, air sample exterior Dome 230, dated May 10, 2023
2. HPAL Analysis Report File #29206733, air samples interior and exterior Dome 230, dated May 11, 2023
3. LANL EM-RESP (Emergency Management Division, Emergency Response Group), Hazmat Team Summary, Response #2023-066
4. N3B-2023-0415, Survey Map Dome 230 from Recovery Plan Entry
5. N3B Root Cause Analysis, N3B-IM-2023-0390, "Individuals Experienced Medical Symptoms While Performing a Regulatory Inspection at TA-54, Area G, Dome 230"
6. N3B-DI-HIS-0014, R.O, Industrial Hygiene Air, Swipe and Bulk Sampling/Monitoring (as updated)

7. N3B-DOP-TRU-1219, R.3, RCRA Inspections and Notifications (as updated)
8. N3B-POL-QAT-0019, R.2, Notification, Investigation and Learning from Events (as updated)

**N3B Response:** The requested documents, policies, and procedures are included as Enclosure 1.

**NMED Request #2:** Request for an update on DOE/N3B future pore-gas sampling for MDA G.

**N3B Response:** Planning for MDA G pore gas sampling is currently underway. N3B anticipates this work will be completed by early 2024.

**NMED Request #3:** Engineering evaluation of Dome 230 to identify settling or shifting of asphalt pad.

**N3B Response:** N3B engineers performed a walkdown survey of Dome 230 on October 18, 2023. This evaluation included a visual investigation of both interior and exterior areas of the dome, and a field survey, including slope analysis, to establish compliance with the technical specifications defined for this facility in Part A.4.2.1 of the Hazardous Waste Permit (Permit). This evaluation determined that the condition of the dome is as intended and designed, that the interior slope of Dome 230 is consistent with the Permit, and that there is no damage or degradation to the asphalt floor. During the investigation, engineering personnel utilized a laser level to confirm a ~1% slope from north to south and west to east, allowing all potential liquids to be directed to the sump on the east end of the dome. The inspection verified that the high-density polyethylene liner is in proper condition and functioning as intended throughout the sump. In conclusion, N3B engineers have determined that Dome 230 is functioning as designed and the foundations show no signs of settlement.

The findings of this engineering evaluation are provided in Enclosure 2 of this submittal.

If you have any questions or comments concerning this submittal, please contact Christian Maupin at (505) 695-4281 ([christian.maupin@em-la.doe.gov](mailto:christian.maupin@em-la.doe.gov)) or Arturo Duran at (575) 373-5966 ([arturo.duran@em.doe.gov](mailto:arturo.duran@em.doe.gov)).

Sincerely,



Robert Edwards III  
Acting Program Manager  
Environment, Safety, Health and Quality  
N3B-Los Alamos

Sincerely,



Digitally signed by Brian  
G. Harcek  
Date: 2023.12.07  
14:56:56 -07'00'

Brian Harcek, Acting Director  
Office of Quality and Regulatory Compliance  
U.S. Department of Energy  
Environmental Management  
Los Alamos Field Office

Enclosure(s): Two hard copies with electronic files:

1. Technical Area 54, Area G, Dome 230 Relevant Documentation, Policies, and Procedures (EM2023-0789)
2. Engineering Evaluation of Dome 230

cc (letter and enclosure[s] emailed):

Laurie King, EPA Region 6, Dallas, TX

Steve Yanicak, NMED-DOE-OB

Neelam Dhawan, NMED-HWB

Rick Shean, NMED-RPD

Stephen Hoffman, NA-LA

Jeanette Hyatt, LANL

Arturo Duran, EM-LA

John Evans, EM-LA

Sarah Eli Gilbertson, EM-LA

Thomas McCrory, EM-LA

Michael Mikolanis, EM-LA

Cheryl Rodriguez, EM-LA

William Alexander, N3B

Brian Clayman, N3B

Ellen Gammon, N3B

Gail Helm, N3B

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Public Reading Room (EPRR)

PRS website

## **Enclosure 1**

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*Technical Area 54, Area G, Dome 230 Relevant Documentation,  
Policies, and Procedures*





# HPAL ANALYSIS REPORT

FILE: 29165566

Sample Description	Analysis Information	Contact Information
Login Date: 05/10/2023 16:46	Instrument: Bertl 2010-AMS	Name: Richard Madrid
Sample Type: Air Sample	Analysis: GrossAB	Phone: 5059010002
Location: TA-54/230	Date: 05/10/2023 16:59	Page/Cell:
Room: outside	Analyst: 113021 <i>WV</i>	e-mail:
Priority: Priority	Results not adjusted for energy, attenuation, or yield unless noted.	
Login Comments: 8.0 cfm flow rate		
Analysis Comments: 1st Count.		

Sample ID	Alpha Activity (dpm/m3)	2* sigma (dpm/m3)	Alpha MDA (dpm/m3)	Beta Activity (dpm/m3)	2* sigma (dpm/m3)	Beta MDA (dpm/m3)	Run Time (h)	Flow Rate (cfm)
1	2.95	2.485	1.99	16.42	5.310	4.09	0.20	8.0

# HPAL ANALYSIS REPORT

FILE: 29206733

Sample Description	Analysis Information	Contact Information
Login Date: 05/11/2023 18:22	Instrument: Bertl 2010-AMS	Name: AARON LABADIE
Sample Type: Air Sample	Analysis: GrossAB	Phone: 5059299501
Location: TA-54/DOME 230	Date: 05/11/2023 18:31	Page/Cell: 5059299501
Room: N/A	Analyst: 240434	e-mail: AARON.LABADIE@EM-LA.DOE.
Priority: Emergency	Results not adjusted for energy, attenuation, or yield unless noted.	
Analysis Comments: First count		

Sample ID	Alpha Activity (dpm/m3)	2* sigma (dpm/m3)	Alpha MDA (dpm/m3)	Beta Activity (dpm/m3)	2* sigma (dpm/m3)	Beta MDA (dpm/m3)	Run Time (h)	Flow Rate (cfm)
1	7.80	1.701	0.29	12.26	2.065	0.90	1.37	8.0
2	2.44	0.614	0.12	4.73	0.833	0.36	3.00	8.0

TA-54-0230

LANL EM-RESP, Hazmat Team Summary

Response #: 2023-066

5/8/23

The Hazmat Safety Plan was signed at 1344, the team then proceeded down range.

The team arrived at dome 230 at 1353, donned PPE and collected equipment. This included two MultiRae 5 gas monitors (O<sub>2</sub>, LEL, CO, H<sub>2</sub>S, VOCs), one PPBRae (ppb VOC detection), and two RO20 dose rate instruments. Team went on air and started entry.

Entry was made at 1403. Upon hazmat team entry, entry personnel on SCBA conducted initial monitoring at the door for airborne and radiological (dose) hazards with no indicated deflection on air monitoring devices (indicating all readings were within normal limits; 20.9% O<sub>2</sub>, no LEL, no CO, no H<sub>2</sub>S, and less than 10ppm VOC), dose rate at the door was less than 0.5mR/hr. Based on those readings, hazmat made entry to dome and began to conduct the 360° hazard assessment starting on the west side of the building proceeding east. Personnel inspected (visually and with instrumentation) the area for any open containers, flammable cabinets, or any possible sources of chemical exposure that may be the source of the odor. When entry personnel were in the area indicated by the workers who reported the odor, the team conducted an in depth sweep of the area which did not identify any anomalies that may be the origin of the odor.

In the area where the workers reported being there was no deflection on any of the air monitoring equipment, and the ambient dose rate was 0.3mR/hr. In the area of the sump, there was no deflection on air monitoring and dose rate readings were 0.2 mR/hr. In the area of the larger 10-drum overpack there was no deflection on air monitoring and dose rate within 30cm of the overpack was 1.2mR/hr.

The team exited the dome at 1415, were surveyed out by RCTs at 1418, then returned to the ops center. Outbrief was conducted at 1428.

Throughout the inspection, entry personnel did not locate any possible sources of the odor, verified the integrity of the drums (condition, lids intact, etc.) and verified that the dose readings were appropriate for the area based off of the information provided by RCTs prior to making entry. Throughout the entirety of the sweep, entry personnel reported no deflection on air monitoring equipment. Upon completion of the 360-hazmat assessment, hazmat personnel exited the building and were surveyed by RCTs which indicated NDA for contamination. As a side note, the entry team did not check any of the in-place drum filters to see if any were loose, although they did perform air monitoring around the drum heads in the area where the workers stated they were when they noticed the odor.

**Support Event Meeting Questions for:** Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230

**New or Update:** Update

**Reported By:** Gail Helm

**Number:** N3B-IR-2023-0390

**Date and time of Discovery:** 05/08/2023, 1152 hours

**Date and time of Categorization:** 05/08/2023 1252 hours

**Location (TA/Building and/or Area):** TA-54, Area G, Dome 230

**N3B Program Manager:** Gerald O'Leary III

**Description:** On 05/08/2023 at 1152 hours, TA-54 Facility Operations Director was notified by the Shift Operations Manager (SOM) that while performing inspections at TA-54, Area G, Dome 230, the individuals that were performing the inspections, observed an odd odor.

The individuals made notification to the Operations Center and entry into our abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill* was performed. The individuals communicated that they may be developing signs and symptoms of a possible exposure, which escalated entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*(ERP), and 911 was contacted. Triad Emergency Operations Support Center (EOSC), Triad Hazmat, and the Los Alamos Fire Department (LAFD) responded. The individuals were evaluated by LAFD emergency response services and transported to Los Alamos Medical Center (LAMC) for further evaluation by 1233 hours. The individuals Supervisor and support RADCON reported to LAMC as well.

By 1304 hours, Command and Control of the Facility was turned over to Triad EOSC and Hazmat Incident Command by the SOM. Triad Hazmat performed inspection of the affected location. No VOCs were detected. Command and Control was returned to the SOM at 1430 hours. Our ERP was exited by 1436 hours.

An Event Meeting will be scheduled.

### Immediate actions taken:

1. Notifications, attention to affected individuals and isolation of the affected location
2. Entry into abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill*; escalating entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*
3. Notification to 911
4. Investigation of affected location

**Categorization (ORPS/Sub -ORPS):** ~~Sub~~-ORPS

**Report Levels:** ~~N/A~~ LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health; **Group 2 Subgroup A(4)**

**Was the Los Alamos Fire Department (LAFD) engaged? (YES/NO):** YES

**Will a Fact Finding session be held to support event learning? (YES/NO):** YES

### Timeline

#### 05/08/2023

- 05/08/2023, approx. 0727 hours, evacuation drill in the admin area; personnel report to Assembly Area 5
- 05/08/2023 Prejob **at 0847hrs**; scheduled activity on the POD and support identified?
- 05/08/2023 XXX hours,
  - What occurred prior to entering Area G and Dome 230?
    - **Participated on the evacuation drill, conducted pre-job brief, gathered associated documentation, headed to Area G started at Dome 153, shafts, AAs, Dome 48, 412, Pad 10, supported walkdown with Florida Expo all 3 inspectors met in Dome 230 (South east side)**
  - Method of travel into Area G and various dome locations?
    - **Shuttle/taxi**
  - Other locations inspections performed prior to Dome 230?
  - How long was each individual in the dome prior to observing odor?
    - **About 25-30 mins**
- 05/08/2023, 0900 – 1120 hours, Waste Handling ops perform drum mining/transfers of MAR to/from HE-RTR, to/from Dome 230 staging area; roll-up door is open; no abnormal odors observed.
  - **Dome rounds for Dome 230 completed earlier in the day**

- Move request identified that containers observed with free liquids after RTR will be staged in Dome 230.
- 05/08/2023, 1136 hours, BB reports a strong odor from Dome 230 while doing RCRA inspections- smell coming from SE side of Dome next to TDOPS in Tech-46 area. She states that her and 2 other individuals are feeling ill and have headaches- SOM (WC) notified
- 05/08/2023, 1137 hours, FOD (GH) and OM (LS) notified
- 05/08/2023, 1140 hours, Entering N3B-AOP-TRU-3003 Material Release or Spill; communication from Ops Center that pick-up has been arranged
- 05/08/2023, 1141 hours, EMAG and radio message sent
- 05/08/2023, 1150 hours, N3B- OccMed notified of event- instructs ENV manager to accompany all 3 individuals to OccMed
- 05/08/2023, 1152 hours, hours notification to the FOD (GH)
- 05/08/2023, 1153 hours, RCRA Manager notified (RM)
- 05/08/2023, 1155 hours, CH-TRU PM notified by the FOD (GH)
- 05/08/2023, 1155 hours, EM-LA FR (LV) notified by the FOD (GH)
- 05/08/2023, 1200 hours, CH-TRU PM notified N3B Senior Management
- 05/08/2023, 1200 hours, Entered N3B-ERP-TRU-3002 Emergency Response- SOS (KM) calls 911
- 05/08/2023, 1202 hours, EOC notified- weather conditions 18mph winds to the South and Sunny
- 05/08/2023, 1212 hours, Emergency vehicles on-site
- 05/08/2023, 1219 hours, RANT notified
- 05/08/2023, 1219 hours, EMAG and radio message sent to stay clear of roadways for emergency vehicles
- 05/08/2023, 1219 hours, LAFD in Area G heading to Dome 230 to check for VOCs- SOM (WC) notified
- 05/08/2023, 1220 hours, EMAG and radio message sent to stay clear of roadways in Area G for emergency vehicles
- 05/08/2023, 1225 hours, EOC IRC, security Protective Force, and HAZMAT on-site
- 05/08/2023, 1227 hours, RCTs notified and on standby
- 05/08/2023, 1234 hours, Additional EMAG sent
  - LAFD states they are getting some readings from containers in Dome 230 and are exiting Dome for RCT survey support
- 05/08/2023, 1235 hours, SOM (WC) notifies RCTs to head to LAMC to survey 1st emergency vehicle with sick individuals as a precaution
- 05/08/2023, 1237 hours, RCT (WW) frisks and clears BB and NR- all clear
  - No VOC readings in Dome 230
- 05/08/2023, 1244 hours, RCTs notified to get most recent surveys and RMIs for Dome 230
- 05/08/2023, 1246 hours, Utilities on-site is this event related??? – as part of response to the event
- 05/08/2023, 1252 hours, EMAG sent to stay clear of roadways
- 05/08/2023, 1252 hours initial categorization, draft event notification (FOD GH)



- 05/08/2023, 1253 hours, RANT notified emergency vehicles still on-site
- 05/08/2023, 1256 hours, other 2 individuals transported to LAMC
- 05/08/2023, 1303 hours, (SOM) Turnover command to IRC HAZMAT and EOC
- 05/08/2023, 1307 hours, DL notified and kept on standby
- 05/08/2023, 1312 hours, EM discusses surveys with DD RCT manager
- 05/08/2023, 1343 hours; SOM gains permission from the FOD for Hazmat vehicles to access CRA-13 should the need arise to support emergency response; worker safety/health
- 05/08/2023, 1344 hours, unified command of control IRC and LAFD
- 05/08/2023, 1354 hours, DD notifies that all patients and vehicles are NDA at LAMC
- 05/08/2023, 1400 hours, HAZMAT and EOC head to Dome 230
- HAZMAT Entry Team's actions/reports during the operation:
  - *At 1344 hours the HAZMAT safety plan was briefed and signed, and we established Unified Command. At 1354 hours HAZMAT began the preparation and staging for the operation. Below is a timeline of the HAZMAT Entry Team's actions/reports during the operation:*
  - 1403: HAZMAT entered dome TA-54-0230.
    - *Air monitoring and rad at the door, no readings (no deflection on any of the instruments for VOCs), no questionable integrity containers identified in Dome 230*
  - 1405: HAZMAT reported no deflections on entry.
  - 1406: HAZMAT reported (< .5 millirem) initial readings and no deflections on air.
  - 1407: HAZMAT reported they are in the center of the room (< .5 millirem) for radiological / no deflections on air.
  - 1409: HAZMAT reported detailed sweep (.3 millirem) and no deflection on air. (Noted this is the area where employees were positioned)
  - 1410: HAZMAT reported at the Standard Waste Pack (.2 millirem) and no deflection on air.
  - 1411: HAZMAT reported (1.2 millirem per/hr) by 30 cm shipping container and no deflection on air.
  - 1413: HAZMAT reported full sweep and detail of the room and no deflections on air monitoring.
  - 1415: HAZMAT reported they are off-air and out of the dome. HAZMAT personnel surveying out with RCT.
  - 1418: HAZMAT personnel surveyed out of the area. Entry team personnel were reported as NDA.
  - *At 1425 hours HAZMAT, LAFD, IRC Safety and I conducted a debrief with facility personnel. HAZMAT advised they conducted a 360-degree air/radiological monitoring in TA-54-0230. They advised the facility personnel the air monitoring resulted in no deflections and the radiological monitoring resulted in low levels of radiation detection.*

*They advised the facility the radiation levels at the 55-gallon containers were (1.2 millirem) which were below the acceptable limits for radiological exposure.*

- o *HAZMAT deemed the area to be safe and advised the room was in a safe configuration. At 1430 hours the facility was returned to the TA-54 Operations Manager. At 1442 hours all units cleared the scene. This incident is closed. Contact Los Alamos Fire Department regarding their investigation of this incident.*
- 05/08/2023, 1428 hours, HAZMAT and ~~EOC~~ IRC finished in Dome 230
  - o No concerns in Dome 230 highest level of rad reading was 1.2mrem on contact at 30cm to TDOP. Decision to clear dome is made
- 05/08/2023, 1430 hours, Command and Control is returned back to the SOM (WC)
- 05/08/2023, 1432 hours, FOD (GH) notified
- 05/08/2023, 1436 hours, Exiting N3B-AOP-TRU-3003 *Material Release or Spill* and N3B-ERP-TRU-3002 *Emergency Response*. All operations in Domes 229, 230, 231, 232 released for normal operations.
- 05/08/2023, 1538 hours, FOD requests to IH&S Manager (RB) to perform a post event, follow-up investigation for VOCs at Dome 230 for 05/09/2023.
  - o **Dome 230 access remains restricted**
- 05/08/2023, 1612 hours, email from (RM) RCRA Supervisor, updating the status of the 3 individuals, doctor excuse with a return to work on 5/11/2023.
- 05/08/2023, 1633 hours, ESH&Q receive medical reports and re-categorization of the event is necessary to ORPS Reportable event, Group 2 Subgroup A (4) L.
- 05/08/2023, 1655 hours EMAG sent to stay clear of Dome 230 until further notice
- 05/08/2023, 1717 hours, event is updated to reflect the re-categorization, Group 2 Subgroup A (4) L.
- 05/08/2023, 1717 hours, IH&S Manager (RB) acknowledges request for post event re-investigation of Dome 230 for 05/09/2023.

## **05/09/2023**

- 05/09/2023, 0717 hours, IH performs follow-up monitoring in Dome 230
- 05/09/2023, 0819 hours, initial report of the re-monitoring, no VOCs were detected on the PID and the IH(s) did not observe any odd odors in Dome 230.
- 05/09/2023, 0946 hours, email communication from Regulatory Compliance that a notification will need to be made to NMED.
- 05/09/2023, 0953 hours, IH&S (LR) provides the results of the follow-up monitoring for VOCs performed at Dome 230.
- 05/09/2023, 1200 hours, ESH&Q PM status meeting with N3B for update on Dome 230; action item assignment and status
- 05/09/2023, 1328 hours, communication email from the SOM (WC) regarding fuel in emergency response vehicles. (Engine 3-55 gal, Medic units – 35 gal, Hazmat unit – 30gal)

- 05/09/2023, 1433 hours, ESH&Q Director documents through email the emergency bioassay kit list of individuals.
- 05/09/2023, 1453 hours, *N3B Communications* email - Team members encounter abnormal odors at TA-54; sent to Los Alamos Medical Center for evaluation
- 05/09/2023, 1500 hours, ESH&Q PM status meeting with N3B and EM-LA for update on Dome 230
- 05/09/2023, 1534 hours, S7S Director (DT) provides LAFD Run Sheet via email
- 05/09/2023, 1718 hours, status of wellness check performed by ESH&Q Manage (WR) to ESH&Q Director (EG) for 2 of 3 individuals, email communication regarding the verbal communication with the individuals.
  - 1510 hours, still experiencing symptoms (head pressure/migraine, fatigue), but not as bad as yesterday. Characterized the odor as “paint thinner” smell. Stated the odor was primarily in the Tech 46 area of the dome. After smelling the odor, stayed in the area for 2-3 minutes trying to locate the source. He noted that the roll up door was open. asked two questions.
    - What were the results of the air monitoring performed in the dome. – Answered during the call
    - Are all the drums equipped with filtration. – Told him I would confirm that and call him back.
  - 1525 hours, still experiencing symptoms (upset stomach, sore throat) but not as bad as yesterday. She also characterized the odor as a “paint thinner” smell. Stated she was not in the dome when the odor was first detected by Nico and Brooke, but immediately noticed it upon entering the area. Nico and Brooke were trying to identify the source of the odor and get a drum number. Stated that the smell was in the Tech 46 area, and she remained in the area for only a minute before leaving with Nico and Brooke. She did not have any questions.
- 05/09/2023, 1758 hours, email notification from N3B Regulatory Compliance to NMED of the event.

## **05/10/2023**

- 05/10/2023, approx. 0630 hours, request to RADCON Manager for the radiological survey of the exterior of Dome 230 to be performed.
- 05/10/2023, 0712 hours, RADCON provides the nasal smear results to FOD for the event at Dome 230.
- 05/10/2023, 0802 hours, (DT) Director S&S provide LAFD witness statement; Battalion Chief incorporates LAFD and Hazmat.
- 05/10/2023, 0830 hours, status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, potential CAM placement; plan for re-entry for extensive radiological survey; determine approach as to Type of WP or Emergency Work.

- 05/10/2023, 0854 hours, NMED emails acknowledgement of notification from N3B Regulatory Compliance via email.
- 05/10/2023, 1131 hours RADCON Supervisor provides RMIs performed in the last 48 hours to the FOD via email.
- 05/10/2023, 1249 hours, Incident Report from the IRC to (EG) Emergency Management N3B.
- 05/10/2023, 1251 hours, AirNet Sampling and Stack Monitoring reports provided; YTD = 4/2023
- 05/10/2023, 1315 hours, follow on status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, plan for re-entry for extensive radiological survey; determined by N3B to be Emergency Work.
- 05/10/2023, 1330 hours, RADCON Supervisor provides exterior survey results performed for Dome 230 via email
- 05/10/2023, 1406 hours, N3B receives Triad Incident Report; via email through Director S&S (DT).
- 05/10/2023, 1748 hours, RADCON Manager provides High Volume Air Sampler results from HPAL via email.
- 05/10/2023, approx. 1730 hours, CH-TRU personnel deployed to retrieve equipment to support the planned re-entry effort.

#### **05/11/2023**

- 05/11/2023, 0845 hours, status meeting with N3B and EM-LA for update on Dome 230; status of action taken, procedures to be used, for re-entry of Dome 230 for extensive survey by RADCON/IH/Waste Ops/Facility Ops.
- 05/11/2023, 1000 hours, perform comprehensive pre-job to Emergency Work plan for re-entry
- 05/11/2023, 1300 hours plan for entry into Dome 230
- 05/11/2023, 1415-1420 hours, team make actual entry into Dome 230
- 05/11/2023, 1623 hours, re-entry effort complete at Dome 230
- 05/11/2023, 1734 hours, post-job re-entry for Dome 230 at 54-247 conference room.
- 05/11/2023, 1828 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive; followed by verbal/telecomm
- 05/11/2023, 1851 hours, RADCON Manager email High Volume Air Sample results from Triad. Sample #1 is the filter inside Dome 230 and Sample 2 is the filter from outside the dome near our step off pad. Both appear to be radon based on the 2 to 1 ratio (Beta to Alpha) HPAL will count the filters again in the morning to show the decay of radon on the filters.

#### **05/14/2023**

- 05/14/2023, 0903 hours, RADCON manager email 2nd count of the High Volume filters from Dome 230. Sample 1 is inside the dome, Sample 2 is outside the dome. The activity has dropped once again. Great indication that all we have is Radon.

### **05/15/2023**

- 05/15/2023, 0830 hours, Attempt to conduct the Event Meeting/Fact Finding; postponed due to 1 of 3 individuals are out sick; not related to this event.
- 05/15/2023, 0934 hours, final count on the High Volume Air Samples for Dome 23 taken on 5-11-23 during our re-entry. We had them recount over the weekend to let the radon decay from the previous samples. Sample #1 is inside dome 230 and sample #2 is outside the dome near the reentry (step off pad) entrance to the dome. Both samples showed No Detectable Activity (NDA).
- 05/15/2023, 1134 hours, Received Hazmat summary via email from Director S&S (DT) for the event response.
- 05/15/2023, 1614 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive.
- 05/15/2023, 1907 hours, 5-Day Report Follow On Report on Emergency Response at TA-54 Dome 230 Emergency Response Due to an Abnormal Odor; email communication from N3B Regulatory Compliance (CM) to NMED.

### **05/16/2023**

- 05/16/2023, 0830 hours, Event Meeting/Fact Finding

Timeline comments from Event Meeting:

### **QUESTIONS:**

#### **People**

1. What activity was being performed at the time of the event?
  - a. RCRA Inspections
2. What were your activities prior to the event?
3. How long were you in Dome before experiencing symptoms?
  - a. 25-30 minutes
4. Was this a scheduled or emerged activity?
  - a. Scheduled
5. Were you working alone or part of a team?
  - a. Team of 3
6. How were you feeling prior to the event?
  - a. Feeling good, energetic
7. Can you describe the odor?

- a. Strong paint thinner smell
- 8. How soon after did you begin to feel symptoms?
  - a. After a couple of minutes
- 9. Released with work restriction, or just days?
  - a. No restrictions
- 10.

### **Location**

- 1. What is the history of the storage dome; any prior issues?
  - a. MTRU/TRU waste
- 2. What is Dome 230 used to support/activity process? Storage of TRU and LLW; 606 containers
  - a. 2 Tech 46 buffer zones
- 3. Any equipment running at the time?
  - a. Propane Forklift with parrot beak
- 4. Any issues from past RMIs?
  - a. No dose rates nor contamination issues
- 5. What type of monitoring equipment was used by
  - a. RADCON,
  - b. IH,
  - c. LAFD,
  - d. Hazmat?
- 6. To verify, what were the readings?
  - a. RADCON,
  - b. IH,
  - c. LAFD,
  - d. Hazmat
- 7. What is affected inspection wise, until we release the dome?
  - a. RCRA – NMED notified
  - b. RMIs – 5/10/23 most recent (monthly dose rate)
  - c. ~~Rounds~~
  - d. PMs
  - e. Surveillances (weekly/monthly)
- 8. Any issues of this nature reported prior?
- 9. Any issues similar to this event? Yes; December 2022, 54-486; odd odor with LAFD and Hazmat response.
  - a. No waste containers present in 54-486

### **Process/Activity/Planned Operations**

- 1. How did the response go; use of the ERP?
  - a. Update periodic review date

2. Any issues with paper, people, or equipment?
3. Any issues with Command and Control?
4. Any issues with communications/site notifications?
- 5.

**Compensatory:**

1. 05/08/2023 Access to 54-230 is restricted and posted on exterior dome doors of Dome 230
  - a. **Implemented shift order to restrict access to Dome 230**
2. Follow-up VOC survey of Dome 230, 05/09/2023; 0.0ppm documented report
3. **Bioassay (7 individuals)**

**Corrective Actions:**

1. Exterior survey of Dome 230 **5/10/2023**
  - a. **High Vol outside (NDA) entrance of the Dome**
2. Interior survey of Dome 230
3. Plan for routine monitoring/surveillance
4. **On-call phone notifications**
5. **AOP/ERP**

**Pros, what went right?:**

- Entry of the AOP
- Escalation decision for entry of the ERP
- Notifications, including 911, EOSC, etc.
  - **Unified command**
- **Communication with Triad Utilities**
- **Dome Isolation/access restriction**

**Cons, what went wrong?:**

- **Miscommunication of radiological unit readings**
- Investigation vs immediate exit of Dome 230
- **Notification to “on-call” phones for support organizations**
- **Transportation (GOV availability)**
- **Delay on RCT surveys**

**Pros, what went right?:**

- Reporting – Facility Operations
- Response – Triad, Facility Operations



**Confirm Categorization:**

**Categorization (ORPS/Sub -ORPS):** ~~Sub~~-ORPS

**Report Levels:** ~~N/A~~ LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health; Group 2 Subgroup A(4)

NTS Reportable

## Radiation Survey (Map)

N3B-2023-0415

Date/Time:

4/5/23 11:16

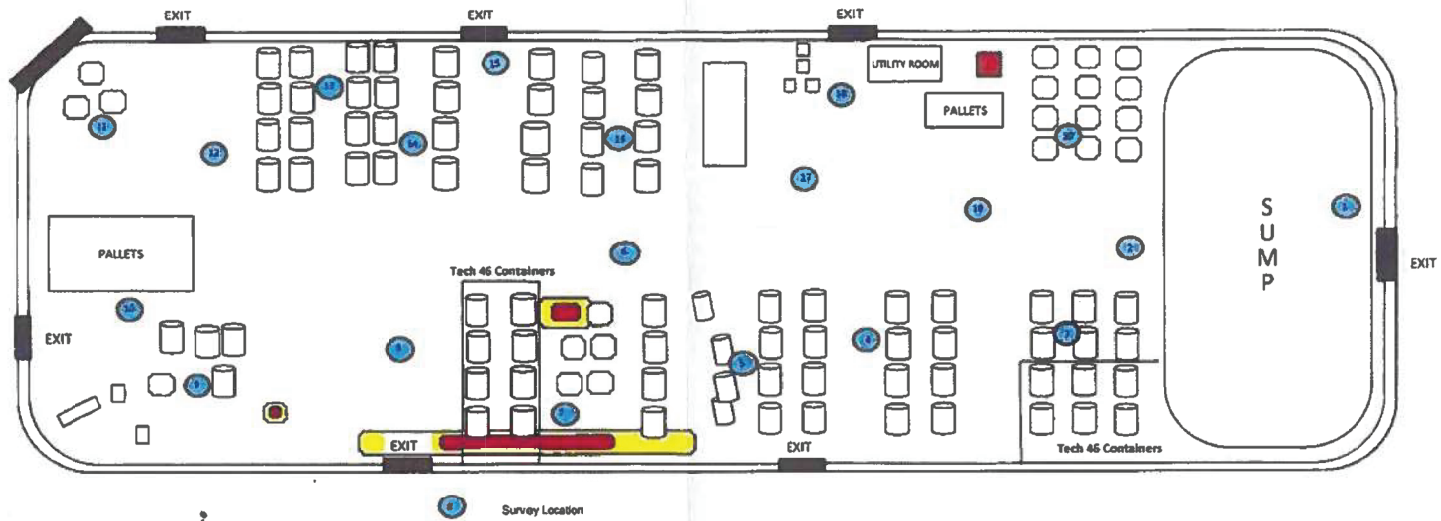
Location: TA - 54 - DOME 230

Surveyor: W. Wray

RWP# N/A

### DOME 230 MONTHLY RMI

DOME IS POSTED AS A "RADIATION AREA"



COPY

All readings are taken in mR/hr. Dose rate readings are taken @ 30 cm from the radiation source.

Dose rates in BLUE =  $< 5 \text{ mR/hr}$   
Dose rates in RED =  $\geq 5 \text{ mR/hr}$

#### BACKGROUND DOSE RATES

Gamma  $< 0.10 \text{ mR/hr}$   
Neutron  $< 0.5 \text{ mR/hr}$

--- Rad Boundaries

Survey Type: Alpha ☐  
Beta ☒  
Gamma ☒  
Neutron ☒  
Tritium ☐

 Fixed Contamination Area

Issue	
<b>Details</b>	
<b>Generated From</b>	<b>Current State</b>
N3B-IR-2023-0390	Implementation
<b>Issue Owner</b>	
Gail Helm - 114849	
<b>Title</b>	
Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230	
<b>Description</b>	
<p>On 05/08/2023 at 1152 hours, TA-54 Facility Operations Director was notified by the Shift Operations Manager (SOM) that while performing inspections at TA-54, Area G, Dome 230, the individuals that were performing the inspections, observed an odd odor.</p> <p>The individuals made notification to the Operations Center and entry into our abnormal response procedure N3B-AOP-TRU-3003, Material Release or Spill was performed. The individuals communicated that they may be developing signs and symptoms of a possible exposure, which escalated entry into our emergency response procedure, N3B-ERP-TRU-3002, Emergency Response(ERP), and 911 was contacted. Triad Emergency Operations Support Center (EOSC), Triad Hazmat, and the Los Alamos Fire Department (LAFD) responded. The individuals were evaluated by LAFD emergency response services and transported to Los Alamos Medical Center (LAMC) for further evaluation. The individuals Supervisor and support RADCON reported to LAMC as well.</p> <p>By 1304 hours, Command and Control of the Facility was turned over to Triad EOSC and Hazmat Incident Command by the SOM. Triad Hazmat performed inspection of the affected location. No VOCs were detected. Command and Control was returned to the SOM at 1430 hours. Our ERP was exited by 1436 hours.</p> <p>An Event Meeting will be scheduled.</p>	
<b>Immediate action(s) taken</b>	
<ol style="list-style-type: none"> <li>1. Notifications, attention to affected individuals and isolation of the affected location</li> <li>2. Entry into abnormal response procedure N3B-AOP-TRU-3003, Material Release or Spill; escalating entry into our emergency response procedure, N3B-ERP-TRU-3002, Emergency Response</li> <li>3. Notification to 911</li> <li>4. Investigation of affected location</li> </ol>	
<b>How Identified</b>	<b>Significance Level</b>
Event	High
<b>Identified By</b>	<b>Identified By Org</b>
Gail Helm - 114849	CH-TRU
<b>Due Date</b>	<b>Date Implementation Complete</b>
11/01/2023	
<b>Days Open</b>	
140	
<b>Problem Statement</b>	
<p>On May 8, 2023, three N3B employees were completing RCRA inspections in Dome 230 when they encountered a chemical odor and began to feel ill. While no direct cause was identified for the reported exposures, the team did evaluate and disposition some possible scenarios discussed in the Chemical Exposure Scenarios section of this report. The following is a summary of the identified problems:</p> <p>N3B personnel did not immediately call 911 when they began to experience symptoms. During the onset of symptoms, the employees did not recognize the event as a chemical exposure that could rapidly escalate into a medical emergency. Multiple N3B procedures need to be revised to stress the recognition of symptoms and appropriate notifications.</p> <p>Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EMLA to DOE HQ prior to recognition that the meter reading that was reported by LAFD was errant. The incorrect initial reading communicated was an order of magnitude higher than the actual level in the facility and led to unnecessary level of concern within higher levels of EM-LA and DOE-HQ.</p> <p>There were two entries made into Dome 230 following the initial event. The first was a post event entry for follow-up IH monitoring. Several departments at N3B have differing opinions on the correctness associated with the IH entry. In addition, there is a difference of opinion on the correctness of previously performed facility releases based on external response personnel confirmatory information. The second was the unauthorized pest control entry where the escort failed to fulfill his duties as an escort.</p> <p>N3B S&amp;H had not historically performed an adequate facility hazard assessment for the plausibility of a VOC release associated with TRU waste, which would have identified a more comprehensive suite of VOC monitoring equipment to be readily deployable for this type of event. Because of this inadequate supply of IH monitoring equipment, comprehensive air monitoring was not performed in a timely manner following the initial event. The lack of readily available IH equipment also highlighted that there is not a process to obtain emergency equipment in a timely manner.</p> <p>The event was an Occupational Safety &amp; Health Administration (OSHA) recordable injury, and therefore negatively affected N3B's Total Recordable Cases (TRC) rate. The event was determined to be reportable under DOE Order 232.2A, Occurrence Reporting and Processing of Operations Information (ORPS).</p>	
See Root Cause Analysis uploaded to documents in this IM-2023-0390 for full report.	

Details		
Causal Analysis Process and Methodology Summary		
A careful and in-depth review of the sequence of events (timeline), and the barriers (barrier analysis) that could or should have prevented the events contained in this report. The "5 Why" process was a key tool used to identify the causal factors.		
Investigation Results Summary		
RCA for Dome 230 Emergency Response uploaded into documents. See attachment RCA Dome 230 Final in documents.		
Extent of Issue		
<p>Extent of Condition: Without an adequate and comprehensive facility hazard assessment for the plausibility of exposure scenarios associated with N3B processes and operations, vulnerabilities will remain where necessary monitoring equipment will not be available (or capable of being rapidly sourced) for immediate response to those plausible events.</p> <p>Extent of Cause: N3B lacks a formal documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities. Absent effective corrective measures for issues identified in this report, N3B is likely to repeat similar problems and causes in the future.</p>		
Causal Analyst		Is Waste Certification Official (WCO) Approval Required?
Thomas Harrison - 353050		• No
Causes		
Code	Type	Description
<span title="Training Deficiency">A6</span>	Apparent	
<span title="Communication LTA">A5</span>	Apparent	
<span title="Not available or inconvenient for use">A5B3>>A5-B3C02</span>	Contributing	
<span title="Procurement Control LTA">A2>>A2B5</span>	Root	
<span title="Equipment / Material Problem">A2</span>	Root	
Actions		
Identifier	Actions to be Performed	
N3B-IM-2023-0390-07	Investigate the issues/gaps associated with obtaining equipment and materials when using the SAWA agreement during emergency events that did not work as expected during the Dome 230 event.	
N3B-IM-2023-0390-06	N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.	
N3B-IM-2023-0390-05	N3B does not have a formal, documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities. Update existing facility emergency response procedures, and develop a specific comprehensive re-entry/recovery procedure.	
N3B-IM-2023-0390-04	Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading reported by LAFD was incorrect. The invalidated initial reading was miscommunicated as an order of magnitude higher than the actual level in the facility, which led to an unnecessary level of concern within higher levels of EM-LA and DOE-HQ. Appropriate N3B management who interface with EM-LA will communicate the issue with EM-LA for their independent review and resolution.	
N3B-IM-2023-0390-03	Los Alamos Fire Department (LAFD) communicated radiological monitoring meter reading data in error (order of magnitude higher than actual) resulting in confusion as to conditions within Dome 230. Appropriate N3B/Triad personnel who interface with LAFD communicate the issue with LAFD for their independent review and resolution.	

Actions					
Identifier		Actions to be Performed			
N3B-IM-2023-0390-02		Revise N3B Building Emergency Plan's to designate employee chemical exposure with any medical symptoms as a medical condition requiring 911 to be called immediately.			
N3B-IM-2023-0390-01		Provide training to N3B employees, managers and supervisors on the need for immediate medical attention for employees exhibiting any medical symptoms involving a possible chemical exposure.			
Comments					
#	By	Date	Time	State	Comment
1	Helm, Gail	05/18/2023	13:44	Evaluate	Attached RE EVENT NOTIFICATION Emergency Response Due to an Abnormal Odor Observed at TA-54 Area G Dome 230.msg
2	Helm, Gail	05/18/2023	13:45	Evaluate	Attached Notes - Event Meeting Emergency Response Due to an Abnormal Odor Observed at TA-54 Area G Dome 230.pdf
3	Helm, Gail	05/18/2023	13:48	Evaluate	Attached N3B-Form-6177 - Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230.pdf
4	Helm, Gail	06/01/2023	09:27	Evaluate	Evaluate Task Completed.
5	Forde, Anne	06/29/2023	14:22	Cause Analysis / Action Plan	Attached Dome 230 RCA Final 6.29.23 Signed.pdf
6	Forde, Anne	07/06/2023	12:23	Cause Analysis / Action Plan	Root Cause is being captured in this IM for IM-2023-0395. See related Items tab for IM-2023-0395.
7	Harrison, Thomas	07/07/2023	15:10	Cause Analysis / Action Plan	Cause Analysis / Action Plan Task Completed.
8	Helm, Gail	07/18/2023	11:03	IO Approval	IO Approval Task Completed.
Notifications					
Person / Team		Closure Notice	Opt-in Comments		
Gail Helm - 114849		Y	N		
Functional Areas					
Primary	Secondary	Tertiary			
Safety and Health	Industrial Safety				
Locations					
TA	Type	Location			
TA54-Area G					
Related Items					
Reference Type	Identifier	Details	Notes		
Issue	<div class='APPCAP-A'><div class='normal'><a href="javascript:void(window.parent.postMessage({'Module\':\'APP-CAPA\',\'Object_id\':\'2200387\'},\'*\'))" title="Click to View Details"><span>N3B-IM-2023-0395</span></a></div></div>	Two Unauthorized Entries to Dome 230 for IH and Pest Control Activities While the Dome is Posted as “NO ENTRY”			
Event					
Date of Event				Time of Event	
05/08/2023				11:52	
Date of Categorization				Time of Categorization	
05/08/2023					

<b>Event</b>						
				12:52		
<b>PAAA Reportable</b>				<b>Was this event ORPS or Sub-ORPS?</b>		
• Yes				• ORPS		
<b>Will a Fact Finding session be held to support event learning?</b>				<b>Was the Los Alamos Fire Department (LAFD) engaged?</b>		
• Yes				• Yes		
<b>Categorization</b>						
<b>ORPS Code</b>	<b>Description</b>	<b>Level</b>				
2A(4)	Any single occurrence, injury, or exposure resulting in three or more personnel having Days Away, Restricted or Transferred (DART) cases per 29 CFR Section 1904.7, Recordkeeping Forms and Recording Criteria.	L				
<b>Trend Codes</b>						
<b>Code</b>	<b>Description</b>					
A2	Equipment / Material Problem					
A2>>A2B5	Procurement Control LTA					
A4B2>>A4B2C-08	Means not provided for assuring adequate equipment quality, reliability, or operability					
A5	Communication LTA					
A5B3>>A5B3C-02	Not available or inconvenient for use					
A6	Training Deficiency					
A7>>A7B4	No Cause is Applicable					
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Forde, Anne	Forde, Anne	05/10/2023 15:55 MDT	Forde, Anne	05/10/2023 15:55 MDT
Evaluate	Completed	Helm, Gail	Forde, Anne	05/10/2023 15:55 MDT	Helm, Gail	06/01/2023 09:27 MDT
Cause Analysis / Action Plan	Completed	Harrison, Thomas	Helm, Gail	06/01/2023 09:27 MDT	Harrison, Thomas	07/07/2023 15:10 MDT
IO Approval	Completed	Helm, Gail	Harrison, Thomas	07/07/2023 15:10 MDT	Helm, Gail	07/18/2023 11:03 MDT
Implementation	Working	Harrison, Thomas	Helm, Gail	07/18/2023 11:03 MDT		
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
RE EVENT NOTIFICATION Emergency Response Due to an Abnormal Odor Observed at TA-54 Area G Dome 230.msg					Helm, Gail	05/18/2023 13:44 MDT
Notes - Event Meeting Emergency Response Due to an Abnormal Odor Observed at TA-54 Area G Dome 230.pdf					Helm, Gail	05/18/2023 13:45 MDT
N3B-Form-6177 - Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230.pdf					Helm, Gail	05/18/2023 13:48 MDT
Dome 230 RCA Final 6.29.23 Signed.pdf					Forde, Anne	06/29/2023 14:22 MDT

**From:** Gail M. Helm [gail.helm@em-la.doe.gov]  
**To:** EventNotification (EXTERNAL) [EventNotification@EM-LA.DOE.GOV]  
**Subject:** RE: EVENT NOTIFICATION: Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230  
**Sent:** Mon 5/8/2023 5:16 PM GMT-06:00  
**Importance:** Normal  
**UPDATE:** Please see the update to our categorization.

---

**From:** Gail M. Helm <gail.helm@em-la.doe.gov>  
**Sent:** Monday, May 8, 2023 3:10 PM  
**To:** EventNotification (EXTERNAL) <EventNotification@EM-LA.DOE.GOV>  
**Subject:** EVENT NOTIFICATION: Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230

**Title:** Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230

**New or Update:** Update  
**Reported By:** Gail Helm  
**Number:** N3B-IR-2023-0390  
**Date and time of Discovery:** 05/08/2023, 1152 hours  
**Date and time of Categorization:** 05/08/2023 1252 hours  
**Location (TA/Building and/or Area):** TA-54, Area G, Dome 230  
**N3B Program Manager:** Gerald O'Leary III

**Description:** On 05/08/2023 at 1152 hours, TA-54 Facility Operations Director was notified by the Shift Operations Manager (SOM) that while performing inspections at TA-54, Area G, Dome 230, the individuals that were performing the inspections, observed an odd odor.

The individuals made notification to the Operations Center and entry into our abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill* was performed. The individuals communicated that they may be developing signs and symptoms of a possible exposure, which escalated entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*(ERP), and 911 was contacted. Triad Emergency Operations Support Center (EOSC), Triad Hazmat, and the Los Alamos Fire Department (LAFD) responded. The individuals were evaluated by LAFD emergency response services and transported to Los Alamos Medical Center (LAMC) for further evaluation by 1233 hours. The individuals Supervisor and support RADCON reported to LAMC as well.

By 1304 hours, Command and Control of the Facility was turned over to Triad EOSC and Hazmat Incident Command by the SOM. Triad Hazmat performed inspection of the affected location. No VOCs were detected. Command and Control was returned to the SOM at 1430 hours. Our ERP was exited by 1436 hours.

An Event Meeting will be scheduled.



**Immediate actions taken:**

1. Notifications, attention to affected individuals and isolation of the affected location
2. Entry into abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill*; escalating entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*
3. Notification to 911
4. Investigation of affected location

**Categorization (ORPS/Sub -ORPS):** ~~Sub~~-ORPS

**Report Levels:** N/A LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health; Group 2 Subgroup A(4)

**Was the Los Alamos Fire Department (LAFD) engaged? (YES/NO):** YES

**Will a Fact Finding session be held to support event learning? (YES/NO):** YES

**Gail Marie Helm | Facility Operations Director**  
Newport News Nuclear BWXT Los Alamos (N3B)  
CH-TRU  
c. 505-309-1319  
e. [gail.helm@em-la.doe.gov](mailto:gail.helm@em-la.doe.gov)



1200 Trinity Drive Suite 150, Los Alamos NM 87544

**Support Event Meeting Questions for:** Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230

**New or Update:** Update

**Reported By:** Gail Helm

**Number:** N3B-IR-2023-0390

**Date and time of Discovery:** 05/08/2023, 1152 hours

**Date and time of Categorization:** 05/08/2023 1252 hours

**Location (TA/Building and/or Area):** TA-54, Area G, Dome 230

**N3B Program Manager:** Gerald O'Leary III

**Description:** On 05/08/2023 at 1152 hours, TA-54 Facility Operations Director was notified by the Shift Operations Manager (SOM) that while performing inspections at TA-54, Area G, Dome 230, the individuals that were performing the inspections, observed an odd odor.

The individuals made notification to the Operations Center and entry into our abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill* was performed. The individuals communicated that they may be developing signs and symptoms of a possible exposure, which escalated entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*(ERP), and 911 was contacted. Triad Emergency Operations Support Center (EOSC), Triad HAZMAT, and the Los Alamos Fire Department (LAFD) responded. The individuals were evaluated by LAFD emergency response services and transported to Los Alamos Medical Center (LAMC) for further evaluation by 1233 hours. The individuals Supervisor and support RADCON reported to LAMC as well.

By 1304 hours, Command and Control of the Facility was turned over to Triad EOSC and HAZMAT Incident Command by the SOM. Triad HAZMAT performed inspection of the affected location. No VOCs were detected. Command and Control was returned to the SOM at 1430 hours. Our ERP was exited by 1436 hours.

An Event Meeting will be scheduled.

**Immediate actions taken:**

1. Notifications, attention to affected individuals and isolation of the affected location
2. Entry into abnormal response procedure N3B-AOP-TRU-3003, *Material Release or Spill*; escalating entry into our emergency response procedure, N3B-ERP-TRU-3002, *Emergency Response*
3. Notification to 911
4. Investigation of affected location

**Categorization (ORPS/Sub -ORPS):** ~~Sub~~-ORPS

**Report Levels:** ~~N/A~~ LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health; Group 2 Subgroup A(4)

**Was the Los Alamos Fire Department (LAFD) engaged? (YES/NO):** YES

**Will a Fact Finding session be held to support event learning? (YES/NO):** YES

## Timeline

### 05/08/2023

- 05/08/2023, approx. 0727 hours, Evacuation drill in the TA-54 Administrative Area; personnel in the Administrative Area report to Assembly Area 5.
  - Weather Temperature & Barometric Pressure (Los Alamos County, localconditions.com)
    - 05/07/2023, 1115 hours, 63.68°F approx. 30.1 inHG
    - 05/08/2023, 1115 hours, 65.12°F; approx. 30.14 inHG
- 05/08/2023, 0847 hours, RCRA pre-job; activity was scheduled activity on the POD and support was identified as:
  - BB – PIC/Inspector
  - NR – Inspector
  - RA – RCRA Inspection Support
  - What occurred prior to entering Area G and Dome 230?
    - Participated on the evacuation drill, conducted pre-job brief, gathered associated documentation, headed to Area G started to perform RCRA inspections.
    - Entered Dome 230 at approx. 1109 hours.
  - Method of travel into Area G and various dome locations:
    - Shuttle/taxi
  - Other locations inspections performed prior to Dome 230? Started at Dome 153, shafts, AAs, Dome 48, 412, Pad 10, supported walk down with Florida Expo all 3 inspectors met in Dome 230 (South east side).
  - How long was each individual in Dome 230 prior to observing odor?
    - About 25-30 minutes
- 05/08/2023, 0900 – 1120 hours, Waste Handling Operators perform drum mining/transfers of MAR to/from HE-RTR, to/from Dome 230 staging area; roll-up door is open; no abnormal odors observed.

- Dome rounds for Dome 230 completed at 0846 hours.
    - Area G Dome 0230 Inspection Sheet dated 05/08/2023, N3B-DOP-TRU-1105, Work Release Inspection Sheets performed at 0846 was filled out by a qualified Waste Operator and showed no indications of any abnormalities within Dome 230. This includes inspection of excess equipment, Dome structure, exits and doors operational, minimum combustible material, and no drum/waste container integrity issues.
  - Move request identified that containers observed with free liquids after RTR are stored in the staging area of Dome 230.
- 05/08/2023, 1136 hours, BB reports to TA-54 Operations Center that a strong odor from Dome 230 while doing RCRA inspections- smell coming from southeast side of Dome 230 interior, next to Ten Drum Overpacks (TDOPs, which are empty, do not contain MAR) in Tech-46 area. She (BB) states that her and 2 (NR, RA) other individuals are feeling ill and have headaches- SOM (WC) notified.
- 05/08/2023, 1137 hours, FOD (GH) and FOM (LS) notified, via text
- 05/08/2023, 1140 hours, Entering N3B-AOP-TRU-3003 *Material Release or Spill*; communication from TA-54 Operations Center that pick-up of the 3 individuals has been arranged.
- 05/08/2023, 1141 hours, EMAG (text messaging system) and radio message sent
- 05/08/2023, 1150 hours, N3B Occupational Medicine notified of event- instructs ENV manager to accompany all 3 individuals to Triad Occupational Medicine (initial determination)
- 05/08/2023, 1152 hours, SOM provides verbal/telecomm notification to the FOD (GH)
- 05/08/2023, 1153 hours, RCRA Manager notified (RM)
- 05/08/2023, 1155 hours, CH-TRU PM notified by the FOD (GH)
- 05/08/2023, 1155 hours, EM-LA FR (LV) notified by the FOD (GH)
- 05/08/2023, 1200 hours, CH-TRU PM notified N3B Senior Management (BS, KL)
- 05/08/2023, 1200 hours, Entered N3B-ERP-TRU-3002, *Emergency Response*- SOS (KM) calls 911
- 05/08/2023, 1201 hours, Engine 3, Medic 3, and Rescue 1 dispatched to TA-54
- 05/08/2023, 1202 hours, Individuals brought into Operations Center and sat down; Emergency Operations Support Center notified by the TA-54 Operations Center; Operations Center personnel obtain initial weather conditions, 10 mph winds and 18mph wind gusts to the south; sunny.
- 05/08/2023, 1212 hours, Emergency response vehicles on-site
- 05/08/2023, 1219 hours, Triad RANT notified of the response vehicles reporting to TA54 for emergency response, and to “stay clear of roadways for emergency vehicles”.
- 05/08/2023, 1219 hours, EMAG and radio message sent by the Operations Center to “stay clear of roadways for emergency vehicles”.
- 05/08/2023, 1219 hours, Los Alamos Fire Department (LAFD) in Area G heading to Dome 230 to check for VOCs- SOM (WC) notified.

- 05/08/2023, 1220 hours, EMAG and radio message sent by Operations Center to “stay clear of roadways in Area G for emergency vehicles”.
- 05/08/2023, 1225 hours, IRC, Protective Force, and HAZMAT on-site
- 05/08/2023, 1227 hours, RCTs notified and on standby
- 05/08/2023, 1234 hours, Additional EMAG sent
  - LAFD states they are getting some readings from containers in Dome 230 and are exiting Dome for RCT survey support; HAZMAT clarifies that there was a unit issue when reading/communicating reading of 225 micorem; actual reading 0.2/0.3 millirem.
- 05/08/2023, 1235 hours, SOM (WC) notifies RCTs to head to LAMC to survey 1st emergency vehicle with (1) sick individual (RA) as a precaution
- 05/08/2023, 1237 hours, RCT (WW) frisks and clears BB and NR- all clear
  - No VOC readings in Dome 230 observed by LAFD
- 05/08/2023, 1244 hours, RCTs notified to retrieve the most recent surveys and RMIs for Dome 230
- 05/08/2023, 1246 hours, Triad Utilities on-site– SOM requested to determine if a gas line or other type of utility could have been impacted. Triad Utilities communicates that no utilities are in the location of concern and no natural gas lines in the vicinity.
- 05/08/2023, 1252 hours, EMAG sent to stay clear of roadways
- 05/08/2023, 1252 hours initial categorization, draft event notification (FOD, GH)
- 05/08/2023, 1253 hours, RANT notified emergency vehicles still on-site
- 05/08/2023, 1256 hours, (2) individuals (BB, NR) transported to LAMC
- 05/08/2023, 1303 hours, (SOM) Turnover command to IRC
- 05/08/2023, 1307 hours, DL notified and kept on standby
- 05/08/2023, 1312 hours, IRC discusses surveys with DD RCT manager
- 05/08/2023, 1343 hours; SOM gains permission from the FOD for HAZMAT vehicles to access CRA-13 should the need arise to support emergency response; worker safety/health.
- 05/08/2023, 1344 hours, unified command IRC and LAFD
- 05/08/2023, 1354 hours, DD notifies that all patients and vehicles are NDA at LAMC
- 05/08/2023, 1400 hours, HAZMAT and IRC head to Dome 230
- HAZMAT Entry Team’s actions/reports during the operation:
  - *At 1344 hours the HAZMAT safety plan was briefed and signed, and we established Unified Command. At 1354 hours HAZMAT began the preparation and staging for the operation. Below is a timeline of the HAZMAT Entry Team's actions/reports during the operation:*
  - *1403: HAZMAT entered dome TA-54-0230.*
    - *Air monitoring and rad at the door, no readings (no deflection on any of the instruments for VOCs), no questionable integrity containers identified in Dome 230*

- 1405: HAZMAT reported no deflections on entry.
  - 1406: HAZMAT reported (< .5 millirem) initial readings and no deflections on air.
  - 1407: HAZMAT reported they are in the center of the room (< .5 millirem) for radiological / no deflections on air.
  - 1409: HAZMAT reported detailed sweep (.3 millirem) and no deflection on air. (Noted this is the area where employees were positioned)
  - 1410: HAZMAT reported at the Standard Waste Pack (.2 millirem) and no deflection on air.
  - 1411: HAZMAT reported (1.2 millirem per/hr) by 30 cm shipping container and no deflection on air.
  - 1413: HAZMAT reported full sweep and detail of the room and no deflections on air monitoring.
  - 1415: HAZMAT reported they are off-air and out of the dome. HAZMAT personnel surveying out with RCT.
  - 1418: HAZMAT personnel surveyed out of the area. Entry team personnel were reported as NDA.
  - At 1425 hours HAZMAT, LAFD, IRC Safety and I conducted a debrief with facility personnel. HAZMAT advised they conducted a 360-degree air/radiological monitoring in TA-54-0230. They advised the facility personnel the air monitoring resulted in no deflections and the radiological monitoring resulted in low levels of radiation detection. They advised the facility the radiation levels at the 55-gallon containers were (1.2 millirem) which were below the acceptable limits for radiological exposure.
  - HAZMAT deemed the area to be safe and advised the room was in a safe configuration. At 1430 hours the facility was returned to the TA-54 Operations Manager. At 1442 hours all units cleared the scene. This incident is closed. Contact Los Alamos Fire Department regarding their investigation of this incident.
- 05/08/2023, 1428 hours, HAZMAT and IRC finished in Dome 230
    - No concerns in Dome 230 highest level of rad reading was 1.2mrem at 30cm for the empty TDOP. Decision to clear dome is made.
  - 05/08/2023, 1430 hours, Command and Control is returned back to the SOM (WC)
  - 05/08/2023, 1432 hours, FOD (GH) notified
  - 05/08/2023, 1436 hours, Exiting N3B-AOP-TRU-3003 *Material Release or Spill* and N3B-ERP-TRU-3002 *Emergency Response*. All operations in Domes 229, 231, 232 released for normal operations.
  - 05/08/2023, 1538 hours, FOD requests to IH&S Manager (RB) to perform a post event, follow-up investigation for VOCs at Dome 230 for 05/09/2023.



- o Dome 230 access remains restricted and is posted “No Entry” on exterior dome doors.
- 05/08/2023, 1612 hours, email from (RM) RCRA Supervisor, updating the status of the 3 individuals, doctor excuse with a return to work on 5/11/2023.
- 05/08/2023, 1633 hours, ESH&Q receive medical reports and re-categorization of the event is necessary to ORPS Reportable event, Group 2 Subgroup A (4) L.
- 05/08/2023, 1655 hours EMAG sent to stay clear of Dome 230 until further notice
- 05/08/2023, 1717 hours, event is updated to reflect the re-categorization, Group 2 Subgroup A (4) L.
- 05/08/2023, 1717 hours, IH&S Manager (RB) acknowledges request for post event re-investigation of Dome 230 for 05/09/2023.

### 05/09/2023

- 05/09/2023, 0717 hours, IH performs follow-up monitoring in Dome 230
- 05/09/2023, 0819 hours, initial report of the re-monitoring, no VOCs were detected on the PID and the IH(s) did not observe any odd odors in Dome 230.
- 05/09/2023, 0946 hours, email communication from Regulatory Compliance that a notification will need to be made to NMED.
- 05/09/2023, 0953 hours, IH&S (LR) provides the results of the follow-up monitoring for VOCs performed at Dome 230.
- 05/09/2023, 1200 hours, ESH&Q PM status meeting with N3B for update on Dome 230; action item assignment and status
- 05/09/2023, 1328 hours, communication email from the SOM (WC) regarding fuel in emergency response vehicles. (Engine 3-55 gal, Medic units – 35 gal, HAZMAT unit – 30gal)
- 05/09/2023, 1433 hours, ESH&Q Director documents through email the emergency bioassay kit list of individuals.
- 05/09/2023, 1453 hours, *N3B Communications* email - Team members encounter abnormal odors at TA-54; sent to Los Alamos Medical Center for evaluation
- 05/09/2023, 1500 hours, ESH&Q PM status meeting with N3B and EM-LA for update on Dome 230
- 05/09/2023, 1534 hours, S7S Director (DT) provides LAFD Run Sheet via email
- 05/09/2023, 1718 hours, status of wellness check performed by ESH&Q Manage (WR) to ESH&Q Director (EG) for 2 of 3 individuals (RA, NR), email communication regarding the verbal communication with the individuals.
  - o (NR) 1510 hours, still experiencing symptoms (head pressure/migraine, fatigue), but not as bad as yesterday. Characterized the odor as “paint thinner” smell. Stated the odor was primarily in the Tech 46 area of the dome. After smelling the odor, stayed in the area for 2-3 minutes trying to locate the source. He noted that the roll up door was open. Asked two questions.



- What were the results of the air monitoring performed in the dome. – Answered during the call
  - Are all the drums equipped with filtration. – Told him I would confirm that and call him back.
- o (RA) 1525 hours, still experiencing symptoms (upset stomach, sore throat) but not as bad as yesterday. She also characterized the odor as a “paint thinner” smell. Stated she was not in the dome when the odor was first detected by Nico and Brooke, but immediately noticed it upon entering the area. Nico and Brooke were trying to identify the source of the odor and get a drum number. Stated that the smell was in the Tech 46 area, and she remained in the area for only a minute before leaving with Nico and Brooke. She did not have any questions.
- 05/09/2023, 1758 hours, email notification from N3B Regulatory Compliance to NMED of the event.

#### **05/10/2023**

- 05/10/2023, approx. 0630 hours, request to RADCON Manager for the radiological survey of the exterior of Dome 230 to be performed.
- 05/10/2023, 0712 hours, RADCON provides the nasal smear results to FOD for the event at Dome 230.
- 05/10/2023, 0802 hours, (DT) Director S&S provide LAFD witness statement; Battalion Chief incorporates LAFD and HAZMAT.
- 05/10/2023, 0830 hours, status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, potential CAM placement; plan for re-entry for extensive radiological survey; determine approach as to Type of WP or Emergency Work.
- 05/10/2023, 0854 hours, NMED emails acknowledgement of notification from N3B Regulatory Compliance via email.
- 05/10/2023, 1131 hours RADCON Supervisor provides RMIs performed in the last 48 hours to the FOD via email.
- 05/10/2023, 1249 hours, Incident Report from the IRC to (EG) Emergency Management N3B.
- 05/10/2023, 1251 hours, AirNet Sampling and Stack Monitoring reports provided; YTD = 4/17/2023
- 05/10/2023, 1315 hours, follow on status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, plan for re-entry for extensive radiological survey; determined by N3B to be Emergency Work.
- 05/10/2023, 1330 hours, RADCON Supervisor provides exterior survey results performed for Dome 230 via email

- 05/10/2023, 1406 hours, N3B receives Triad Incident Report; via email through Director S&S (DT).
- 05/10/2023, 1748 hours, RADCON Manager provides High Volume Air Sampler results from HPAL via email.
- 05/10/2023, approx. 1730 hours, CH-TRU personnel deployed to retrieve equipment to support the planned re-entry effort.

#### **05/11/2023**

- 05/11/2023, 0845 hours, status meeting with N3B and EM-LA for update on Dome 230; status of action taken, procedures to be used, for re-entry of Dome 230 for extensive survey by RADCON/IH/Waste Ops/Facility Ops.
- 05/11/2023, 1000 hours, perform comprehensive pre-job to Emergency Work plan for re-entry
- 05/11/2023, 1300 hours plan for entry into Dome 230
- 05/11/2023, 1415-1420 hours, team make actual entry into Dome 230
- 05/11/2023, 1623 hours, re-entry effort complete at Dome 230
- 05/11/2023, 1734 hours, post-job re-entry for Dome 230 at 54-247 conference room.
- 05/11/2023, 1828 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive; followed by verbal/telecomm
- 05/11/2023, 1851 hours, RADCON Manager email High Volume Air Sample results from Triad. Sample #1 is the filter inside Dome 230 and Sample 2 is the filter from outside the dome near our step off pad. Both appear to be radon based on the 2 to 1 ratio (Beta to Alpha) HPAL will count the filters again in the morning to show the decay of radon on the filters.

#### **05/14/2023**

- 05/14/2023, 0903 hours, RADCON manager email 2nd count of the High Volume filters from Dome 230. Sample 1 is inside the dome, Sample 2 is outside the dome. The activity has dropped once again. Great indication that all we have is Radon.

#### **05/15/2023**

- 05/15/2023, 0830 hours, Attempt to conduct the Event Meeting/Fact Finding; postponed due to 1 of 3 individuals are out sick; not related to this event.
- 05/15/2023, 0934 hours, final count on the High Volume Air Samples for Dome 23 taken on 5-11-23 during our re-entry. We had them recount over the weekend to let the radon decay from the previous samples. Sample #1 is inside dome 230 and sample #2 is outside the dome near the reentry (step off pad) entrance to the dome. Both samples showed No Detectable Activity (NDA).

- 05/15/2023, 1134 hours, Received HAZMAT summary via email from Director S&S (DT) for the event response.
- 05/15/2023, 1614 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive.
- 05/15/2023, 1907 hours, 5-Day Report Follow On Report on Emergency Response at TA-54 Dome 230 Emergency Response Due to an Abnormal Odor; email communication from N3B Regulatory Compliance (CM) to NMED.

## 05/16/2023

- 05/16/2023, 0830 hours, Event Meeting/Fact Finding
  - o Event Meeting/Fact Finding reviewed and commented on timeline for 05/08/2023.

## Timeline comments/questions from Event Meeting/Relevant Facts:

### People

1. What activity was being performed at the time of the event?
  - a. RCRA Inspections
2. What were your activities prior to the event? Participated on the evacuation drill, conducted pre-job brief, gathered associated documentation, headed to Area G started to perform RCRA inspections.
3. How long were you in Dome before experiencing symptoms?
  - a. 25-30 minutes; document end times on RCRA inspection forms; had completed Dome 229 RCRA inspections prior to entering Dome 230.
4. Was this a scheduled or emerged activity?
  - a. Scheduled
5. Were you working alone or part of a team?
  - a. Team of 3
6. How were you feeling prior to the event?
  - a. Feeling good, energetic; hydrated prior to heading into the field.
  - b. Follow up question as to how individuals felt at the Event Meeting; communicated they were feeling well; recovered.
7. Can you describe the odor?
  - a. Strong paint thinner smell
8. How soon after did you begin to feel symptoms?
  - a. After a couple of minutes
9. Released with work restriction, or just days?

- a. No restrictions

## **Location**

1. What is the history of the storage dome; any prior issues?
  - a. MTRU/TRU waste
  - b. Tech46; controlled in storage and behind barriers.
  - c. Two drums with pin holes, W800469 and W801972; controlled, rad/cargo tape covering the pin holes.
2. What is Dome 230 used to support/activity process?
  - a. Storage of TRU and LLW; 606 containers
  - b. 2 Tech 46 buffer zones
  - c. No air exchange or air flow in this location
3. Any equipment running at the time?
  - a. Propane Forklift with parrot beak
4. Any issues from past RMIs?
  - a. No dose rates nor contamination issues
5. What type of monitoring equipment was used by LAFD/HAZMAT?
  - a. Multiray
  - b. PPB
6. To verify, what were the readings observed by LAFD/HAZMAT?
  - a. LAFD communicated a reading and recognize a unit issue in communication of 225 microrem; HAZMAT communicates 0.2/0.3 mrem, correction of communication of the reading.
7. What is affected inspection wise, until we release the dome?
  - a. RCRA – NMED notified
  - b. RMIs – 5/11/23 most recent (monthly dose rate); 0.9 mrem/hr @30 centimeters.
  - c. PMs – Completed/performed previous month; will perform May PMs by first week in June
  - d. Surveillances (weekly/monthly), weekly complete on 05/11/2023;
8. Any issues of this nature reported prior? No
9. Any issues similar to this event? Yes; December 2022, 54-486; odd odor with LAFD and HAZMAT response.
  - a. No waste containers present in 54-486
  - b. 1 individual involved (NR)

## **Process/Activity/Planned Operations**

1. How did the response go; use of the ERP?

- a. Update periodic review date
  - b. No issues with the use and completion of the ERP; well documented.
- 2. Any issues with paper, people, or equipment?
  - a. People – miscommunication on radios, outside of Facility Operations/CH-TRU.
- 3. Any issues with Command and Control?
  - a. No issues; good collaboration
- 4. Any issues with communications/site notifications?
  - a. miscommunication on radios, outside of Facility Operations/CH-TRU.

### Compensatory:

- 1. 05/08/2023 Access to 54-230 is restricted and posted on exterior dome doors of Dome 230
  - a. Implemented shift order to restrict access to Dome 230
- 2. Follow-up VOC survey of Dome 230, 05/09/2023; 0.0ppm documented report
- 3. Bioassay (7 individuals)
- 4. Exterior survey of Dome 230
  - a. 5/10/2023, High Vol outside (NDA) entrance of the Dome
- 5. Interior survey of Dome 230
  - a. 5/11/2023, High Vol inside;
  - b. 5/11/2023, summa and VOC monitoring
  - c. 5/11/2023, contamination and dose rate survey
- 6. Plan in process for routine monitoring/surveillance by IH&S

### Pros, what went right?:

- Entry of the AOP
- Escalation decision for entry of the ERP
- Notifications, including 911, EOSC, etc.
  - Unified command
- Communication with Triad Utilities
- Dome Isolation/access restriction

### Cons, what went wrong?:

- Miscommunication of radiological unit readings; clarified by HAZMAT during the event (see timeline)
- Education is needed for Senior Management to understand unified command and interpretation of event/process/response, how it “works”, which contributed to miscommunication of information outside of Facility Operations/CH-TRU.

- Notification to “on-call” phones for support organizations
- Transportation (GOV availability, lack of)
- Delay on RCT surveys
- AOP/ERP Strengthen for RADCON to request and perform radiological surveys

**Confirmed Categorization:**

**Categorization (ORPS/Sub -ORPS):** ORPS

**Report Levels:** LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health; Group 2 Subgroup A(4)

**Other:**

**NTS Reportable**

**Corrective Actions to be developed from the RCA; Event is HIGH Significance Level**

## Event Report

\*All Events Boxes 1-16 | \*L/M Significance Events Complete 1-17 | \*H Events 1-16 & Root Cause Analysis

1. Title of Event: Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230		
2. Date of Discovery: 05/08/2023		3. Time of Discovery: 1152 hours
4. Location of Event: Ta-54, Area G, Dome 230	5. Responsible N3B Organization: Responsible Manager/FOD/PM: Maupin/Helm/O'Leary	
6. Event Notification Attached (Y/N): Y	7. IR# N3B-IR-2023-0390	8. Significance Level (H/M/L): H
9. ORPS Reportable? (Y/N) Y	10. ORPS Categorization: Group 2 Subgroup A(4)L	
11. PAAA Reportable? (Y/N) Y		
12. Brief Summary of Event: (What Happened?)  <p>On 05/08/2023 at 1152 hours, TA-54 Facility Operations Director was notified by the Shift Operations Manager (SOM) that while performing inspections at TA-54, Area G, Dome 230, the individuals that were performing the inspections, observed an odd odor.</p> <p>The individuals made notification to the Operations Center and entry into our abnormal response procedure N3B-AOP-TRU-3003, Material Release or Spill was performed. The individuals communicated that they may be developing signs and symptoms of a possible exposure, which escalated entry into our emergency response procedure, N3B-ERP-TRU-3002, Emergency Response(ERP), and 911 was contacted. Triad Emergency Operations Support Center (EOSC), Triad HAZMAT, and the Los Alamos Fire Department (LAFD) responded. The individuals were evaluated by LAFD emergency response services and transported to Los Alamos Medical Center (LAMC) for further evaluation by 1233 hours. The individuals Supervisor and support RADCON reported to LAMC as well.</p> <p>By 1304 hours, Command and Control of the Facility was turned over to Triad EOSC and HAZMAT Incident Command by the SOM. Triad HAZMAT performed inspection of the affected location. No VOCs were detected. Command and Control was returned to the SOM at 1430 hours. Our ERP was exited by 1436 hours.</p>		
13. What Should Have Happened?  <p>Routine monitoring/surveillance by IH&amp;S should be performed routinely.</p>		

#### 14. Relevant Facts and Timeline:

**05/08/2023**

- 05/08/2023, approx. 0727 hours, Evacuation drill in the TA-54 Administrative Area; personnel in the Administrative Area report to Assembly Area 5.
  - Weather Temperature & Barometric Pressure (Los Alamos County, localconditions.com)
    - 05/07/2023, 1115 hours, 63.68°F approx. 30.1 inHG
    - 05/08/2023, 1115 hours, 65.12°F; approx. 30.14 inHG
- 05/08/2023, 0847 hours, RCRA pre-job; activity was scheduled activity on the POD and support was identified as:
  - BB – PIC/Inspector
  - NR – Inspector
  - RA – RCRA Inspection Support
  - What occurred prior to entering Area G and Dome 230?
    - Participated on the evacuation drill, conducted pre-job brief, gathered associated documentation, headed to Area G started to perform RCRA inspections.
    - Entered Dome 230 at approx. 1109 hours.
  - Method of travel into Area G and various dome locations:
    - Shuttle/taxi
  - Other locations inspections performed prior to Dome 230? Started at Dome 153, shafts, AAs, Dome 48, 412, Pad 10, supported walk down with Florida Expo all 3 inspectors met in Dome 230 (South east side).
  - How long was each individual in Dome 230 prior to observing odor?
    - About 25-30 minutes
- 05/08/2023, 0900 – 1120 hours, Waste Handling Operators perform drum mining/transfers of MAR to/from HE-RTR, to/from Dome 230 staging area; roll-up door is open; no abnormal odors observed.
  - Dome rounds for Dome 230 completed at 0846 hours.
    - Area G Dome 0230 Inspection Sheet dated 05/08/2023, N3B-DOP-TRU-1105, Work Release Inspection Sheets performed at 0846 was filled out by a qualified Waste Operator and showed no indications of any abnormalities within Dome 230. This includes inspection of excess equipment, Dome structure, exits and doors operational, minimum combustible material, and no drum/waste container integrity issues.
  - Move request identified that containers observed with free liquids after RTR are stored in the staging area of Dome 230.
- 05/08/2023, 1136 hours, BB reports to TA-54 Operations Center that a strong odor from Dome 230 while doing RCRA inspections- smell coming from southeast side of Dome 230 interior, next to Ten Drum Overpacks (TDOPs, which are empty, do not contain MAR) in Tech-46 area. She (BB) states that her and 2 (NR, RA) other individuals are feeling ill and have headaches- SOM (WC) notified.
- 05/08/2023, 1137 hours, FOD (GH) and FOM (LS) notified, via text
- 05/08/2023, 1140 hours, Entering N3B-AOP-TRU-3003 *Material Release or Spill*; communication from TA-54 Operations Center that pick-up of the 3 individuals has been arranged.



- 05/08/2023, 1141 hours, EMAG (text messaging system) and radio message sent
- 05/08/2023, 1150 hours, N3B Occupational Medicine notified of event- instructs ENV manager to accompany all 3 individuals to Triad Occupational Medicine (initial determination)
- 05/08/2023, 1152 hours, SOM provides verbal/telecomm notification to the FOD (GH)
- 05/08/2023, 1153 hours, RCRA Manager notified (RM)
- 05/08/2023, 1155 hours, CH-TRU PM notified by the FOD (GH)
- 05/08/2023, 1155 hours, EM-LA FR (LV) notified by the FOD (GH)
- 05/08/2023, 1200 hours, CH-TRU PM notified N3B Senior Management (BS, KL)
- 05/08/2023, 1200 hours, Entered N3B-ERP-TRU-3002, *Emergency Response*- SOS (KM) calls 911
- 05/08/2023, 1201 hours, Engine 3, Medic 3, and Rescue 1 dispatched to TA-54
- 05/08/2023, 1202 hours, Individuals brought into Operations Center and sat down; Emergency Operations Support Center notified by the TA-54 Operations Center; Operations Center personnel obtain initial weather conditions, 10 mph winds and 18mph wind gusts to the south; sunny.
- 05/08/2023, 1212 hours, Emergency response vehicles on-site
- 05/08/2023, 1219 hours, Triad RANT notified of the response vehicles reporting to TA54 for emergency response, and to “stay clear of roadways for emergency vehicles”.
- 05/08/2023, 1219 hours, EMAG and radio message sent by the Operations Center to “stay clear of roadways for emergency vehicles”.
- 05/08/2023, 1219 hours, Los Alamos Fire Department (LAFD) in Area G heading to Dome 230 to check for VOCs- SOM (WC) notified.
- 05/08/2023, 1220 hours, EMAG and radio message sent by Operations Center to “stay clear of roadways in Area G for emergency vehicles”.
- 05/08/2023, 1225 hours, IRC, Protective Force, and HAZMAT on-site
- 05/08/2023, 1227 hours, RCTs notified and on standby
- 05/08/2023, 1234 hours, Additional EMAG sent
  - o LAFD states they are getting some readings from containers in Dome 230 and are exiting Dome for RCT survey support; HAZMAT clarifies that there was a unit issue when reading/communicating reading of 225 micorem; actual reading 0.2/0.3 millirem.
- 05/08/2023, 1235 hours, SOM (WC) notifies RCTs to head to LAMC to survey 1st emergency vehicle with (1) sick individual (RA) as a precaution
- 05/08/2023, 1237 hours, RCT (WW) frisks and clears BB and NR- all clear
  - o No VOC readings in Dome 230 observed by LAFD
- 05/08/2023, 1244 hours, RCTs notified to retrieve the most recent surveys and RMIs for Dome 230
- 05/08/2023, 1246 hours, Triad Utilities on-site– SOM requested to determine if a gas line or other type of utility could have been impacted. Triad Utilities communicates that no utilities are in the location of concern and no natural gas lines in the vicinity.
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  - *At 1344 hours the HAZMAT safety plan was briefed and signed, and we established Unified Command. At 1354 hours HAZMAT began the preparation and staging for the operation. Below is a timeline of the HAZMAT Entry Team's actions/reports during the operation:*
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  - *HAZMAT deemed the area to be safe and advised the room was in a safe configuration. At 1430 hours the facility was returned to the TA-54 Operations Manager. At 1442 hours all units cleared the scene. This incident is closed. Contact Los Alamos Fire Department regarding their investigation of this incident.*
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  - No concerns in Dome 230 highest level of rad reading was 1.2mrem at 30cm for the empty TDOP. Decision to clear dome is made.
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- 05/08/2023, 1436 hours, Exiting N3B-AOP-TRU-3003 *Material Release or Spill* and N3B-ERP-TRU-3002 *Emergency Response*. All operations in Domes 229, 231, 232 released for normal operations.
- 05/08/2023, 1538 hours, FOD requests to IH&S Manager (RB) to perform a post event, follow-up investigation for VOCs at Dome 230 for 05/09/2023.
  - Dome 230 access remains restricted and is posted “No Entry” on exterior dome doors.
- 05/08/2023, 1612 hours, email from (RM) RCRA Supervisor, updating the status of the 3 individuals, doctor excuse with a return to work on 5/11/2023.
- 05/08/2023, 1633 hours, ESH&Q receive medical reports and re-categorization of the event is necessary to ORPS Reportable event, Group 2 Subgroup A (4) L.
- 05/08/2023, 1655 hours EMAG sent to stay clear of Dome 230 until further notice
- 05/08/2023, 1717 hours, event is updated to reflect the re-categorization, Group 2 Subgroup A (4) L.
- 05/08/2023, 1717 hours, IH&S Manager (RB) acknowledges request for post event re-investigation of Dome 230 for 05/09/2023.

### 05/09/2023

- 05/09/2023, 0717 hours, IH performs follow-up monitoring in Dome 230
- 05/09/2023, 0819 hours, initial report of the re-monitoring, no VOCs were detected on the PID and the IH(s) did not observe any odd odors in Dome 230.
- 05/09/2023, 0946 hours, email communication from Regulatory Compliance that a notification will need to be made to NMED.
- 05/09/2023, 0953 hours, IH&S (LR) provides the results of the follow-up monitoring for VOCs performed at Dome 230.
- 05/09/2023, 1200 hours, ESH&Q PM status meeting with N3B for update on Dome 230; action item assignment and status
- 05/09/2023, 1328 hours, communication email from the SOM (WC) regarding fuel in emergency response vehicles. (Engine 3-55 gal, Medic units – 35 gal, HAZMAT unit – 30gal)
- 05/09/2023, 1433 hours, ESH&Q Director documents through email the emergency bioassay kit list of individuals.
- 05/09/2023, 1453 hours, *N3B Communications* email - Team members encounter abnormal odors at TA-54; sent to Los Alamos Medical Center for evaluation
- 05/09/2023, 1500 hours, ESH&Q PM status meeting with N3B and EM-LA for update on Dome 230
- 05/09/2023, 1534 hours, S7S Director (DT) provides LAFD Run Sheet via email
- 05/09/2023, 1718 hours, status of wellness check performed by ESH&Q Manage (WR) to ESH&Q Director (EG) for 2 of 3 individuals (RA, NR), email communication regarding the verbal communication with the individuals.
  - (NR) 1510 hours, still experiencing symptoms (head pressure/migraine, fatigue), but not as bad as yesterday. Characterized the odor as “paint thinner” smell. Stated the odor was primarily in the Tech 46 area of the dome. After smelling the odor, stayed in the area for 2-3 minutes trying to locate the source. He noted that the roll up door was open. Asked two questions.
    - What were the results of the air monitoring performed in the dome. – Answered during the call
    - Are all the drums equipped with filtration. – Told him I would confirm that and call him back.

- o (RA) 1525 hours, still experiencing symptoms (upset stomach, sore throat) but not as bad as yesterday. She also characterized the odor as a “paint thinner” smell. Stated she was not in the dome when the odor was first detected by Nico and Brooke, but immediately noticed it upon entering the area. Nico and Brooke were trying to identify the source of the odor and get a drum number. Stated that the smell was in the Tech 46 area, and she remained in the area for only a minute before leaving with Nico and Brooke. She did not have any questions.

- 05/09/2023, 1758 hours, email notification from N3B Regulatory Compliance to NMED of the event.

#### **05/10/2023**

- 05/10/2023, approx. 0630 hours, request to RADCON Manager for the radiological survey of the exterior of Dome 230 to be performed.
- 05/10/2023, 0712 hours, RADCON provides the nasal smear results to FOD for the event at Dome 230.
- 05/10/2023, 0802 hours, (DT) Director S&S provide LAFD witness statement; Battalion Chief incorporates LAFD and HAZMAT.
- 05/10/2023, 0830 hours, status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, potential CAM placement; plan for re-entry for extensive radiological survey; determine approach as to Type of WP or Emergency Work.
- 05/10/2023, 0854 hours, NMED emails acknowledgement of notification from N3B Regulatory Compliance via email.
- 05/10/2023, 1131 hours RADCON Supervisor provides RMIs performed in the last 48 hours to the FOD via email.
- 05/10/2023, 1249 hours, Incident Report from the IRC to (EG) Emergency Management N3B.
- 05/10/2023, 1251 hours, AirNet Sampling and Stack Monitoring reports provided; YTD = 4/17/2023
- 05/10/2023, 1315 hours, follow on status meeting with N3B and EM-LA for update on Dome 230 and plan for Radiological Survey, plan for re-entry for extensive radiological survey; determined by N3B to be Emergency Work.
- 05/10/2023, 1330 hours, RADCON Supervisor provides exterior survey results performed for Dome 230 via email
- 05/10/2023, 1406 hours, N3B receives Triad Incident Report; via email through Director S&S (DT).
- 05/10/2023, 1748 hours, RADCON Manager provides High Volume Air Sampler results from HPAL via email.
- 05/10/2023, approx. 1730 hours, CH-TRU personnel deployed to retrieve equipment to support the planned re-entry effort.

#### **05/11/2023**

- 05/11/2023, 0845 hours, status meeting with N3B and EM-LA for update on Dome 230; status of action taken, procedures to be used, for re-entry of Dome 230 for extensive survey by RADCON/IH/Waste Ops/Facility Ops.
- 05/11/2023, 1000 hours, perform comprehensive pre-job to Emergency Work plan for re-entry
- 05/11/2023, 1300 hours plan for entry into Dome 230

- 05/11/2023, 1415-1420 hours, team make actual entry into Dome 230
- 05/11/2023, 1623 hours, re-entry effort complete at Dome 230
- 05/11/2023, 1734 hours, post-job re-entry for Dome 230 at 54-247 conference room.
- 05/11/2023, 1828 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive; followed by verbal/telecomm
- 05/11/2023, 1851 hours, RADCON Manager email High Volume Air Sample results from Triad. Sample #1 is the filter inside Dome 230 and Sample 2 is the filter from outside the dome near our step off pad. Both appear to be radon based on the 2 to 1 ratio (Beta to Alpha) HPAL will count the filters again in the morning to show the decay of radon on the filters.

#### **05/14/2023**

- 05/14/2023, 0903 hours, RADCON manager email 2nd count of the High Volume filters from Dome 230. Sample 1 is inside the dome, Sample 2 is outside the dome. The activity has dropped once again. Great indication that all we have is Radon.

#### **05/15/2023**

- 05/15/2023, 0830 hours, Attempt to conduct the Event Meeting/Fact Finding; postponed due to 1 of 3 individuals are out sick; not related to this event.
- 05/15/2023, 0934 hours, final count on the High Volume Air Samples for Dome 23 taken on 5-11-23 during our re-entry. We had them recount over the weekend to let the radon decay from the previous samples. Sample #1 is inside dome 230 and sample #2 is outside the dome near the reentry (step off pad) entrance to the dome. Both samples showed No Detectable Activity (NDA).
- 05/15/2023, 1134 hours, Received HAZMAT summary via email from Director S&S (DT) for the event response.
- 05/15/2023, 1614 hours, email EM-LA and EM HQ regarding Dome 230, via email by acting vice executive.
- 05/15/2023, 1907 hours, 5-Day Report Follow On Report on Emergency Response at TA-54 Dome 230 Emergency Response Due to an Abnormal Odor; email communication from N3B Regulatory Compliance (CM) to NMED.

#### **05/16/2023**

- 05/16/2023, 0830 hours, Event Meeting/Fact Finding
  - Event Meeting/Fact Finding reviewed and commented on timeline for 05/08/2023.

#### **Timeline comments/questions from Event Meeting/Relevant Facts:**

##### **People**

1. What activity was being performed at the time of the event?
  - a. RCRA Inspections
2. What were your activities prior to the event? Participated on the evacuation drill, conducted pre-job brief, gathered associated documentation, headed to Area G started to perform RCRA inspections.
3. How long were you in Dome before experiencing symptoms?



- a. 25-30 minutes; document end times on RCRA inspection forms; had completed Dome 229 RCRA inspections prior to entering Dome 230.
- 4. Was this a scheduled or emerged activity?
  - a. Scheduled
- 5. Were you working alone or part of a team?
  - a. Team of 3
- 6. How were you feeling prior to the event?
  - a. Feeling good, energetic; hydrated prior to heading into the field.
  - b. Follow up question as to how individuals felt at the Event Meeting; communicated they were feeling well; recovered.
- 7. Can you describe the odor?
  - a. Strong paint thinner smell
- 8. How soon after did you begin to feel symptoms?
  - a. After a couple of minutes
- 9. Released with work restriction, or just days?
  - a. No restrictions

#### **Location**

- 1. What is the history of the storage dome; any prior issues?
  - a. MTRU/TRU waste
  - b. Tech46; controlled in storage and behind barriers.
  - c. Two drums with pin holes, W800469 and W801972; controlled, rad/cargo tape covering the pin holes.
- 2. What is Dome 230 used to support/activity process?
  - a. Storage of TRU and LLW; 606 containers
  - b. 2 Tech 46 buffer zones
  - c. No air exchange or air flow in this location
- 3. Any equipment running at the time?
  - a. Propane Forklift with parrot beak
- 4. Any issues from past RMIs?
  - a. No dose rates nor contamination issues
- 5. What type of monitoring equipment was used by LAFD/HAZMAT?
  - a. Multiray
  - b. PPB
- 6. To verify, what were the readings observed by LAFD/HAZMAT?
  - a. LAFD communicated a reading and recognize a unit issue in communication of 225 microrem; HAZMAT communicates 0.2/0.3 mrem, correction of communication of the reading.
- 7. What is affected inspection wise, until we release the dome?
  - a. RCRA – NMED notified
  - b. RMIs – 5/11/23 most recent (monthly dose rate); 0.9 mrem/hr @30 centimeters.
  - c. PMs – Completed/performed previous month; will perform May PMs by first week in June
  - d. Surveillances (weekly/monthly), weekly complete on 05/11/2023;
- 8. Any issues of this nature reported prior? No

9. Any issues similar to this event? Yes; December 2022, 54-486; odd odor with LAFD and HAZMAT response.
  - a. No waste containers present in 54-486
  - b. 1 individual involved (NR)

#### **Process/Activity/Planned Operations**

1. How did the response go; use of the ERP?
  - a. Update periodic review date
  - b. No issues with the use and completion of the ERP; well documented.
2. Any issues with paper, people, or equipment?
  - a. People – miscommunication on radios, outside of Facility Operations/CH-TRU.
3. Any issues with Command and Control?
  - a. No issues; good collaboration
4. Any issues with communications/site notifications?
  - a. miscommunication on radios, outside of Facility Operations/CH-TRU.

#### **Compensatory:**

1. 05/08/2023 Access to 54-230 is restricted and posted on exterior dome doors of Dome 230
  - a. Implemented shift order to restrict access to Dome 230
2. Follow-up VOC survey of Dome 230, 05/09/2023; 0.0ppm documented report
3. Bioassay (7 individuals)
4. Exterior survey of Dome 230
  - a. 5/10/2023, High Vol outside (NDA) entrance of the Dome
5. Interior survey of Dome 230
  - a. 5/11/2023, High Vol inside;
  - b. 5/11/2023, summa and VOC monitoring
  - c. 5/11/2023, contamination and dose rate survey
6. Plan in process for routine monitoring/surveillance by IH&S

#### **Pros, what went right?:**

- Entry of the AOP
- Escalation decision for entry of the ERP
- Notifications, including 911, EOSC, etc.
  - Unified command
- Communication with Triad Utilities
- Dome Isolation/access restriction

#### **Cons, what went wrong?:**

- Miscommunication of radiological unit readings; clarified by HAZMAT during the event (see timeline)
- Education is needed for Senior Management to understand unified command and interpretation of event/process/response, how it “works”, which contributed to miscommunication of information outside of Facility Operations/CH-TRU.
- Notification to “on-call” phones for support organizations

- Transportation (GOV availability, lack of)
- Delay on RCT surveys
- AOP/ERP Strengthen for RADCON to request and perform radiological surveys

**Confirmed Categorization:**

**Categorization (ORPS/Sub -ORPS):** ORPS

**Report Levels:** LOW

**Event Reporting Criteria (Group/Subgroup/Sequence Criteria):** Group 2, Personnel Safety and Health;  
Group 2 Subgroup A(4)

**Other:**

**NTS Reportable**

**Corrective Actions to be developed from the RCA; Event is HIGH Significance Level**

15. Event Meeting Conducted (Y/N): Y

Event Meeting Date and Time: 05/15/2023 0830 hours;  
rescheduled to 05/16/2023 0830 hours

16. FOD/PM Designated Responsible Manager

Name: Gail Helm

Title: FOD

Date: 05/18/23



## Event Report

17. Facts	Problems	Causes (Includes Cause Code)	Safe Stable Immediate Actions	Extent of Condition	Short Term Corrective Action	Long Term Corrective Action	Follow Up for Effectiveness
N/A; *H Events 1-16 & Root Cause Analysis							

## Event Report



17. Facts	Problems	Causes (Includes Cause Code)	Safe Stable Immediate Actions	Extent of Condition	Short Term Corrective Action	Long Term Corrective Action	Follow Up for Effectiveness



**N3B Root Cause Analysis**  
N3B-IM-2023-0390

**Individuals Experienced Medical Symptoms  
While Performing a Regulatory Inspection at  
TA-54, Area G, Dome 230**

Conducted 05/31/2023 to 06/29/2023

Prepared By:	Gene Vitullo	N3B Root Cause Analyst, BWXT Corporate Reach-back	
Reviewed & Approved By:	Bob Macfarlane	N3B Environmental, Safety, Health & Quality Program Manager	

## Table of Contents

Introduction .....	3
Scope .....	3
Background.....	3
Key Activities – High Level Timeline.....	5
Problem Statements Summary .....	12
Team .....	14
Methodology .....	14
Barrier Analysis.....	15
Extent of Condition.....	17
Extent of Cause .....	17

## Attachments

- Attachment 1: Dome 230 Site Map
- Attachment 2: Individuals Interviewed
- Attachment 3: Documents Reviewed
- Attachment 4: Acronym List

## Introduction

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) Acting Executive Officer, Bradley Smith, commissioned an independent Root Cause Analysis (RCA) consistent with an Issues Management System declaration of a “high” level incident in response to the initial medical event, and additional follow-on events, associated with individuals experiencing medical symptoms while performing a regulatory inspection at TA-54 (Area G), Dome 230. The events in question occurred May 8, 2023 through May 16, 2023.

The objective of the analysis was to develop specific and realistic corrective and/or preventive actions that are intended to prevent future recurrence of potential employee chemical exposures and operational control lapses in N3B’s safety-conscious work environment.

This RCA was performed by a team consisting of an independent consultant and N3B employees including representatives of ESH&Q, facility operations, engineering, emergency response and regulatory compliance. The team applied integrated methodologies to select the appropriate tools to investigate, analyze, determine the key facts, problems, causes, recommend corrective actions, and identify opportunities for improvement. This RCA involved a comprehensive review and analysis of relevant documents and information, and interviews of involved personnel.

## Scope

The RCA team investigated the medical event itself, and the corresponding emergency and post event investigation responses. The RCA team reviewed each of the activities for ineffective barriers, programmatic weaknesses, and human performance factors that may have contributed to responses, which were inconsistent with expectations. The objective of the RCA was to identify corrective actions as well as opportunities for improvement.

## Background

*Note: Due to minor inconsistencies between witness statements and the various reports and documents relied upon in this report, all times reported are approximate. In order to minimize confusion, the reader is directed to the Key Activities – High Level Timeline section of this RCA report.*

In compliance with Triad’s Hazardous Waste Facility Permit (HWFP), container storage units are inspected weekly or after waste has been moved. Dome 230 is a container storage unit permitted under the HWFP and, as such, is subject to regular inspections in accordance with Permit requirements.

N3B inspections of Resource Conservation and Recovery Act (RCRA) permitted units are conducted by qualified inspectors in accordance with N3B-DOP-TRU-1219. This procedure requires that personnel performing inspection activities meet facility access criteria, recognize site hazards and uphold established facility controls. Inspectors must additionally take appropriate action when unusual hazardous conditions are encountered, including immediately contacting the TA-54 Operations Center upon discovery of such a condition.

On May 8, 2023, following a planned evacuation drill conducted at the TA-54 administrative area, three Regulatory Inspectors (RIs) conducted a pre-job briefing prior to initiation of HWFP inspections. The plan of the day (POD) included inspections of multiple permitted units located within Area G, including Dome 230. The three RIs entered Area G by vehicle and proceeded with multiple planned RCRA facility inspections prior to arriving at Dome 230.

At approximately 1109 hours, two of the three RIs entered Dome 230 from the southeast entrance for the purpose of conducting the RCRA inspection (see Dome 230 site map provided in Attachment 1 for referenced locations). Waste handling operations, including drum mining and transfers of waste from the

High Energy Real Time Radiography (HERTR) to Dome 230 were underway by CH-TRU Waste Handling Operators. During the waste handling operation, the roll-up door (see Attachment 1) was open and no odors were reported by the workers in this area. The waste handling operations continued in Dome 230 until approximately 1120 hours.

Approximately 25-30 minutes after entering Dome 230, the two RIs who were actively performing the inspection noted an odor similar to paint thinner in the vicinity of columns 2 and 5 (see Attachment 1). The RIs conducted further investigation of the immediate area to identify the source of the odor. The third RI, upon rejoining the inspection group, also noted an odor similar to paint thinner, resulting in all three RIs promptly exiting the dome.

At 1136 hours, the RI, who was acting as the Person in Charge (PIC), called TA-54 OpsCenter to notify of the odor encountered within Dome 230, and that all three RIs reported individuals who were experiencing physical symptoms of illness. The OpsCenter made notifications by text to the Field Operations Manager (FOM) and the Field Operations Director (FOD), and the facility entered into abnormal response procedure N3B-AOP-TRU-3003, Material Release or Spill. The RIs were transported from Dome 230 to TA-54 OpsCenter by vehicle.

At 1200 hours, the RIs arrived at the TA-54 OpsCenter with one employee showing worsening symptoms, including nausea and dry heaving. This situation prompted a call to 911 and the facility entered into N3B-ERP-TRU-3002, Emergency Response Plan (ERP). Emergency responders from Los Alamos Fire Department (LAFD) arrived at the TA-54 OpsCenter, followed shortly thereafter by Triad's Incident Response Commander (IRC) and Triad HazMat. Immediate assessment of the individuals began by LAFD Medics and the first RI was transported by LAFD to LAMC, with the remaining two RIs following shortly thereafter. Medical staff provided further assessment of the three RIs at LAMC. All three RIs were released from LAMC by 1515 hours (Release times: 1446, 1451 and 1513 hours), and then returned to TA-54. Although no diagnosis was provided, all three RIs were issued 2-days of stay at home work restrictions.

While the RIs were being assessed at the TA-54 OpsCenter, LAFD proceeded to Dome 230 to perform monitoring for volatile organic compounds (VOCs) and radiation. Initially, LAFD reported elevated radiation monitoring results of 225 millirem/hr. However, this was subsequently determined to be incorrect by Triad HazMat Responders. The actual readings collected in Dome 230 were 0.2-0.3 millirem/hr., which are normal radiation levels expected for Dome 230.

At approximately 1303 hours, the N3B Shift Operations Manager (SOM) transferred control of the facility to the Triad IRC and at 1344 hours, unified command was established between the IRC, Triad HazMat and LAFD. Shortly thereafter, preparations began for a reconnaissance effort of Dome 230 by Triad HazMat. This effort included air monitoring for oxygen, Lower Explosive Limit (LEL), Carbon Monoxide (CO), Hydrogen Sulfide (H<sub>2</sub>S), VOCs and radiation contamination as well as visual indications for open containers or possible sources of chemical exposure that may produce an odor. The monitoring did not identify any abnormal conditions. At approximately 1430 hours, HazMat determined the facility to be safe, and at approximately 1430 hours, control of the facility was relinquished to the N3B SOM, and all external responders exited the facility and Site. TA-54 OpsCenter exited abnormal operating procedures (Material Release or Spill and ERP), and released all facilities except Dome 230 to normal operations. Dome 230 was subsequently posted for restricted access pending further evaluation. The FOD requested that the CH-TRU ESH Manager perform further investigation of Dome 230 for VOCs in support of resumption of normal operations.

The requested follow-up action was conducted the morning of May 9, 2023, and no abnormal conditions or unusual odors were detected. A status meeting was conducted with stakeholders (i.e., N3B, EM-LA and DOE Headquarters) to discuss Dome 230 reentry and recovery actions. Upper management was made aware of the Industrial Hygienist (IH) personnel entry at this meeting- (Note: The IH entry was deemed inappropriate by upper management and an Event Meeting/Fact Finding was scheduled for May 23, 2023 at 0830 hours). Notification of the event was provided to New Mexico Environment Department (NMED), Hazardous Waste Bureau.

On May 10, 2023, N3B began development of a recovery and sampling plan to restore Dome 230 to normal operations.

On May 11, 2023, N3B met with DOE to provide an update of the status of Dome 230 and the path forward to resume normal operations. Entry was made into Dome 230 by CH-TRU for the purpose of completing extensive facility IH and RadCon monitoring. N3B upper management subsequently met with DOE to provide updated information.

On May 15, 2023, results from the high volume air samples collected were received, indicating no abnormal activity was detected.

On May 16, 2023, the initial Event Meeting was held and fact finding began.

## Key Activities – High Level Timeline

The three high-level timelines presented below are intended to orient the reader to the series of activities leading up to and following the described event. Three timelines were required to address the N3B employee illnesses, and post event issues within Dome 230.

*Note 1: During review of critiques, witness statements, occurrence reports, external organization response reports and OpsCenter center logs variations in times were noted; however, any discrepancies noted were determined to be insignificant in relation to this causal analysis. Because of the variations noted, all times referenced in this report are approximate.*

*Note 2: Throughout the timeline, “RIs” refer to the three (3) N3B employees who experienced the illness symptoms.*

### Dome 230 Initial Event (05/08/2023) Timeline

05/08/2023 0727hrs	05/08/2023 0846hrs	05/08/2023 0847hrs	05/08/2023 0930hrs	05/08/2023 1109hrs	05/08/2023 1136hrs	05/08/2023 1140hrs
N3B RIs participated in a site evacuation drill.	Waste Operations personnel completed dome rounds.	RCRA inspection pre-job brief was conducted with the RIs.	RIs (3) began inspections of RCRA Permitted Facilities, starting at Dome 283.	RCRA inspection of Dome 230 was started. A total of 9 facility RCRA inspections were completed prior to arrival at Dome 230. Note: Two (2) of the RIs entered at 1109hrs. The third RI joined them shortly after a hygiene break in route to Dome 230.	Problem (1) RIs exit Dome 230 and report odor and physical symptoms to the OpsCenter. Communication lacked verbalization of symptom severity, which did not trigger an immediate 911 call.	The OpsCenter entered into Material Release or Spill Procedure, and arranged transportation of employees from Dome 230 to the OpsCenter.

Colored cells describe facts that resulted in problem statements developed within this Report.

05/08/2023 1150hrs	05/08/2023 1200hrs	05/08/2023 1212hrs	05/08/2023 1225hrs	05/08/2023 1230hrs	05/08/2023 1234hrs	05/08/2023 1240hrs
TA-54 Ops Center notified N3B OccMed, who directed the Ops Center to transport employees to Triad OccMed. (Not executed, see 1200hrs)	Upon arrival at the OpsCenter, the employees' exhibited worsening physical symptoms and 911 was immediately called. The OpsCenter entered into ERP.	LAFD arrived and evaluated the RIs.	Triad IRC, HazMat and Protective Force arrived at the OpsCenter	The first RI was transported to LAMC.	Problem (2) & Problem (3) LAFD entered Dome 230 and performed Rad survey and air monitoring for VOCs. LAFD reported an errant Rad meter reading of 225 millirem/hr versus actual reading of 0.2/0.3 millirem/hr. Errant information was reported through unofficial channels to EM-LA Leadership.	The second and third RIs were evaluated and are transported to LAMC.
05/08/2023 1403-1425hrs	05/08/2023 1430hrs	05/08/2023 1436hrs	05/08/2023 1446-1515hrs	05/08/2023 Critical Note:	Blank Cell	Blank Cell
Triad HazMat arrived, entered Dome 230, performed air and Rad monitoring then exited the area. No abnormal conditions were identified.	Triad HazMat declared an "all clear" from the emergency response. Command and control was returned to N3B.	OpsCenter exited Abnormal Operations Procedures (AOP 3003 & ERP 3002) and released operations to all facilities, except, Dome 230, which was posted for restricted access.	Following medical evaluation, the RIs were released from LAMC. (Release times: 1446, 1451 and 1513hrs). The employees returned to TA-54.	The LAMC Doctor gave RIs a 2-day away from work restriction. No specific diagnosis for the symptoms was provided.		



**Dome 230 IH Re-entry Event (05/09/2023) Timeline**

05/08/2023 1436hrs	05/08/2023 1538hrs	05/08/2023 1715hrs	05/08/2023 1925hrs	05/09/2023 0630-0700hrs	05/09/2023 0700-0716hrs	05/09/2023 Critical Note:
The OpsCenter exited Abnormal Operations Procedures (AOP-3003 & ERP 3002) and released operations to all facilities except Dome 230 which was posted for restricted access.	The FOD requested the CH-TRU ESH Manager to perform a follow-up investigation for VOCs at Dome 230 on 05/09/2023.	CH-TRU ESH Manager acknowledged FOD request and intent to perform request on 05/09/2023	S&H Director acknowledged request from FOD and asked CH-TRU ESH Manager to evaluate the need for respiratory protection prior to reentry.	IH Professional, concluded no IH need for respiratory protection, and then contacted RadCon Manager to ask if respiratory protection was needed to reenter Dome 230. The RadCon Manager stated that no respiratory protection was needed for entry.	Problem (4) ESH&Q PM and CH-TRU PM discussed IH and RadCon planned actions to enter Dome 230 and conduct surveys and atmospheric monitoring.	Problem (4) ESH&Q PM and CH-TRU PM were not aware that Acting Executive Officer and EM-LA were under the assumption that no access into Dome 230 was going to take place.

05/09/2023 0717-0819hrs	05/09/2023 0953hrs	05/09/2023 1200hrs	05/09/2023 1433hrs	06/06/2023	Blank Cell	Blank Cell
IH Professionals perform monitoring (Altair 5x) in Dome 230 and no abnormal atmospheric issues were detected, results were reported to OpsCenter.	IH results were reported via email to senior management (i.e., ESH&Q PM, CH-TRU PM).	During the N3B Dome 230 status update meeting, N3B senior management was informed of the IH monitoring. The Recovery Manager was not informed that a reentry was performed.	Because of the confusion regarding access control approvals for Dome 230 at the time of the IH professionals' reentry, bioassay analysis was deemed appropriate to be consistent with the previous day entries.	Reports of "No Intake" was received for four (4) of the ten (10) bioassays taken. Triad analysis laboratory shut-down for 2 weeks (C-NR).  Updated 06/28/2023: Remaining six (6) bioassay results reported as "No Intake" from Triad laboratory.		

**Dome 230 Rad and IH Reconnaissance Event (05/11/2023) Timeline**

05/10/2023	05/10/2023	05/10/2023 0830hrs	05/10/2023 1315hrs	05/11/2023 0845hrs	05/11/2023 1000hrs	05/11/2023 1415-1420hrs
Problem (5) & Problem (6) N3B IH did not have requisite VOC monitoring equipment (with the exception of one working PID) on-site to perform reentry monitoring and assessment.	Problem (5) & Problem (6) N3B dispatched personnel to obtain requisite IH VOC monitoring equipment from WIPP and Triad.	A status meeting between EM-LA and N3B occurred to update actions of the Recovery Plan. The group agreed to meet again with additional detail at 1300hrs.	A follow up status meeting between EM-LA and N3B occurred to update details of the Recovery Plan. A determination was made to conduct work under an emergency work scope package.	A status meeting between EM-LA and N3B was conducted to address questions regarding availability, selection and calibration of IH monitoring equipment for reentry.	A comprehensive pre-job briefing to emergency work package was conducted for reentry into Dome 230 for radiological and IH monitoring	N3B IH & RP re-entered Dome 230 to perform monitoring (Rad and IH used Emergency Work Log Work Package # WT-2023-0387).

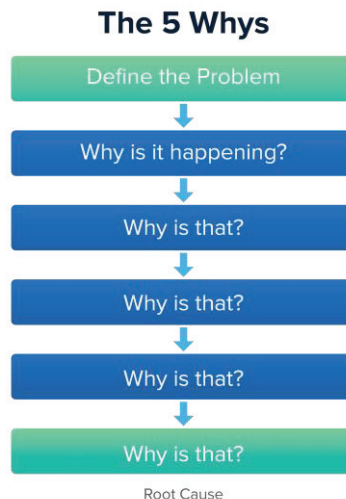
05/11/2023 1623hrs	05/11/2023 1734hrs	05/11/2023 1851hrs	05/17/2023 1919hrs	05/17/2023 Critical Note	05/18/2023	Blank Cell
Reentry monitoring effort was completed. No abnormal conditions were identified.	Post job debrief conducted.	Rad high volume sampler results reported. No abnormal data was reported.	Problem (5) & Problem (6) Report received from external laboratory on Summa Canisters used for VOC monitoring on 05/11/2023. Report indicated no results because canisters were not properly configured (i.e., missing critical parts) for operability.	Problem (5) & Problem (6) Summa Canisters were not available at N3B and were sourced externally from WIPP and Triad. N3B IH either did not understand, or did not receive, the instructions for use of the externally sourced equipment.	A report was received from an external laboratory on Passive Lapel Personal Monitoring VOC Badges. No abnormal data was reported.	

### Pest Control Uncontrolled Entry into Dome 230 Timeline

05/16/2023	05/16/2023 0930hrs	05/16/2023 1106hrs	05/16/2023 1107hrs	05/16/2023 1143- 1146hrs	05/16/2023 1430hrs	Blank Cell
Dome 230 restrictions were discussed at the POD. Area G Maintenance Superintendent (1) was at the POD. Pest Control work in Area G on the POD for 05/16/2023. A shift order restricting unauthorized entry into Dome 230 was in place, and discussed at the POD.	Problem (4) Pest Control crew on-site and received pre-job briefing by Maintenance Superintendent (2). Briefing did not discuss Dome 230 restriction. Maintenance Superintendent (1) did not communicate the Dome 230 restrictions to the other Maintenance Superintendents. Escort did not attend the briefing.	OpsCenter received a notification from a Waste Storage Supervisor of a witnessed exit of Pest Control personnel and escort from Dome 230.	OpsCenter contacted pest control crew escort to determine if entry into Dome 230 was made, and escort confirmed the entry. OpsCenter requested escort and pest control crew to remain in vehicles and await Radcon support at the OpsCenter.	Radcon performed surveys and determined NDA.	Problem (4) During critique investigation the escort admitted to not following access control requirements for entry into Area G, nor posting at Dome 230.	

### Why Process

The Team evaluating the Dome 230 event employed a commonly used RCA technique called “The 5 Whys” process (See chart below). While it is called “The 5 Whys” process, the number of whys needed to reach the primary (aka Root Cause) causal element of each problem is not required to be exactly 5.



## Problem Statements

The RCA Team identified the following problems associated with the initial response and follow-up to this event.

Identified Problems (“Whys”), Causes and Recommended Actions:

- (1) N3B personnel did not immediately call 911 upon recognition/reporting of medical symptoms directly related to a possible chemical exposure.

Why? Exposed employees, and their supervisor, did not immediately recognize the significance of medical symptoms, which can and did increase in severity, directly related to a possible chemical exposure.

Why? When calling the Operations Center, potentially exposed RIs did not clearly verbalize symptom severity that would indicate a need for an immediate 911 call.

Why? TA-54 BEP does not mention chemical exposure as a major injury, requiring 911 to be called immediately.

Cause: Current training of N3B employees, managers and supervisors, and TA-54-BEP protocols, do not recognize how chemical exposures, particularly respiratory, can develop into rapidly escalating medical conditions requiring immediate medical attention.

Recommendations:

- (1) Provide training to N3B employees, managers and supervisors on the need for immediate medical attention for employees exhibiting any medical symptoms involving a possible chemical exposure.
  - (2) Revise N3B BEPs to designate employee chemical exposure with any medical symptoms as a medical condition requiring 911 to be called immediately.
- (2) Los Alamos Fire Department (LAFD) communicated radiological monitoring meter reading data in error (order of magnitude higher than actual) resulting in confusion as to conditions within Dome 230.

Note: LAFD is an external organization, and not within the scope of this root cause analysis to determine the cause of their error.

Recommendation: Appropriate N3B/Triad personnel who interface with LAFD communicate the issue with LAFD for their independent review and resolution.

- (3) Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading reported by LAFD was incorrect. The invalidated initial reading was miscommunicated as an order of magnitude higher than the actual level in the facility, which led to an unnecessary level of concern within higher levels of EM-LA and DOE-HQ.

Note: EM-LA is an external organization, and not within the scope of this root cause analysis to determine the cause of communication issue.

Recommendation: Appropriate N3B management who interface with EM-LA will communicate the issue with EM-LA for their independent review and resolution.

- (4) Entries were made into Dome 230 following the event without knowledge, alignment or approval of all required stakeholders.

- Why? Communications were not formalized for alignment between N3B Senior Management and the Facility Operations Director (FOD) on requirements, approvals and expectations for re-entry of Dome 230.
- Why? The signs on the entrances to Dome 230 were ambiguous as to the need for additional OpsCenter approval for entry.
- Why? IHS believed they were authorized to access Dome 230 after obtaining POD activity approval in the OpsCenter and did not need to make a separate call to the OpsCenter prior to entering the Dome 230.
- Why? The Escort for the pest control crew failed to read and sign the Shift Order communicating the access restrictions to Dome 230 and did not brief escorted personnel on access restriction to Dome 230. (Specific to Pest Control Escort Personal Accountability Event)
- Why? There is a fundamental disconnect in expectations regarding the prerequisites and requirements necessary (work documents, qualifications, etc.) for IH post event entries, including the use of data provided by external response personnel.
- Why? Senior personnel brought perspectives and approaches from other site experiences that differ, and were not reconciled across N3B Departments.

Cause: N3B does not have a formal, documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities.

Recommendation: N3B needs to update existing procedures, and develop a specific comprehensive re-entry/recovery procedure.

- (5) N3B was unable to quickly source critical industrial hygiene monitoring equipment for needed reentry and more comprehensive analysis, following release from the emergency response.

- Why? The Service Agreement/Work Authorizations (SAWA) process did not work as expected.
- Why? N3B Safety & Health Programs (S&H) lacked adequate equipment ordering details and specifications to facilitate procurement or rental timeliness.

Cause: N3B lacks a "rapid" procurement and rental process to obtain, and receipt inspect critical emergency response equipment during and immediately following an emergency.

Recommendations:

- (1) N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.
- (2) N3B needs to investigate the issues/gaps associated with use of the SAWA agreement during this event that did not work as expected.

- (6) N3B was unable to execute a timely and comprehensive suite of atmospheric monitoring for volatile organic compounds (VOC) immediately following a potential release in Dome 230.

- Why? N3B S&H did not have the requisite suite of VOC monitoring equipment on-site (i.e., Passive [Adsorbent] Badges, and Summa Canisters) to perform the more comprehensive monitoring necessary for the event.
- Why? N3B S&H personnel did not have adequate information to properly deploy monitoring equipment (i.e., Summa Canisters) externally sourced for reentry monitoring.

**Cause:** N3B S&H did not perform an adequate facility hazard assessment for the plausibility of a VOC release associated with TRU waste, which would have identified equipment, other than PIDs and Draeger Tubes, necessary to provide more comprehensive monitoring. Additionally, only one PID was functional and the Draeger tubes were expired.

**Recommendation:** N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.

## Problem Statements Summary

On May 8, 2023, three N3B employees were completing RCRA inspections in Dome 230 when they encountered a chemical odor and began to feel ill. While no direct cause was identified for the reported exposures, the team did evaluate and disposition some possible scenarios discussed in the Chemical Exposure Scenarios section of this report. The following is a summary of the identified problems:

N3B personnel did not immediately call 911 when they began to experience symptoms. During the onset of symptoms, the employees did not recognize the event as a chemical exposure that could rapidly escalate into a medical emergency. Multiple N3B procedures need to be revised to stress the recognition of symptoms and appropriate notifications.

Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading that was reported by LAFD was errant. The incorrect initial reading communicated was an order of magnitude higher than the actual level in the facility and led to unnecessary level of concern within higher levels of EM-LA and DOE-HQ.

There were two entries made into Dome 230 following the initial event. The first was a post event entry for follow-up IH monitoring. Several departments at N3B have differing opinions on the correctness associated with the IH entry. In addition, there is a difference of opinion on the correctness of previously performed facility releases based on external response personnel confirmatory information. The second was the unauthorized pest control entry where the escort failed to fulfill his duties as an escort.

N3B S&H had not historically performed an adequate facility hazard assessment for the plausibility of a VOC release associated with TRU waste, which would have identified a more comprehensive suite of VOC monitoring equipment to be readily deployable for this type of event. Because of this inadequate supply of IH monitoring equipment, comprehensive air monitoring was not performed in a timely manner following the initial event. The lack of readily available IH equipment also highlighted that there is not a process to obtain emergency equipment in a timely manner.

The event was an Occupational Safety & Health Administration (OSHA) recordable injury, and therefore negatively affected N3B's Total Recordable Cases (TRC) rate. The event was determined to be reportable under DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information* (ORPS).

## Chemical Exposure Source Scenarios

During the investigative process and interviews conducted by the Dome 230 RCA Team, three (3) scenarios were identified as possible causes of the chemical exposures reported by the workers while performing an inspection in Dome 230.

*Note: For inspection location where chemical odors were identified, and scenario discussions below, refer to Attachment (1) Dome 230 Map.*



<u>Scenario 1</u>	One of the Triad HazMat team responders commented on ongoing and active contractor construction work approximately 0.80 miles East-Southeast in White Rock.
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) The distance from White Rock to the Dome 230 location (0.80 miles) and the concentration of an airborne contaminant that would be needed to reach Dome 230, as well as the fact that White Rock is down grade in topography.</li> <li>(2) The wind direction and speed documented at the time of the event was from the North to South at 18mph, which does not support transport of chemical vapors, if actually occurring, from the construction site to Dome 230.</li> <li>(3) The chemical concentration at, and dispersed from White Rock, had the wind direction been a factor, would have to had been at such a high concentration that it would have caused issues directly at the construction site and around the exterior portions of Dome 230, which would have been noted by the employees prior to entry.</li> </ol>
<u>Scenario 2</u>	A separate team of N3B Waste Handlers were moving drums into Dome 230 through the west rollup door approximately 150 feet opposite of the RIs location (between columns 2 and 5). This scenario was investigated because it was reported by the RIs as a potential source of the odor.
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) The distance from the two work groups and air concentration in between would not support a point source concentration at the location where the workgroup experienced the chemical odors.</li> <li>(2) There is no mechanical air movement within Dome 230 that would draw a chemical odor from the roll-up door to the area where the chemical odor was present.</li> <li>(3) The workers moving the drums into Dome 230 did not report any unusual odors during transfer of the drums from the High Energy Real Time Radiography to Dome 230.</li> </ol>
<u>Scenario 3</u>	<p>On 31 May 2023, members of the Dome 230 RCA Team visited Dome 230 to familiarize themselves with the event location. During the familiarization walk-down, the team members requested the IH technician present to perform PID readings directly at the vent location on 28 floor level drums located (14 per row) between columns 2 and 5. The request to survey these specific drum vents with a PID was based on this being the area where the workers involved in the event smelled the odor. Previous surveys were general area versus point source at the drum vents. Two of the 28 drum vents surveyed (Drums 69342 and 91479) indicated VOC readings on the PID. The readings were 13 ppm at the drum 69342 vent and 7 ppm at the drum 91479 vent, and in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents.</p>
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) Follow-up vent surveys on drums 69342 and 91479 were performed on 06/07/2023 and 06/08/2023. On 06/07/2023 the readings were 17.7 ppm at the drum 69342 vent and 13.0 ppm at the drum 91479 vent, and again in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents. On 06/08/2023, the readings were 15.0 – 89.1 ppm at the drum 69342 vent and 2.6 – 20.8 ppm at the drum 91479 vent. Again, in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents.</li> </ol>

- (2) In discussion with the TRU Waste Programs Director (SME) following the visit to Dome 230, the SME indicated that VOCs could reasonably be assumed to be present at the drum vents, given the purpose of the vents and the waste constituent profiles.
- (3) A burst-release of VOCs from drums 69342 and 91479 was considered, and plausibility was limited to two scenarios. (1) A significant temperature rise in Dome 230 causing a volume-pressure variant. The ambient temperatures on the days leading up to and the day of the event varied approximately between 55 and 65 degrees Fahrenheit. The Dome 230 interior temperature, while not directly taken, would be consistent with the temperature change. (2) An intermittent thermal-chemical reaction within drums 69342 and 91479. Temperature readings were requested by the RCA Team. Temperatures were taken on 06/09/2023 once IH obtained access to an Infrared Laser Thermometer (See Problem (5) & (6)). Multiple temperature readings were taken on the top and sides of drums 69342 and 91479. The temperature readings ranged from the high-50s to mid-60s degrees Fahrenheit. Temperature readings were performed on additional random drums in the vicinity of columns 2 and 5; those readings were consistent with the temperature readings on drums 69342 and 91479.

Note: Contained in this Report is an “open item” recommendation for N3B to evaluate if any further monitoring of these drums is necessary, or appropriate.

## Team

The core team was comprised of the following individuals

- Erika Gorman: Causal Team Member, Emergency Preparedness Coordinator, N3B
- Thomas Harrison, Causal Team Member, Longenecker & Associates Reach-back
- Justin Kirkes: Causal Team Member, QA Specialist, Longenecker & Associates
- Nico Randall: Causal Team Member (part time), Environmental Field Operation Technician, N3B
- Luis Santana: Causal Team Member, Sr. Manager Facility Operations, N3B
- Gene Vitullo: Causal Team Lead, Corporate Reach-back Employee, BWXT
- Jennifer von Rohr: Causal Team Member, Environmental Professional, N3B
- David Wirkus: Causal Team Member, Director of Radiation Protection, N3B

The team worked with many individuals directly and indirectly involved in the Dome 230 events, as well as consulted with various Subject Matter Experts (SME). A complete list of contacted individuals can be found in Attachment 3.

## Methodology

A careful and in-depth review of the sequence of events (timeline), and the barriers (barrier analysis) that could or should have prevented the events contained in this report. The “5 Why” process was a key tool used to identify the causal factors.



## Barrier Analysis

Based on the information collected during the causal analysis, and based on discussions with individuals involved with the Dome 230 events, the team identified barriers that could have prevented the problems identified in this report. The analysis identifies whether barriers were present, absent, effective, or ineffective.

Barrier	Type of Control	Analysis – Present? Effective? Absent?	Why was it Effective and or Ineffective?	Potential Cause?
Formal Re-entry and Recovery Procedure	Administrative	Absent	N/A	N3B does not have a formal documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities.
Pre-Job Briefing	Administrative	Present – Partially Effective	IH personnel briefed the plan and actions to be taken but did not document a formal pre-job brief.  Pest Control crew did receive a formal pre-job brief but did not cover access prohibition to Dome 230.	Dome 230 access restrictions were not covered during the pre-job brief and Dome 230 was entered without authorization (Pest Control incident). IH personnel assumed access granted at OpsCenter to perform scheduled POD activity including access to Dome 230.
Pause/Stop Work Procedure	Administrative	Present – Partially Effective	RCRA Inspector did not immediately pause, leave the area, and notify the Ops Center.	RCRA Inspectors try locating the source of the smell.
Building Emergency Plan (BEP) Procedure	Administrative	Present – Partially Effective	BEP states that when an emergency occurs workers should contact 911, then the OpsCenter.	BEP does not provide guidance for contacting 911 for a chemical exposure with symptoms/injuries.
Posting/Signage	Administrative	Present – Ineffective	Sign was placed on the facility, but could have provided more specificity on entry approvals.	IH personnel assumed access granted at OpsCenter to perform scheduled POD activity included access to Dome 230.  Escort for Pest Control crew did not adhere to the requirements of posted signage.
Emergency Response Procedure	Administrative	Present - Effective	Emergency Response Procedure was adhered to, once initiated.	Procedure does not contain recovery guidance.

Barrier	Type of Control	Analysis – Present? Effective? Absent?	Why was it Effective and or Ineffective?	Potential Cause?
Escort Responsibilities (Pest Control Incident)	Administrative	Present – Ineffective	Multiple controls were in place but not adhered to.	Escort failed to read and sign Shift Order for Dome 230 Access Prohibition and thoroughly brief Pest Control crew on the facility's changed conditions and access prohibition to Dome 230.
Chemical Management Procedure	Administrative	Present – Ineffective	Workers failed to call 911 immediately after a chemical related exposure	Workers failed to recognize the significance of an abnormal odor and immediate symptoms in one of the workers.
Material Release or Spill Procedure	Administrative	Present – Effective	Material Release or Spill procedure was adhered to once initiated.	N/A
Senior Supervisory Watch (SSW)	Administrative	Present – Effective	SSW focused on technical aspects of evolution and overall oversight.	N/A
Service Authorization and Work Agreement (SAWA)	Administrative	Present - Partially Effective	Lacks specifications for equipment needs and emergency procurement or rental.	SAWA lacks a “rapid” procurement and rental process to obtain critical emergency response equipment during and immediately following an emergency.
Los Alamos Fire Department (LAFD) Emergency Response	Administrative	Present – Partially Effective	Inaccurately communicated radiological monitoring data from Dome 230.	Unknown, LAFD responsibility to assess.
N3B Industrial Hygiene Monitoring Capability	Administrative	Present – Partially Effective	S&H was unable to execute comprehensive atmospheric monitoring for VOCs in a timely manner. S&H only had one working PID, and the requisite Draeger tubes were expired.	Inadequate facility hazard assessment, and comprehensive suite of VOC monitoring equipment unavailable, for plausible chemical events.

## Extent of Condition

Without an adequate and comprehensive facility hazard assessment for the plausibility of exposure scenarios associated with N3B processes and operations, vulnerabilities will remain where necessary monitoring equipment will not be available (or capable of being rapidly sourced) for immediate response to those plausible events.

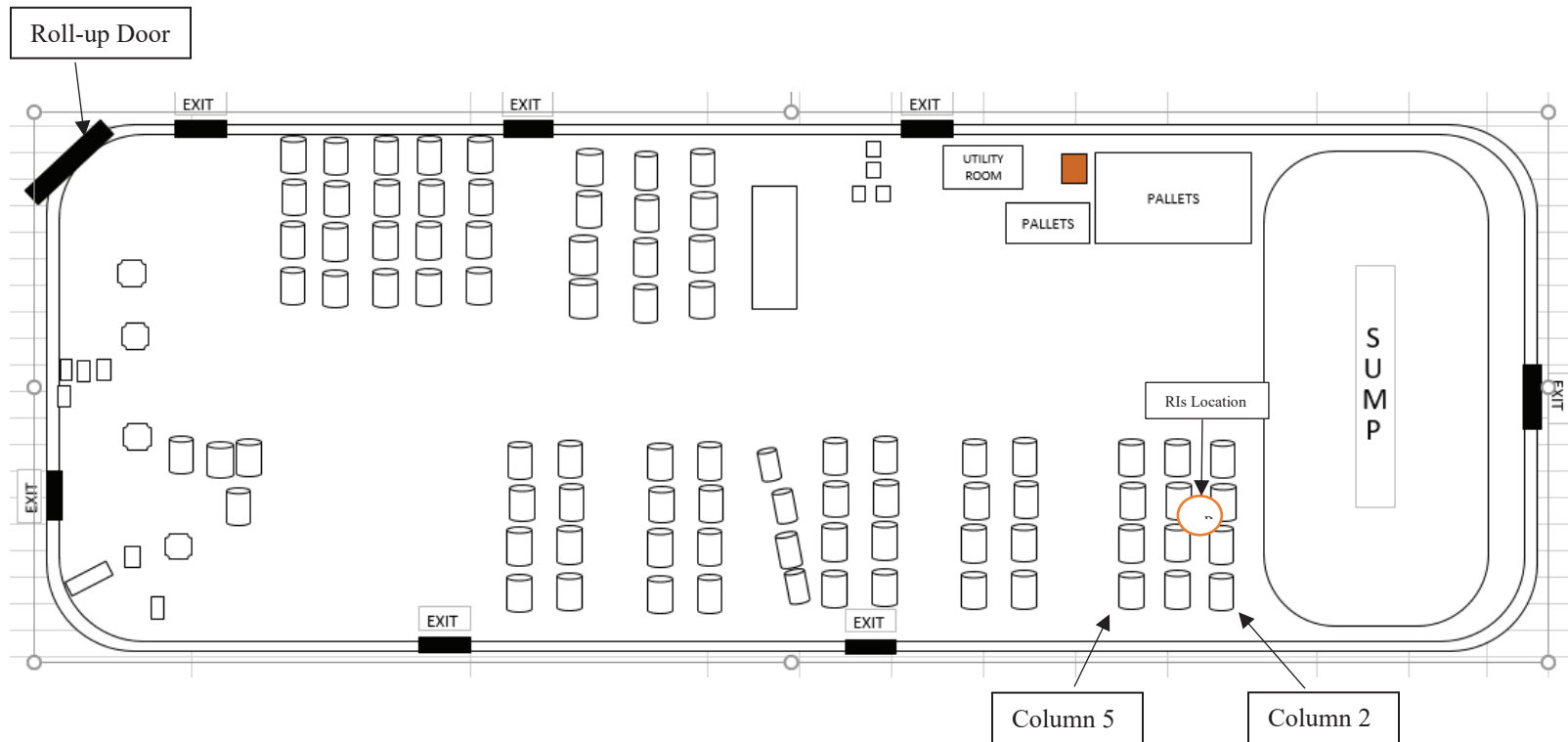
## Extent of Cause

N3B lacks a formal documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities. Absent effective corrective measures for issues identified in this report, N3B is likely to repeat similar problems and causes in the future.

## Open Items

- (1) The RCA Team was informed by one of the RCRA Inspectors that blood was drawn by medical responders on the way to the hospital. This was the only patient who had blood drawn based on interviews, and witness statements. The patient who had the blood drawn volunteered to check to see if the blood was analyzed, and provide that information to N3B OccMed. The patient contacted LAFD and was told that the person who could provide that information would not be available until July 08, 2023. Finding out if the blood drawn was actually analyzed, and if so, the results could provide additional valuable information on the exposures. Obtaining this information must be done following all of the requirements of The Health Insurance Portability and Accountability Act.
- (2) Scenario (3) of the Chemical Exposure Source Scenarios section of this Report recommends N3B S&H evaluate if any further monitoring of the two specific drums noted to have VOC readings at the drum vents is necessary, or appropriate. The N3B S&H Director should formally resolve the need for performing additional monitoring of drums 69342 and 91479, between columns 2 and 5 in Dome 230.

## Attachment 1: Dome 230 Site Map



## Attachment 2: Individuals Interviewed

Name	Title	Organization
Erica Lopez	Occupational Case Management Specialist	N3B CH-TRU
Rosa Angus	Environmental Field Operations Tech	N3B CH-TRU
Ellen Gammon	Senior Director, Waste Management	N3B CH-TRU
Nico Randall	Environmental Field Operations Tech	N3B CH-TRU
Luis Rivera	Industrial Hygienist	N3B CH-TRU
Randy Martinez	Senior Supervisor, Regulatory Compliance	N3B CH-TRU
Nichole Lundgard	ENS Program Manager	N3B CH-TRU
Alice Doswell	BWXT Corporate Reach-back	BWXT
Robert Macfarlane	EHS&Q Program Manager	N3B CH-TRU
William Reed	Manager, Safety & Health	N3B CH-TRU
Luis Rivera	Industrial Hygienist	N3B CH-TRU
Zachary Martinez	Nuclear Operator	N3B CH-TRU
Gail Helm	Facility Operations Director	N3B CH-TRU

### Attachment 3: Documents Reviewed

Number	Document Title	Revision	Notes
N3B-AOP-TRU-3003	<i>Material Release or Spill</i>	0	
N3B-AP-P300	<i>Integrated Work Management</i>	1	
N3B-AP-P300-1	<i>Integrated Work Control Process</i>	1	
N3B-AP-TRU-1001	<i>General Site Hazards and Controls</i>	0	
N3B-AP-TRU-1002	<i>Access Control</i>	4, IPC-1	
N3B-AP-TRU-1101	<i>Pre-Job Briefings</i>	1	
N3B-BEP-TRU-3001	<i>TA-54 East Building Emergency Plan (BEP)</i>	2	
N3B-DI-HIS-0014	<i>Industrial Hygiene Air, Swipe and Bulk Sampling/Monitoring</i>	0	
N3B-DOP-TRU-1219	<i>RCRA Inspections and Notifications</i>	3	
N3B-ERD-54-230-00593	<i>Evaluation of Dome 230 Radiological and Industrial Hygiene Data</i>	0	
N3B-ERP-TRU-3002	<i>Emergency Response</i>	0	
N3B-Form-6177	<i>Event Report</i>	1	Title of Events: Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230; Follow-up Action to an Abnormal Odor at TA-54, Area G, Dome 230; Three Individuals Enter Dome 230 for Pest Control Activities While the Dome is Posted as "NO ENTRY";
N3B-Form-6159	<i>Eye Witness Statement Interview Form</i>	0	21 individual statements collected
N3B-P101-14	<i>Chemical Management</i>	0	
N3B-P101-19	<i>Safety Signs, Labels and Tags</i>	0	
N3B-P102-2	<i>Occupational Injury and Illness Response, Reporting and Investigation</i>	0	
N3B-P315	<i>Conduct of Operations Manual</i>	0	
N3B-P322-1	<i>Causal Analysis and Corrective Action Development</i>	0	
N3B-P322-4	<i>Issues Management</i>	1	
N3B-POL-ESH-0003	<i>Hazard Communication and Chemical Hygiene Plan</i>	0	
N3B-POL-QAT-0019	<i>Notification, Investigation and Learning from Events</i>	2	
N3B-SOP-RP-0005	<i>Radiological Emergency Response</i>	1	
WT-2023-0387	<i>Perform Reconnaissance-Level Radiological and Industrial Hygiene Surveys in Dome 230</i>	0	

#### Attachment 4: Acronym List

BEP	Building Emergency Plan
CO	Carbon Monoxide
DOE	Department of Energy
EM-LA	Environmental Management – Los Alamos
ENS	Engineering & Nuclear Safety
EOSC	Emergency Support Emergency Operations Center
ERP	Emergency Response Procedure
ESH&Q	Environmental, Safety, Health and Quality
FOD	Facility Operations Director
FOM	Facility Operations Manager
H <sub>2</sub> S	Hydrogen Sulfide
HERTR	High Energy Real Time Radiography
HWFP	Hazardous Waste Facility Permit
IH	Industrial Hygiene
IRC	Incident Response Commander
LAFD	Los Alamos Fire Department
LAMC	Los Alamos Medical Center
LEL	Lower Explosive Limit
N3B	Newport News Nuclear and BWXT
NDA	Non-detectable Activity
NMED	New Mexico Environmental Department
OccMed	Occupational Medicine Organization
OpsCenter	Operations Control Center (N3B)
ORPS	Occurrence Reporting and Processing of Operations Information
OSHA	Occupational Safety & Health Administration
PIC	Person in Charge
PID	Photo Ionization Detector
POD	Plan of Day
RadCon	Radiological Controls
RCA	Root Cause Analysis
RCRA	Resource Conservation and Recovery Act
RIs	RCRA Inspectors
RP	Radiation Protection
S&H	Safety and Health
SAWA	Service Authorization Work Agreement
SME	Subject Matter Expert
SOM	Shift Operations Manager
SSW	Senior Supervisory Watch
TRC	Total Recordable Cases
Triad	Triad National Security, LLC
VOC	Volatile Organic Compounds
WIPP	Waste Isolation Pilot Plant

IM Action					
<b>Details</b>					
<b>Generated From</b>			<b>System Identifier</b>		
N3B-IM-2023-0390			IMA-2023-0560		
<b>Current State</b>			<b>Responsible Organization</b>		
Implementation			CH-TRU		
<b>Action to be performed</b>					
Investigate the issues/gaps associated with obtaining equipment and materials when using the SAWA agreement during emergency events that did not work as expected during the Dome 230 event.					
<b>Action Closure Requirements</b>					
Provide results of investigation of issues/gaps associated with obtaining equipment and materials when using the SAWA agreement.					
<b>Originator</b>			<b>Originator's Organization</b>		
Anne Forde - 361875			Environment, Safety & Health		
<b>Date Created</b>			<b>Due Date</b>		
07/06/2023 13:37 MDT			11/01/2023		
<b>Date Implementation Complete</b>	<b>Days Open</b>				
	83				
<b>Actions Taken</b>					
<p>Triad can only provide resources based on what is outlined in the SAWAs. The SAWAs themselves are not binding as in Triad and N3B does not have to provide any services in the agreements if they do not have the resources. When Triad or N3B ask for a service that is not explicitly outlined it might require Group or Division Leader Approval prior to providing support. N3B IMO is working with Triad IMO to determine methods to fast track resource approvals when an emergency occurs.</p> <p>The N3B Interface Office will provide SAWA briefings (see attached) to all CH-TRU/ER relevant personnel and define what is and is not in scope when processing requests with Triad and inform them on the process for added scope to a SAWA. Attached is OE for closure.</p>					
<b>Action Owner</b>			<b>Issue Owner</b>		
Erik Loechell - 234183			Gail Helm - 114849		
<b>Type</b>			<b>Causal Analysis Lead</b>		
Corrective			Thomas Harrison - 353050		
<b>Long Term</b>					
N					
<b>Applicable Causes</b>					
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>	
IMC-2023-0070	A2	Equipment / Material Problem	Root		
<b>Comments</b>					
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>
1	Loechell, Erik	08/09/2023	16:11	Implementation	Implementation Task Completed.
2	Helm, Gail	08/09/2023	16:16	Verify Action	Verify Action Task Completed.
3	Palalon, Chris	08/31/2023	16:52	Implementation	EMRB approved to roll back this action on 8/31/23 to add more OE.
4	Palalon, Chris	08/31/2023	16:52	Rollback	Task rolled back from MRB Review to Implementation: Action Owner identified that action closure requirements have not been met
5	Loechell, Erik	09/05/2023	06:10	Implementation	Conducting Manager/Director Annual SAWA Review on the October Director meeting.
<b>Notifications</b>					
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>			
Anne Forde - 361875	Y	N			



Due Date Change Requests							
Identifier	Reason for Change	Original Date	Proposed Date	Disposition			
	EMRB	08/16/2023	11/01/2023	Approved			
N3B-IM-2023-0390-07-CHG01	approved to extend this action to 11/1/23 to add more OE on 8/31/23.						
Workbook							
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On	
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 13:37 MDT	Forde, Anne	07/06/2023 13:37 MDT	
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 13:37 MDT	AUTO-GENERATED	07/07/2023 15:12 MDT	
Implementation	Completed	Loechell, Erik	AUTO-GENERATED	07/07/2023 15:12 MDT	Loechell, Erik	08/09/2023 16:11 MDT	
Verify Action	Completed	Helm, Gail	Loechell, Erik	08/09/2023 16:11 MDT	Helm, Gail	08/09/2023 16:16 MDT	
Quality Review	Skipped		Helm, Gail	08/09/2023 16:16 MDT	Helm, Gail	08/09/2023 16:16 MDT	
PAAA Review	Skipped		Helm, Gail	08/09/2023 16:16 MDT	Helm, Gail	08/09/2023 16:16 MDT	
MRB Review	Cancelled	EMRB	Helm, Gail	08/09/2023 16:16 MDT	Palalon, Chris	08/31/2023 16:50 MDT	
Implementation	Working	Loechell, Erik	Palalon, Chris	08/31/2023 16:50 MDT			
Attachments					Uploaded By		Date Uploaded
LA-UR-22-29348 SAWA Briefing.pdf					Loechell, Erik		08/09/2023 16:09 MDT
Interface Agreements with N3B_MO Contractor_2022 INTERNAL.pptx					Loechell, Erik		08/09/2023 16:11 MDT
EMRB Closure Review Meeting Minutes 8.31.23.pdf					Palalon, Chris		08/31/2023 16:51 MDT

# LA-UR-22-29348

Approved for public release; distribution is unlimited.

**Title:** Service Agreement/Work Authorization (SAWA) 2022 Refresher/Awareness Briefing

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Ethridge, Tori Marie  
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**Intended for:** Presentation

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# Service Agreement/Work Authorization (SAWA) 2022 Refresher/Awareness Briefing

## Triad's EM/N3B Interface Management Office (IMO):

- Greg Juerling
- Craig Douglass
- Taylor Valdez
- Tori Ethridge

## NNSA Oversight \_\_\_\_\_:

- Darlene Rodriguez
- Kevin Wallace

**August 2022**



Managed by Triad National Security, LLC, for the U.S. Department of Energy's NNSA.

# Agenda

## 1. Work Authorization

*Greg Juerling*

- SAWA Business Model
- SAWA Content/Services
- SAWA Change Process

## 2. Access and Operational Control

*Craig Douglass*

- Definitions
- OCA Process

## 3. Information Requests/Transfers

*Taylor Valdez*

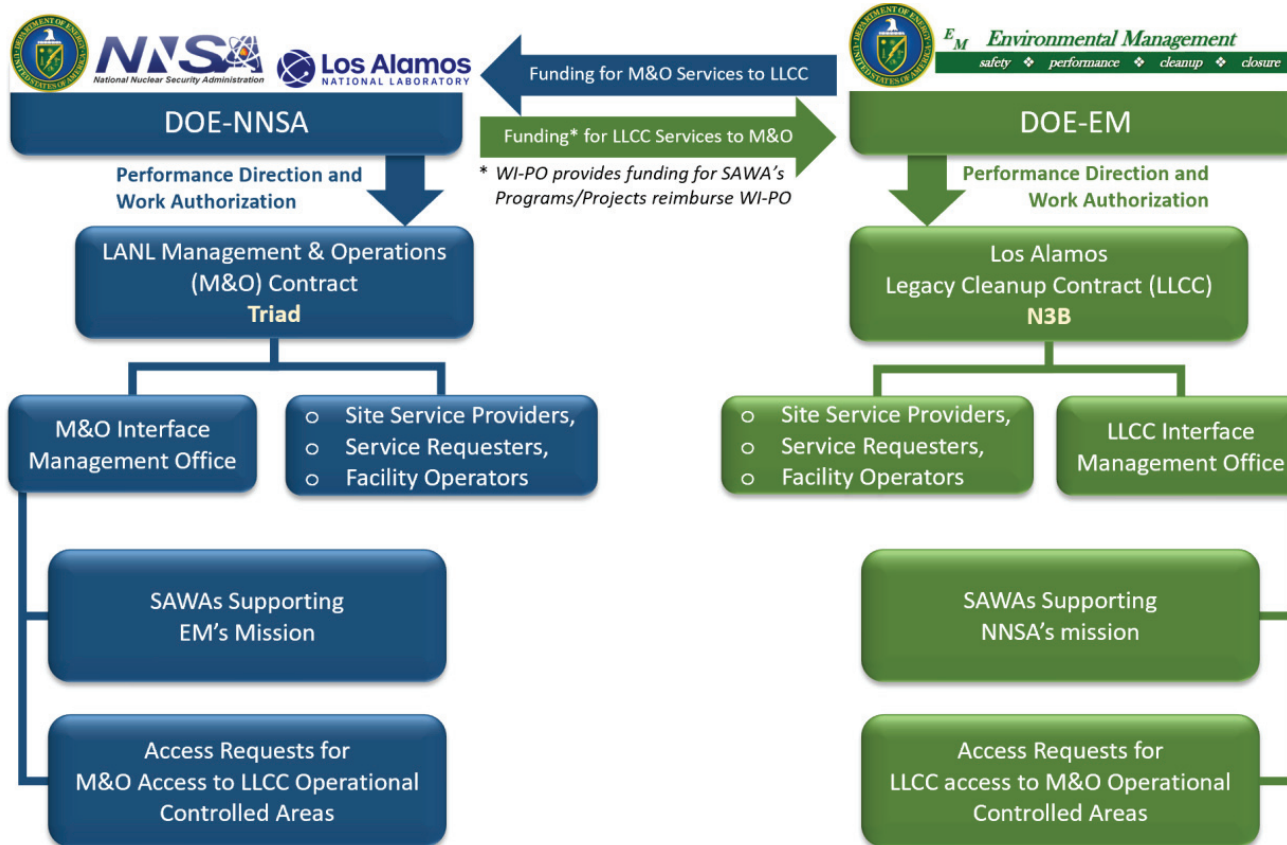
- Types
- Transfer Process

## 4. Fiscal Planning and Status Reporting

*Tori Ethridge*

- FY Planning
- Status Reporting
- Triad Reporting
- N3B Reporting

# SAWA Business Model



- ❑ **Weekly IMO meetings are held on Tuesday and Thursday @10am**
- ❑ **Technical SMEs attend based on meeting agenda items**

# SAWA – Contents

- 12 SAWAs authorize Triad to provide services to N3B – ~\$15M/year
- 2 SAWAs authorize N3B to provide services to Triad – ~\$0.5M/year

## Table of Contents

Introduction..... 3

1 Period of Authorization, Total Estimate, and Scope of Work..... 4

1.1 General Principles and Coordination Responsibilities..... 4

1.2 Instrument Calibration Services..... 5

1.3 Dosimetry and Health Physics Analysis Laboratory (HPAL) Support..... 6

1.4 Radiological Control Technician Qualification ..... 8

2 Service-Specific Points of Contact..... 9

3 Issue Resolution..... 10

4 Deliverable Schedule..... 10

5 Service Cost Basis ..... 11

Modification History..... 12



# SAWA – Triad Services

**M&O services to the EM Mission** (0xx) *reflects the SAWA where services are authorized*

## ❑ **Site Wide Cost Share\* Services:**

- Emergency Management (001)
- Security & Safeguards (002)
- Environmental Permits and Data Sharing (003)
- Primary Utilities, Roads & Grounds (005)
- Infrastructure Planning and GIS Mapping (005/009)
- Communication Infrastructure & Networking (007)
- Training (GET and refreshers) (007)
- Medical Services (011)
- Interface Management Office\*\* (009/012)

\* *The Cost Share ratio is defined as:  
N3B headcount / (Triad+N3B headcount)*

\*\* *IMO costs are shared 50/50*

## ❑ **Direct Charge Services:**

- Wildland Fire Fuel Mitigation on EM property (001)
- Fire Alarm Upgrade support (001)
- After Hours Security (002)
- Regulatory compliance and coordination (003)
- Radiation Protection Support and RCT Quals (004)
- Facility and Operations requests (005/006)
- Network Infrastructure special requests (007)
- WCATS Support (008)
- RANT Loading Services (008)
- LLW NDA Services (008)
- Cultural Services (009)
- Scoping and estimating for new services (012)
- Short Term Services (012)

# SAWA – N3B Services

## LLCC services to the NNSA Mission (001)

- Water Sampling Support Services
- Low-Level Waste Disposal Service – Pit 38
- TRU Waste Services
  - Storage and container movement
  - Payload builds for shipping to WIPP
  - Container Remediation
- Limited-Term non-TRU Waste Storage Services at Area L
- Flanged Tritium Waste Container (FTWC) Support Services
- Regulatory Interface and Coordination Services

**The majority of N3B services are for dispositioning TRU Waste**

## Access Control (002)

# Change Process – Definitions

## SAWA Modifications

- ❑ An SCR Package is required for scope changes and forms the basis for a Modification. It consists of:
  - 1) a completed SCR form,
  - 2) a redline of the SAWA,
  - 3) a cost estimate, and
  - 4) an updated SCTR accounting for the change.
- ❑ SAWAs can only be changed by a **Modification**.
- ❑ A **Modification** for Total Estimate changes, Period of Authorization Changes and Administrative changes such as language clarifications, Point of Contact (POC) changes, ***do not require an SCR***.
- ❑ An approved **STS** requires NNSA and EM Contracting Officers approval only and is incorporated as a Modification into M&O-012.
- ❑ An approved **ANE** requires NNSA and EM Contracting Officers approval only and incorporated as a Modification into the SAWA where scope is authorized.

### *Definitions defined in M&O-012*

- SAWA Change Request (SCR)
- Modification
- Short Term Service (STS) Request
- Authorized, Not Estimated (ANE) Request
- SAWA Cost Tracking Report (SCTR)

# Change Process – New Scope

## Steps for N3B to add a new service:

1. New Scope is requested by N3B through an SCR or STS
2. Triad provides NNSA a recommendation for responding to request
3. NNSA COR/CO concurs with recommendation or provides alternate direction
4. Triad prepares response to N3B SCR (SAWA codes are charged)
5. N3B and Triad requesters/providers sign SCR
6. Triad prepares Modification
7. N3B and EM approve Modification
8. Triad and NNSA Approve Modification

### Philosophy for providing services to EM/N3B:

- When there is no impact to mission,
- The lab risk profile doesn't change, and
- It is in the best interest of the government

*This process is reciprocated when Triad wants a new service from N3B*

# Access and Operational Control

## Separation of Field Activities

- ☐ Due to differing contractual requirements each Contractor must have Primary Work Control Authority over their own field work and areas of operation
- ☐ Accomplished through Access Agreements (transient daily tasks) or transfers of Operational Control for both long term Operations or short-term (Intermittent) Operations

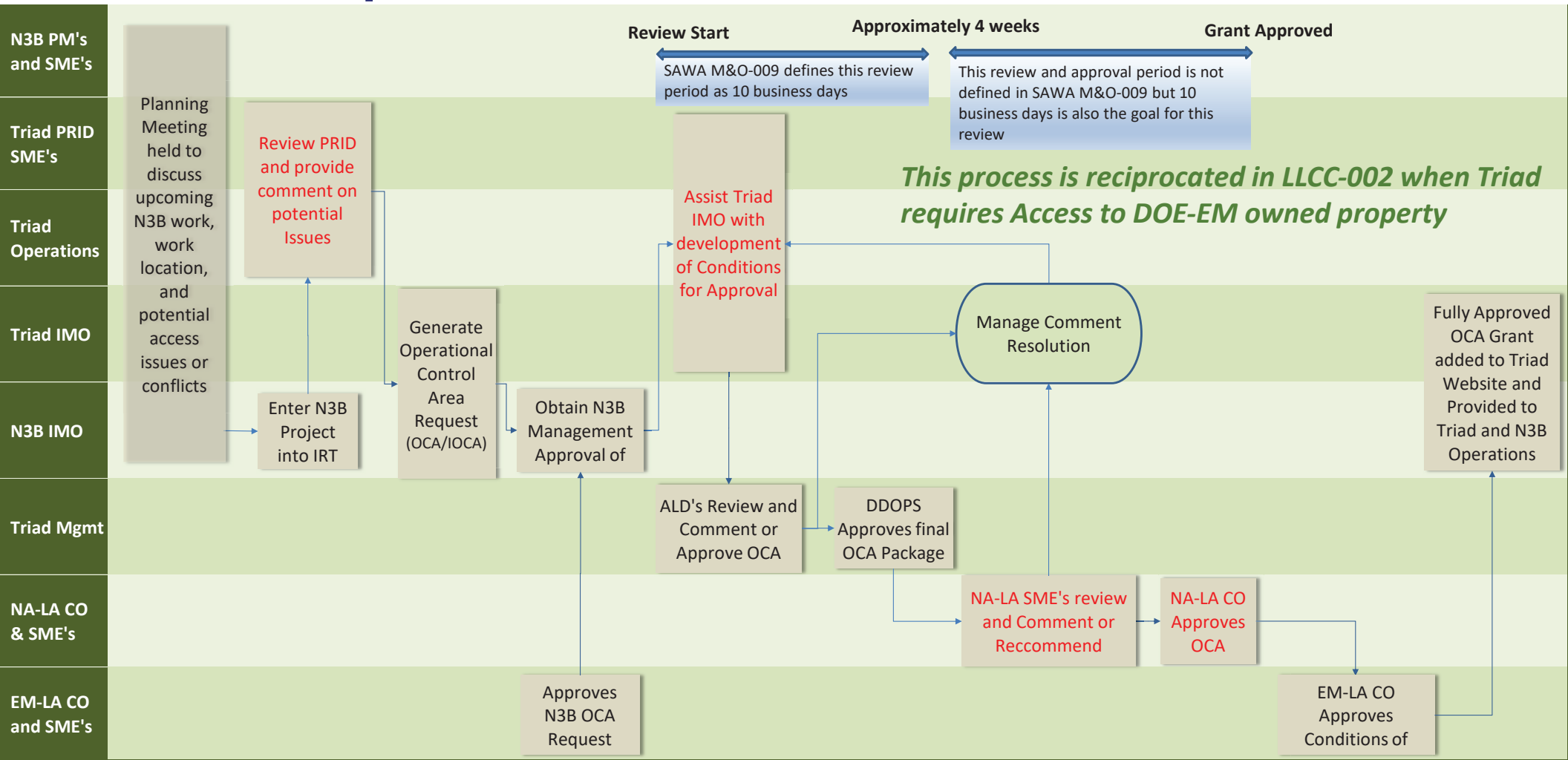
## Access Agreements

- ☐ Required for Low Hazard, transient work being conducted in the other Contractor's Operational Control Areas
- ☐ Approved by the Facility Operations Directors
- ☐ Require coordination through Operations Plan-of-the-Day schedules

## Operational Control Area Agreements

- ☐ Required for Moderate and High Hazard work being conducted in the other Contractor's Operational Control Areas
- ☐ Processed by the Interface Offices on behalf of the affected Operations Organizations.
- ☐ Include Intermittent Operational Control Areas in cases when complete turnover of an area is not feasible.
- ☐ OCA Boundaries captured in a GIS Layer so that site-wide SME's can assist with planning (PRID/ExID)

# Access and Operational Control – OCA Process



# Information Requests/Transfers – Types

Typical information requests N3B is authorized for in the following SAWAs:

## ❑ M&O-001

- N3B email address input to Oracle for emergency notifications

## ❑ M&O-007

- “UTrain” Training Transcripts for former Triad Employees
- *\*Historical Records (A single request from N3B can be for 1 file to over a 100 files)*
- *\*Copies of Training Material*
- Cryptocard requests

## ❑ M&O-0012

- *Process clarifications*
- *\*Meeting Actions*

- **An information request log is maintained for requests with a “\*”**
- **Other requests are processed through email distribution lists**

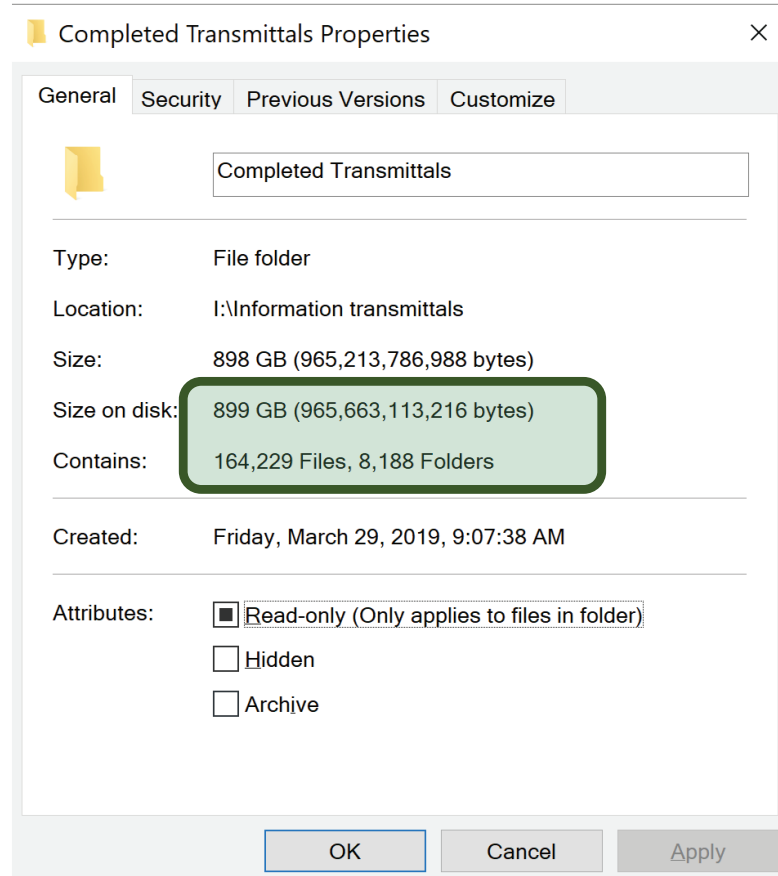


# Information Requests/Transfers – Transfer Process

## Process used to transmit information from Triad to N3B:

- ☐ Perform an EDRMS search or request file(s) from owning organization
- ☐ Data is reviewed by a Derivative Classifier prior to transmitting. The IMO does not handle classified data.
- ☐ Proper Markings are placed on CUI documents (UCNI, OUO, PII, etc.)
- ☐ Data is transmitted to N3B using a transmittal form that requires N3B to acknowledge limitations of use of the information:
  - N3B must protect information from unintended release,
  - N3B has an independent duty to verify and comply with all legal requirements related to topics covered by transferred information, and
  - N3B agrees not to use any proprietary M&O business designations in N3B's own policies, procedures, or course materials.

# Information Requests/Transfers – Files Transferred



- Over 160K files transferred to N3B from July 2018 through June 2022
- The average turn around time is 20 days

# Fiscal Planning and Status Reporting – FY Planning

## Annual SAWA Extensions

- ❑ Planning is performed in May – August
  - Cost sharing services are based next Fiscal Year indirect budget call (May)
  - Strategy meetings are used to establish guidance for direct charge services (June)
  - Head count data is analyzed to determine Cost Share ratio (August)
  - Final Estimates are submitted August 30th for review and approval by all Four Parties (August)

### Triad Service Providers consist of:

- 3 Deputy Directorates
  - 10 ALDs
    - 43 Divisions
    - 70+ Organizations

# Fiscal Planning and Status Reporting – Status Reporting

## Status Reporting and Analysis

- ❑ Performed monthly and reported to all Four Parties
- ❑ Analysis includes:
  - Validating costs by the IMO and SAWA POCs
  - Comparison of approved estimates versus actual costs at the Task and SAWA levels
  - Funding versus total costs for all SAWAs

# Fiscal Planning and Status Reporting – Triad Reporting

## Summary Status by Task

SAWA #	Project.Task Code	Services	Approved Cumulative Estimate as of May 10, 2022	FY18 - FY21 Actual Costs	FY22 Current Month Cost (JUN)	FY22 Actual Cost thru JUN ME	Grand Total Cost (FY18 thru FY22)	Remaining Balance (Estimate less Cost)	Notes
DIRECT CHARGE	MN3B00.0003DPR0	Direct Penetrating Radiation Monitoring (DPR)	\$253,456	\$203,661	\$5,970	\$43,857	\$247,518	\$5,938	The remaining balance may not sufficiently cover the current rate of monthly expenditures

## Summary Status by SAWA

SAWA	Approved Cumulative Estimate as of 05/10/2022	2018	2019	2020	2021	2022 (thru JUN)	Cumulative Total Costs (FY18-FY22)	Remaining Balance (Estimate less Costs)
M&O-001	10,628,316	891,022	2,197,593	2,163,586	2,439,988	1,782,736	9,474,924	1,153,392
M&O-002	4,359,905	349,197	866,713	1,028,955	974,126	764,128	3,983,118	376,786
M&O-003	6,776,841	439,122	1,236,203	1,494,472	1,415,620	1,085,563	5,670,980	1,105,861
M&O-004	10,451,798	137,951	1,809,144	2,844,452	2,678,320	1,680,986	9,150,854	1,300,944
M&O-005	14,017,014	1,042,511	2,630,589	3,094,588	3,091,364	2,170,852	12,029,904	1,987,110
M&O-006	357,617	11,525	35,619	169,742	67,705	44,862	329,453	28,163
M&O-007	8,025,318	44,578	1,913,401	1,948,634	1,688,044	1,472,105	7,066,761	958,556
M&O-008	10,331,379	170,743	1,540,591	1,470,500	2,862,097	1,950,982	7,994,913	2,336,466
M&O-009	152,802		9,205	43,597	10,112	40,146	103,060	49,742
M&O-010	1,908,054	1,210,764	697,290	-	-	-	1,908,054	0
M&O-011	299,739				94,249	119,418	213,666	86,073
M&O-012	3,205,105	490,877	579,159	449,958	728,407	442,296	2,690,698	514,407
<b>Total</b>	<b>70,513,889</b>	<b>4,788,291</b>	<b>13,515,507</b>	<b>14,708,484</b>	<b>16,050,032</b>	<b>11,554,073</b>	<b>60,616,387</b>	<b>9,897,502</b>

## Funding Summary

EM AFP FUNDS vs COSTS: FY18 - FY21, and FY22 thru JUN |

Funding Account	FUNDS	CUMULATIVE TOTAL COSTS	BALANCE
EY600430E MN3B	\$62,000,000	\$58,522,086	\$3,477,914
EY6004300 MN30	\$1,630,495	\$1,606,690	\$23,805
EY6004130 MN13	\$520,641	\$487,611	\$33,030
<b>Totals</b>	<b>\$64,151,136</b>	<b>\$60,616,387</b>	<b>\$3,534,749</b>

## Funding vs Estimate:

- The Approved Cumulative Estimate reflects total funding needs
- EM provides funding incrementally throughout the FY

# Fiscal Planning and Status Reporting – N3B Reporting

## N3B Status Reporting

SAWA	Title / Services	Approved Cumulative Estimate as of June 2022	Actual Cost FY18-FY21	2022 FY YTD Through MAY	Cumulative Costs through MAY 2022	Remaining Balance
SAWA # LLCC-001	Site Treatment Plan (STP)					
	Regulatory Interface & Coordination Total	154,917	101,183	27,987	129,170	25,747
	Water Sampling					
	Water Sampling Total	192,033	38,908	27,483	66,391	125,642
	LANL TRU Waste					
	Waste Container Storage (est incl ANE-0016)	1,270,793	843,882	112,518	956,400	314,393
	Waste Container Disposal/Shipping	1,047,086	368,387	95,254	463,641	583,445
	Disposition of TRU Reclassified as LLW	1,045,226		-	-	1,045,226
	RTR For ATL-D Campaign	70,804		-	-	70,804
	Dome 231 Remediation	519,560		-	-	519,560
	Area L Storage (NNSA waste only)	629,782	143,077	(30,658)	112,419	517,363
	FTWC Safety Basis Support	283,666	154,791	7,339	162,130	121,536
	TRU Waste Total	4,866,919	1,510,137	184,453	1,694,590	3,172,329
LLCC-001 Total		5,213,869	1,650,228	239,923	1,890,151	3,323,718
SAWA M&O 012	Interface Management Office Services					
M&O-012 Total	IMO Services Total	208,736	44,139	2,094	46,233	162,503
	Grand Total For Triad Funding	5,422,605	1,694,367	242,017	1,936,384	3,486,221

FY18-FY21

Average Cost per year \$495,912

### Funding Summary:

WI-PO Funding Provided	4,436,772
Unspent Funds	Funds Less Costs 2,500,388
Unallocated funds	Funds Less Approved Estimate (985,833)

### Funding for N3B Services:

- WI-PO Funds N3B Services
- Programs/Projects Reimburse WI-PO for Actual Cost of Services

# Contact Information

## Triad Links to IMO Staff

<input type="checkbox"/> <u>Greg Juerling</u> , IMO Manager,	505-231-5935	<a href="mailto:juerling@lanl.gov">juerling@lanl.gov</a>
<input type="checkbox"/> <u>Craig Douglass</u> , Access Control Manager,	505-231-9478	<a href="mailto:craigd@lanl.gov">craigd@lanl.gov</a>
<input type="checkbox"/> <u>Taylor Valdez</u> , Professional Staff Assistant	505-231-2850	<a href="mailto:tvaldez@lanl.gov">tvaldez@lanl.gov</a>
<input type="checkbox"/> <u>Tori Ethridge</u> , Financial Analyst	505-695-6942	<a href="mailto:triley@lanl.gov">triley@lanl.gov</a>

## Triad IMO Website Links

- ☐ Home Page
- ☐ SAWAs
- ☐ SAWA Modifications
- ☐ Access Agreements
- ☐ Operational Control Area Agreements





# Interface Agreements with the M&O Contractor SAWAs

Erik Loechell

# What is a SAWA?

- **SAWA** = Service Agreement/Work Authorization
- They are simply agreements with Triad defining services provided to and for each other.
  - ❖ Best interest of the government/tax-payer (e.g. dosimetry program, existing infrastructure)
  - ❖ **Each SAWA has its own set of N3B/TRIAD Responsibilities and Instructions for execution**
    - 11 service areas from Triad to N3B
    - 2 from N3B to Triad
- Landlord-type services (Utilities, roads, badging support, GET, fire, etc.)
- Emergency management coordination
- Limited Security and Safeguard services (e.g. after-hours Pro-Force and K9)
- Regulatory cooperation
- Access control (both directions)
- Waste services (both directions)
- Limited Occupational Medicine

## Mutually beneficial services:

- Exchanged 164,000 documents between N3B and Triad to date
- Triad and N3B SME Expertise Exchange - UXO support, archeological information, environmental modeling, ACER report & PRS database
- Groundwater Well sampling for Triad in the Weapons Facility Operations (WFO) area- Triad would have to stand up their own program to do this
- Use of the Radioassay Nondestructive Testing (RANT) Facility- More efficient and regular WIPP shipments. with only MLU we would likely only have 8 shipments, not 30-ish a year
- Emergency Medical Treatment (LANL Occ. Med.)
- ANE/STS-
  - Covid-19 testing capabilities
  - Electrical service capabilities (TA-54)
  - TRU Waste Remediation Services (future)
  - LLW/MLLW and TRU waste storage and disposition services

# M&O-001 – M&O-012 (Triad Support to N3B)

- M&O-001: Emergency Management Services and Fire Protection
- M&O-002: Security and Safeguard Services
- M&O-003: Environmental Services
- M&O-004: Limited Radiation Protection Support Services
- M&O-005: Facility Operations Support Services
- M&O-006: Facility Management Support Services
- M&O-007: Business Management Services
- M&O-008: Waste Support Services
- M&O-009: Access Control, Data Management and Cultural Preservation Support Services
- ~~M&O-010: Short Term Services Expiring Before January 2019~~ – Transition
- M&O-011: Emergency Medical Services
- M&O-012: Interface Management Office Services

- LLCC-001: N3B Support Services to Triad
  - Limited water sampling
  - Low-Level Waste Disposal Services – Pit 38
  - Transuranic (TRU) Waste Services
  - Limited-Term non TRU Waste Storage Services at Area L
  - ANE-0054: Disposition of Triad TRU Reclassified LLW/MLLW
  - Flanged Tritium Waste Container (FTWC) Support Services
  - **Regulatory Interface & Coordination**
    - PRS/IP review, Triad project review for impacts to N3B projects or sites
- LLCC-002: Access Control and Coordinated Data Services
  - Access control support services: Operational Control Areas Requests (i.e OCA's/IOCA's)
  - Incident Reporting/Event Notifications
  - Site-Specific Training

- Emergency Response
- Emergency Notification
- Emergency Preparedness and Coordination (including COOP)
- LAFD Integration (Engineering & Nuclear Safety Interface)
- Wildfire Management
- Emergency Explosive Ordinance Disposal
- Fire Protection Program Integration (Engineering & Nuclear Safety Interface)
- Continuity of Operations Program Coordination Services

- Physical Access and Security
  - Pro Force services by request, truck inspection
  - Central Alarm Station (CAS) for Emergencies
  - Software update and access list updates for badge readers (Apollo system)
- Personnel Security and Security Planning Services
  - Security badge issuance, including annual security training
  - Security coordination
- Safeguard Services
  - LAMCAS updates for NMC&A program
  - Provide training for NMC&A
  - Provide hard copy LAMCAS reports
- Information Protection Services
  - Derivative classification (DC) review
  - Protection of sensitive materials N3B may encounter
  - Establish temporary limited area (LA)

- Triad and N3B will coordinate their activities so that environmental regulatory programs are effectively managed for NNSA and DOE-EM
- The Contractors will copy each other on transmissions of environmental communications to NMED, EPA, NNSA and/or DOE-EM, or other regulators, that could impact operations of one another
- The Contractors will share environmental data with each other
- **Each Contractor is responsible for their own compliance**
- Each Contractor will inform the other regarding:
  - Activities that could potentially impact the compliance status of the other
  - Any interactions with regulators that could impact the other Contractor
  - Any actions that effect changes to state or federal law (including advanced coordination of comments to be submitted or discussions with regulators on proposed regulations or standards)
  - Proposed interpretations of requirements that impact environmental compliance programs within the Laboratory



- M&O-003 spells out each contractor's services and obligations
  - Note in particular Section 5 – Deliverable Schedule
- Services/Coordination includes:
  - Air Monitoring Services (Rad NESHAP)
  - Air Permit Management Services
  - Threatened and Endangered Species Survey Services
  - Environmental Data Integration and Consolidated Reporting (EDI/CR) Services
    - Annual Site Wide Environmental Report (ASER)
    - NEPA – SWEIS Yearbook and MAPAR
    - EPCRA
    - 2020 Biennial Report
  - Water Sampling Support Services
  - Regulatory Interface and Coordination Services
  - Meteorology Tower Maintenance and Data Sharing Services
  - Limited Supplemental Environmental Project (SEP) Equipment Services
  - Biological Assessment Services
  - Nest Survey Services
  - TA-54 Area G Soil, Foodstuffs, and Biota Monitoring Services
  - Non-Certified Laboratory Analytical and Experimental Services and Model Consulting

- Instrument calibration (RP instruments and eCAMs)
- Radiation Protection Program Services
  - TLDs
  - Bioassay
- Dosimetry and Health Physics Analysis Laboratory (HPAL) Support
- Radiological Control Technician Qualification

- Site-wide Primary Utilities
  - We are responsible past the tie-in at our areas of operational control (secondary)
  - Does not include TA-21
- Utility Locates and Ground Penetrating Radar (GPR): [utilitylocators@lanl.gov](mailto:utilitylocators@lanl.gov)
- Site-Wide Roads Services
- Traffic Safety Plan and Vehicle Permitting
- **LANL Taxi- Site wide including Los Alamos townsite (non special events)**
- Infrastructure and facilities planning
  - Contractors will coordinate site planning activities
  - Meet at least semi-annually
  - Discuss planned changes that might impact each other's safety basis
- Excess Personal Property Disposition Services
- Gas Facility Services
- Measuring and Test Equipment Calibration Services
- Use of M&O Auditoriums

- Applies only to 03-0271 (Sample Management Office) Shared facility
- M&O provides landlord-type services:
  - Facility access, usage, maintenance and utilities
  - Existing electrical, water, waste water and gas services
  - Key and locksmith services
  - Housekeeping / custodial services including ordinary trash removal
  - Pest control

- Radio Communication Support
  - Assignment of channels, configuration of equipment
- IT Infrastructure Support
  - Limited fiber, limited yellow network access (ChemDB, GIS, PRID, WCATS)
  - Triad support to modify/expand or add functionality to programs in which N3B has access (e.g. creating special PRID workflow to support specific project areas, such as a single cultural resources review for a project)
  - M&O Administered Training
  - EOC qualifications
  - Security refresher
  - NMC&A
  - Site-specific training
  - GET
  - Computer security
- Historical Records Support
- TEMPEST
- M&O Testing
- M&O Training Materials

- Limited waste loading support
  - Specific to RANT facility
- Waste information management support
  - Host WCATS and associated infrastructure
  - Provide access to N3B personnel
- HEPA Filter Testing
  - Inspection and certification for HEPA filtration systems at TA-54
- Non-Destructive Assay
  - NMC&A Verification of LLW and MLLW
  - Verification of N3B Green is Clean (GIC) waste meets Triad standards

- Allows access and transfer of Operational Site Control
  - Operational Control Areas
  - Intermittent Operational Control Areas
  - Access Control
- GIS, PRS access
- LLCC-002 Provides reciprocal access and Operational Site Control transfer

- Emergency Medical Services

Triad's responsibilities for provision of this service are to:

- Provide emergency medical services at the OM clinic to any employee of N3B or its critical subcontractors (Tech2 Solutions and Longenecker and Associates) that has an onsite injury or other emergency medical issue, on the same basis that it provides such services to Triad employees and its subcontractors.
  - **Triad Random COVID testing services under STS-0022** (N3B only)
  - **COVID-19 Decontamination Services under STS-0014**



- Defines Triad and N3B Interface Office roles
- SAWA Change Request (SCR)/modification process
- Short Term Services (STS) (6 months or less)
- Authorized, Not Estimated (ANE)



What is the time-frame for approvals?

- Depends on complexity, level of service or multiple organizational involvement, scope and cost



What is the process for these Services?

- Define Scope, Time-frame (need by), Estimate
  - 4-party approval with Triad, NA-LA, EM-LA and N3B

# I don't see [....] How do I get it added to the SAWAs

18

- Requires detailed scope of work, justification, estimate
  - **Efficiency or convenience for N3B is usually not a sufficient justification (not an easy button, should self-perform)**
  - Overall site efficiency
  - M&O only reasonable provider
- Requires approval by:
  - Program Manager
  - Deputy Lab Director
  - NA-LA Contracting Officer
  - EM-LA Contracting Officer
- Plan ahead – approval will take several weeks

# How do I engage the M&O for a SAWA Service?

- Contact N3B's internal interface office ([N3Binterface@em-la.doe.gov](mailto:N3Binterface@em-la.doe.gov))
  - Interface requests can be made through submitting a Jira ticket accessible from the top of the N3B Home on the pull down menu page under Tools, then “Internal Interface Doc. Requests”. This generates an e-mail to us with a request number for Tracking
    - » Call us!.....We will help
- A meeting may be required to clarify needs and expectations
- Execution of most services can then take place on a peer-to-peer basis
- For routine interactions, the interface office should be informed , but not necessarily involved
  - Putting the interface office on CC is usually sufficient to keep us in the loop

- Services come to us essentially as government furnished. You should not be asked for a charge code
  - The M&O will have a specific charge code for their personnel to use
  - NA-LA will use this to bill EM-LA
  - Keep an accounting of services, timeframes, and durations in case we are later asked for verification
- Services from N3B to the M&O will have a specific charge code to be used for time and expenses
  - EM-LA will use this to bill NA-LA
  - Charge code for scoping & estimating used for specific services requested by Triad
    - When the service is approved and becomes an STS or ANE, a new cost code with a budget based on the estimate will be issued

***“.....A Penny Saved is a Penny Earned!!!”***

# Is a SAWA a Contract?

- Not exactly, but...
  - Read the full SAWA for any service you want to use
    - **There are obligations on N3B as conditions for the M&O providing a service**
    - There are time constraints on many services
- We have no contractual privity with the M&O
  - “... neither Contractor has any authority, expressed or implied, to assume or create any obligation on behalf of the other Contractor...”
  - EM-LA and NA-LA will each consider support to the other contractor in determining fee
- Planning and communication are vital to getting the support you need, when you need it.



EMRB Extension/Closure Review

Date: 08-31-23

Prepared By: ERIN TAVAROSI

Accuracy/Approval: *[Signature]*

Title: CAS SPECIALIST

Title: CAS SUPERVISOR

Date: 08-31-23

Date: 08-31-23

IM Number: 1M-2022-0187-02										Comments
Voting Member										EMRB ON 08/31 DETERMINED OF OF UPDATED 409 IS REQUIRED FOR CLOSURE, ROLL BACK AND RE-ASSIGN TO ELLEN GAMMON, AND ENTER EXTENSION
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2023-0253-13										Comments
Voting Member										Darcy to email training tracking spreadsheet as additional CE. Close action per EMRB once additional CE is received
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: 1M-2022-0338-00										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2022-0338-12										Comments
Voting Member										CLOSE
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IM Number: 1M-2022-0317-00										Comments
Voting Member										ROLLBACK TO AMANDA TO ATTACH COPY OF TRAINING RECORDS W/ T23 ATTENDEES HIGHLIGHTED AS ADDITIONAL CE, THEN RE-SUBMIT FOR EMRB DENIED PROCESS EXTENSION TO 9/10/23 per GME 08/31/23
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M 2023-0390-03										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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EMRB Extension/Closure Review

Date: 08-31-2023Prepared By: ERIN TAVAKOSKIAccuracy/Approval: [Signature]Title: CAS SPECIALISTTitle: CAS SUPERVISORDate: 08-31-2023Date: 08-31-2023

IM Number: <u>117-2023-0390-07</u>										Comments
Voting Member										
ELI FOR ROBERT	DAVID	EILIDH	JESSICA FOR LARRY							ROLLBACK AND PROCESS EXTENSION TO 11-01 TO ALLOW ACTION OWNER TO UP-LOAD SUFFICIENT CLOSURE OF. ACTION OWNER SELF IDENTIFIED THAT CLOSURE REQUIREMENTS HAD NOT BEEN MET
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Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-07				Close		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
EMRB approved to extend this action to 11/1/23 to add more OE on 8/31/23.						
<b>Originator</b>				<b>Originator's Organization</b>		
Chris Mae Palalon - 374390				Environment, Safety & Health		
<b>Date Created</b>				<b>Date Closed</b>		
08/31/2023 16:53 MDT				08/31/2023		
<b>Days Open</b>				<b>Disposition</b>		
0				Approved		
<b>Rationale for Disposition</b>						
EMRB approved to extend this action on 8/31/23. Please see the attached EMRB Closure Review Meeting Minutes on 8/31/23.						
<b>Original Date</b>				<b>Proposed Date</b>		
08/16/2023				11/01/2023		
<b>Reviewer</b>						
EMRB						
<b>Comments</b>						
#	By	Date	Time	State	Comment	
1	Palalon, Chris	08/31/2023	16:54	Review	Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
Chris Mae Palalon - 374390						
Erik Loechell - 234183						
<b>Workbook</b>						
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On
Initiate	Completed	Palalon, Chris	Palalon, Chris	08/31/2023 16:53 MDT	Palalon, Chris	08/31/2023 16:53 MDT
Review	Completed	EMRB	Palalon, Chris	08/31/2023 16:53 MDT	Palalon, Chris	08/31/2023 16:54 MDT
Close	Completed		Palalon, Chris	08/31/2023 16:54 MDT	Palalon, Chris	08/31/2023 16:54 MDT
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
EMRB Closure Review Meeting Minutes 8.31.23.pdf					Palalon, Chris	08/31/2023 16:53 MDT

EMRB Extension/Closure Review

Date: 08-31-23

Prepared By: ERIN TAVAROSI

Accuracy/Approval: *[Signature]*

Title: CAS SPECIALIST

Title: CAS SUPERVISOR

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IM Number: 1M-2023-0253-13										Comments
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IM Number: 1M-2022-0338-00										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2022-0338-12										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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EMRB Extension/Closure Review

Date: 08-31-2023Prepared By: ERIN TAVAKOSKIAccuracy/Approval: [Signature]Title: CAS SPECIALISTTitle: CAS SUPERVISORDate: 08-31-2023Date: 08-31-2023

IM Number: <u>117-2023-0390-07</u>										Comments
Voting Member										
ELI FOR ROBERT	DAVID	EILIDH	JESSICA FOR LARRY							ROLLBACK AND PROCESS EXTENSION TO 11-01 TO ALLOW ACTION OWNER TO UP-LOAD SUFFICIENT CLOSURE OF. ACTION OWNER SELF IDENTIFIED THAT CLOSURE REQUIREMENTS HAD NOT BEEN MET
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IM Action				
<b>Details</b>				
<b>Generated From</b>			<b>System Identifier</b>	
N3B-IM-2023-0390			IMA-2023-0559	
<b>Current State</b>			<b>Responsible Organization</b>	
Implementation			CH-TRU	
<b>Action to be performed</b>				
N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.				
<b>Action Closure Requirements</b>				
Provide OE of comprehensive facility hazard assessment. Provide OE of necessary onsite equipment, rapid procurement and rental capabilities.				
<b>Originator</b>			<b>Originator's Organization</b>	
Anne Forde - 361875			Environment, Safety & Health	
<b>Date Created</b>			<b>Due Date</b>	
07/06/2023 13:30 MDT			09/30/2023	
<b>Date Implementation Complete</b>	<b>Days Open</b>			
	83			
<b>Actions Taken</b>				
<b>Action Owner</b>			<b>Issue Owner</b>	
Elijah Gerlach - 358766			Gail Helm - 114849	
<b>Type</b>			<b>Causal Analysis Lead</b>	
Corrective			Thomas Harrison - 353050	
<b>Long Term</b>				
N				
<b>Applicable Causes</b>				
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>
IMC-2023-0069	A2B5	Procurement Control LTA	Root	
<b>Notifications</b>				
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>		
Anne Forde - 361875	Y	N		
<b>Due Date Change Requests</b>				
<b>Identifier</b>	<b>Reason for Change</b>	<b>Original Date</b>	<b>Proposed Date</b>	<b>Disposition</b>
N3B-IM-2023-0390-06-CHG01	Additional time is needed to ensure the package gets approved (waiting on ops to update an emergency response procedure), ensuring IH staff are trained as well as needing time to compile the applicable reports from the assessment.	09/30/2023	01/25/2024	

Workbook						
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 13:30 MDT	Forde, Anne	07/06/2023 13:30 MDT
Pending Cause	Completed	Holding Tank	Forde, Anne	07/06/2023 13:30 MDT	AUTO-GENERATED	07/07/2023 15:12 MDT
Analysis						
Implementation	Working	Gerlach, Elijah	AUTO-GENERATED	07/07/2023 15:12 MDT		

Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-06				Review		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
Additional time is needed to ensure the package gets approved (waiting on ops to update an emergency response procedure), ensuring IH staff are trained as well as needing time to compile the applicable reports from the assessment.						
<b>Originator</b>				<b>Originator's Organization</b>		
Elijah Gerlach - 358766				Environment, Safety & Health		
<b>Date Created</b>				<b>Days Open</b>		
09/18/2023 17:20 MDT				9		
<b>Disposition</b>						
<b>Rationale for Disposition</b>						
<b>Original Date</b>				<b>Proposed Date</b>		
09/30/2023				01/25/2024		
<b>Reviewer</b>						
EMRB						
<b>Notifications</b>						
<b>Person</b>	<b>Closure Notice</b>	<b>Comments</b>				
Elijah Gerlach - 358766	Y	N				
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Gerlach, Elijah	Gerlach, Elijah	09/18/2023 17:20 MDT	Gerlach, Elijah	09/18/2023 17:20 MDT
Review	Working	EMRB	Gerlach, Elijah	09/18/2023 17:20 MDT		

IM Action						
<b>Details</b>						
<b>Generated From</b>				<b>System Identifier</b>		
N3B-IM-2023-0390				IMA-2023-0558		
<b>Current State</b>				<b>Responsible Organization</b>		
Implementation				CH-TRU		
<b>Action to be performed</b>						
N3B does not have a formal, documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities. Update existing facility emergency response procedures, and develop a specific comprehensive re-entry/recovery procedure.						
<b>Action Closure Requirements</b>						
Provide OE of updated facility emergency response procedures and reentry/recovery procedure.						
<b>Originator</b>				<b>Originator's Organization</b>		
Anne Forde - 361875				Environment, Safety & Health		
<b>Date Created</b>				<b>Due Date</b>		
07/06/2023 13:21 MDT				11/01/2023		
<b>Date Implementation Complete</b>	<b>Days Open</b>					
	83					
<b>Actions Taken</b>						
<b>Action Owner</b>				<b>Issue Owner</b>		
Gail Helm - 114849				Gail Helm - 114849		
<b>Type</b>				<b>Causal Analysis Lead</b>		
Corrective				Thomas Harrison - 353050		
<b>Long Term</b>						
N						
<b>Applicable Causes</b>						
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>		
IMC-2023-0068	A5B3C02	Not available or inconvenient for use	Contributing			
<b>Notifications</b>						
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>				
Anne Forde - 361875	Y	N				
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 13:21 MDT	Forde, Anne	07/06/2023 13:21 MDT
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 13:21 MDT	AUTO-GENERATED	07/07/2023 15:11 MDT
Implementation	Working	Helm, Gail	AUTO-GENERATED	07/07/2023 15:11 MDT		

IM Action					
<b>Details</b>					
<b>Generated From</b>			<b>System Identifier</b>		
N3B-IM-2023-0390			IMA-2023-0557		
<b>Current State</b>			<b>Responsible Organization</b>		
Implementation			CH-TRU		
<b>Action to be performed</b>					
Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading reported by LAFD was incorrect. The invalidated initial reading was miscommunicated as an order of magnitude higher than the actual level in the facility, which led to an unnecessary level of concern within higher levels of EM-LA and DOE-HQ. Appropriate N3B management who interface with EM-LA will communicate the issue with EM-LA for their independent review and resolution.					
<b>Action Closure Requirements</b>					
Provide communication on who/how to appropriately report issues to higher levels of EM-LA and DOE-HQ.					
<b>Originator</b>			<b>Originator's Organization</b>		
Anne Forde - 361875			Environment, Safety & Health		
<b>Date Created</b>			<b>Due Date</b>		
07/06/2023 13:14 MDT			09/28/2023		
<b>Date Implementation Complete</b>	<b>Days Open</b>				
	83				
<b>Actions Taken</b>					
<b>Action Owner</b>			<b>Issue Owner</b>		
Robert Edwards - 140278			Gail Helm - 114849		
<b>Type</b>			<b>Causal Analysis Lead</b>		
Corrective			Thomas Harrison - 353050		
<b>Long Term</b>					
N					
<b>Applicable Causes</b>					
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>	
IMC-2023-0067	A5	Communication LTA	Apparent		
<b>Comments</b>					
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>
1	Palalon, Chris	07/27/2023	16:30	Implementation	Reassigning action owner from Erika Gorman to Robert Edwards. Please see the attached email in documents as OE.
<b>Notifications</b>					
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>			
Anne Forde - 361875	Y	N			
<b>Due Date Change Requests</b>					
<b>Identifier</b>	<b>Reason for Change</b>	<b>Original Date</b>	<b>Proposed Date</b>	<b>Disposition</b>	
N3B-IM-2023-0390-04-CHG02	LAFD leadership was contacted and made aware of the incorrect reporting of radiological results. LAFD committed to inform all shifts of the event and retrain all	08/24/2023	09/28/2023	Approved	



Due Date Change Requests						
Identifier	Reason for Change	Original Date	Proposed Date	Disposition		
	shifts. EM-LA will be apprised of this by the PM for ESH&Q and determine if EM-LA requires any further follow-up.					
N3B-IM-2023-0390-04-CHG01	Extension being requested by Tom Harrison as the Cause Analysis actions were entered for 8/1/2023 originally. This will give the action owner time to complete by 8/24/23.	08/01/2023	08/24/2023	Approved		
Workbook						
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 13:14 MDT	Forde, Anne	07/06/2023 13:14 MDT
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 13:14 MDT	AUTO-GENERATED	07/07/2023 15:11 MDT
Implementation	Cancelled	Gorman, Erika	AUTO-GENERATED	07/07/2023 15:11 MDT	Palalon, Chris	07/27/2023 16:30 MDT
Implementation	Working	Edwards, Robert	Palalon, Chris	07/27/2023 16:30 MDT		
Attachments					Uploaded By	Date Uploaded
RE Action Due.msg					Palalon, Chris	07/27/2023 16:29 MDT

**From:** Robert Edwards [Robert.Edwards@EM-LA.DOE.GOV]  
**To:** Chris Mae S. Palalon [ChrisMae.Palalon@EM-LA.DOE.GOV]  
**Cc:** Thomas Harrison [Thomas.Harrison@EM-LA.DOE.GOV], Erika H. Gorman [Erika.Gorman@EM-LA.DOE.GOV]  
**Subject:** RE: Action Due  
**Sent:** Thu 7/27/2023 4:03 PM GMT-06:00  
**Importance:** Normal  
Sure. Reassign it to me.

Robert

**Robert Edwards – Program Manager**  
Newport News Nuclear BWXT Los Alamos (N3B)  
Environmental, Safety, Health and Quality  
o. 505-257-7022  
c. 505-551-2442  
e. [robert.edwards@em-la.doe.gov](mailto:robert.edwards@em-la.doe.gov)



1200 Trinity Drive, Suite 150, Los Alamos NM 87544

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**From:** Chris Mae S. Palalon <ChrisMae.Palalon@EM-LA.DOE.GOV>  
**Sent:** Thursday, July 27, 2023 10:43 AM  
**To:** Robert Edwards <Robert.Edwards@EM-LA.DOE.GOV>  
**Cc:** Thomas Harrison <Thomas.Harrison@EM-LA.DOE.GOV>; Erika H. Gorman <Erika.Gorman@EM-LA.DOE.GOV>  
**Subject:** RE: Action Due

Hi Robert,

Do you concur with this? Once you concur, I will reassign this task to you.

Thanks,  
Chris Mae

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**From:** Thomas Harrison <[Thomas.Harrison@EM-LA.DOE.GOV](mailto:Thomas.Harrison@EM-LA.DOE.GOV)>  
**Sent:** Thursday, July 27, 2023 9:59 AM  
**To:** Erika H. Gorman <[Erika.Gorman@EM-LA.DOE.GOV](mailto:Erika.Gorman@EM-LA.DOE.GOV)>; Chris Mae S. Palalon <[ChrisMae.Palalon@EM-LA.DOE.GOV](mailto:ChrisMae.Palalon@EM-LA.DOE.GOV)>  
**Subject:** RE: Action Due

Erika is correct. I did go in and re-assign it.  
Not sure why it took.  
Chris-  
Please re-assign to Robert Edwards and push the due date out two weeks please.  
Tom

**From:** Erika H. Gorman <[Erika.Gorman@EM-LA.DOE.GOV](mailto:Erika.Gorman@EM-LA.DOE.GOV)>  
**Sent:** Thursday, July 27, 2023 8:22 AM  
**To:** Chris Mae S. Palalon <[ChrisMae.Palalon@EM-LA.DOE.GOV](mailto:ChrisMae.Palalon@EM-LA.DOE.GOV)>; Thomas Harrison <[Thomas.Harrison@EM-LA.DOE.GOV](mailto:Thomas.Harrison@EM-LA.DOE.GOV)>  
**Subject:** RE: Action Due

Good morning,  
Tom Harrison was planning to reassign this to the ESH&Q PM.  
Thanks

**Erika H. Gorman**  
**Emergency Preparedness Coordinator**  
N3B Los Alamos  
c. (505) 695-8998  
e. [erika.gorman@em-la.doe.gov](mailto:erika.gorman@em-la.doe.gov)

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**From:** Chris Mae S. Palalon <[ChrisMae.Palalon@EM-LA.DOE.GOV](mailto:ChrisMae.Palalon@EM-LA.DOE.GOV)>  
**Sent:** Thursday, July 27, 2023 7:46 AM  
**To:** Erika H. Gorman <[Erika.Gorman@EM-LA.DOE.GOV](mailto:Erika.Gorman@EM-LA.DOE.GOV)>  
**Subject:** Action Due

Hi Erika,

You have an action due for **IM-2023-0390-04**. This is due on Tuesday, **8/1/23**.  
This needs to be closed or extended.  
Please let me know if there is anything I could help you with.

N3B-IM-2023-0390-04	High	Gail Helm - 114849	Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230	Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading reported by LAFD was incorrect. The invalidated initial reading was miscommunicated as an order of magnitude higher than the actual level in the facility, which led to an unnecessary level of concern within higher levels of EM-LA and DOE-HQ. Appropriate N3B
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management who  
interface with EM-LA  
will communicate  
the issue with EM-LA  
for their independent  
review and resolution

Thanks,  
Chris Mae Palalon  
Contractor Assurance Specialist  
Newport News Nuclear BWXT Los Alamos (N3B)  
Environment, Safety, Health and Quality  
c. (505) 709-7929  
e. [ChrisMae.Palalon@em-la.doe.gov](mailto:ChrisMae.Palalon@em-la.doe.gov)



1200 Trinity Dr. Suite 150, Los Alamos NM 87544

Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-04				Close		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
LAFD leadership was contacted and made aware of the incorrect reporting of radiological results. LAFD committed to inform all shifts of the event and retrain all shifts. EM-LA will be apprised of this by the PM for ESH&Q and determine if EM-LA requires any further follow-up.						
<b>Originator</b>				<b>Originator's Organization</b>		
Robert Edwards - 140278				ESH&Q		
<b>Date Created</b>				<b>Date Closed</b>		
08/23/2023 08:51 MDT				08/24/2023		
<b>Days Open</b>				<b>Disposition</b>		
1				Approved		
<b>Rationale for Disposition</b>						
EMRB voted to approve extension on 8/24/23. Please see the attached EMRB Closure Review Meeting Minutes on 8/24/23 in documents.						
<b>Original Date</b>				<b>Proposed Date</b>		
08/24/2023				09/28/2023		
<b>Reviewer</b>						
EMRB						
<b>Comments</b>						
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>	
1	Palalon, Chris	08/24/2023	15:39	Review	Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
Robert Edwards - 140278						
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Edwards, Robert	Edwards, Robert	08/23/2023 08:51 MDT	Edwards, Robert	08/23/2023 08:51 MDT
Review	Completed	EMRB	Edwards, Robert	08/23/2023 08:51 MDT	Palalon, Chris	08/24/2023 15:39 MDT
Close	Completed		Palalon, Chris	08/24/2023 15:39 MDT	Palalon, Chris	08/24/2023 15:39 MDT
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
EMRB Closure Review Meeting Minutes 8.24.23.pdf					Palalon, Chris	08/24/2023 15:39 MDT

EMRB Extension/Closure Review

Date: 08-24-23Prepared By: ERIN TAVAROSSAccuracy/Approval: [Signature]Title: CAS SPECIALISTTitle: CAS SUPERVISORDate: 08-24-23Date: 08-24-23

IM Number: <u>NSD IM-23-0153-01</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						EXTENSION TO END OF YEAR WITH NO FURTHER EXTENSION'S 12-22-25
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0166-25-CHGO4</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						09/28/ APPROVAL
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0390-84</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						09/28/23 APPROVAL
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	

ADDITIONAL ATTENDEES (NON-VOTING): ANNE FORDE, CHRIS MAE PALALON, ERIN TAVAROSS, JESSICA LUSK, NICOLE VIGIL, MIKE ERICKSON, CASSIE BROWN, ROBERT MCFARLANE

EMRB Extension/Closure Review

Prepared By: ERIN TAVAROSKITitle: CAS SPECIALISTDate: 08-24-23Date: 08-24-23Accuracy/Approval: [Signature]Title: CAS SUPERVISORDate: 08-24-23

IM Number: <u>IM-2023-0041-52</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						APPROVAL CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>IM 2023-0045-35</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>IM 2023-0045 #36</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0045-27</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0041-55</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>IM 2023-0041-46</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	

ADDITIONAL ATTENDEES (NON-VOTING): ANNE FORDE, CHRIS MAE PAKALON, ERIN TAVAROSKI, JESSICA LUSK, NICOLE VIGIL, MIKE ERRICKSON, CASSIE BROWN, ROBERT McFARLANE

EMRB Extension/Closure Review  
Date: \_\_\_\_\_

Prepared By: ERIN T. JAROSKI  
Accuracy/Approval: [Signature]

Title: CAS SPECIALIST  
Title: CAS SUPERVISOR

Date: 08/24/23  
Date: 09/24/23

IM Number: <u>1M-2023-004-08</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						ROLL BACK ADDITIONAL ACTIONS TAKEN, CLOSING REQUIREMENTS NOT MET. <del>ON HIGHLIGHT CHANGES IN DOC</del>
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>1M 2023-004-14</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						Rollback - SUPPORTING IN D.C. REVIEW
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>1M-2023-0041-24</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						CLOSE
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>1M-2023-0041-30</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						ROLLBACK FOR EVIDENCE OF EXISTING SUPPORTING TRAINING. RE-ASIGN TO JAROSKI EXTEND TO COMMENTS OCTOBER 30TH.
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>1M-2023-0041-37</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						ROLL BACK TO JESSICA PERSONAL TABLE - ELI/JESSICA WSK TO INVESTIGATE INTENT OF ACTION
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>1M 2023-0041-50</u>										Comments
Voting Member										
LARRY	DAVID	ETLIDH	ELI	ROBERT						ON HOLD. CONTACT TERRY & VINCE TO SEE IF THEY TALKED TO SEFF ABOUT PATH FORWARD.
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	



Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-04				Close		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
Extension being requested by Tom Harrison as the Cause Analysis actions were entered for 8/1/2023 originally. This will give the action owner time to complete by 8/24/23.						
<b>Originator</b>				<b>Originator's Organization</b>		
Anne Forde - 361875				Environment, Safety & Health		
<b>Date Created</b>				<b>Date Closed</b>		
07/20/2023 10:13 MDT				08/01/2023		
<b>Days Open</b>				<b>Disposition</b>		
12				Approved		
<b>Rationale for Disposition</b>						
EMRB voted to approve this extension on 8/1/23.						
<b>Original Date</b>				<b>Proposed Date</b>		
08/01/2023				08/24/2023		
<b>Reviewer</b>						
EMRB						
<b>Comments</b>						
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>	
1	Palalon, Chris	08/01/2023	17:08	Review	Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
Anne Forde - 361875						
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Forde, Anne	Forde, Anne	07/20/2023 10:13 MDT	Forde, Anne	07/20/2023 10:13 MDT
Review	Completed	EMRB	Forde, Anne	07/20/2023 10:13 MDT	Palalon, Chris	08/01/2023 17:08 MDT
Close	Completed		Palalon, Chris	08/01/2023 17:08 MDT	Palalon, Chris	08/01/2023 17:08 MDT
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
EMRB Closure Review Meeting Minutes 8.1.23.pdf					Palalon, Chris	08/01/2023 17:08 MDT

# Extension

EMRB Extension/Closure Review

Prepared By: Anne Fride

Title: CAS Specialist

Date: 8/11/2023

Date: 8/11/2023

Accuracy/Approval: Larry Dell

Title: CAS Senior Advisor

Date: 08/10/2023

IM Number: <u>2020-051-03 CHGS</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						9/28/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0054-01</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						9/28/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0390-02</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						10/27/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0409-11</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						08/31/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>Im-2023-0041-38</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						09/29/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0041-07</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						09/29/23
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	

Extensions

EMRB Extension/Closure Review

Date: 8/11/23

Prepared By:

Anne Frule

Accuracy/Approval:

Lampden

Title:

CAS Specialist

Title:

CAS Senior Advisor

Date:

8/11/2023

Date:

06/01/2023

IM Number: <u>2022-0361-65 Chg 03</u>										Comments
Voting Member										
<del>Larry</del>	<del>David</del>	<del>Robert</del>	<del>Vince</del>	<del>Eli</del>	<del>Jeff</del>					9/14/23 Approved Larry Cant vote on his issue
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0390-01</u>										Comments
Voting Member										
<del>Larry</del>	<del>David</del>	<del>Robert</del>	<del>Vince</del>	<del>Eli</del>	<del>Jeff</del>					Eli cant vote 10/26/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0390-04</u>										Comments
Voting Member										
<del>Larry</del>	<del>David</del>	<del>Robert</del>	<del>Vince</del>	<del>Eli</del>	<del>Jeff</del>					08/24/23 Approved cant vote Robert E.
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	

# Closure

EMRB Extension/Closure Review

Prepared By: Anne Enle

Title: CAS Specialist

Date: 8/1/23

Date: 8/1/23

Accuracy/Approval: Larry Ben

Title: CAS Senior Advisor

Date: 08/01/2023

IM Number: <u>IM 2023-0045-25</u>										Comments
Voting Member										<u>"Can't close to a Draft"</u> <u>Roll Back for implementation</u> <u>Get an extension</u> <u>Action - <u>Bobby Rappe</u></u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>IM-2023-0045-26</u>										Comments
Voting Member										<u>Assign new Action items to</u> <u>Roll Back</u> <u>Bobby Rappe</u> <u>once plan is completed they</u> <u>can reference the SIP-</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0045-29</u>										Comments
Voting Member										<u>Roll Back</u> <u>Reference drawing doesn't</u> <u>#15 Bobby Rappe reference</u> <u>Link, Trap &amp; Qual. needed</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number: <u>2023-0045-09</u>										Comments
Voting Member										<u>Approued to</u> <u>close</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	
IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	<input type="checkbox"/> No	

IM Action						
<b>Details</b>						
<b>Generated From</b>				<b>System Identifier</b>		
N3B-IM-2023-0390				IMA-2023-0556		
<b>Current State</b>				<b>Responsible Organization</b>		
Closed				CH-TRU		
<b>Action to be performed</b>						
Los Alamos Fire Department (LAFD) communicated radiological monitoring meter reading data in error (order of magnitude higher than actual) resulting in confusion as to conditions within Dome 230. Appropriate N3B/Triad personnel who interface with LAFD communicate the issue with LAFD for their independent review and resolution.						
<b>Action Closure Requirements</b>						
OE of communication of issue with LAFD.						
<b>Originator</b>				<b>Originator's Organization</b>		
Anne Forde - 361875				Environment, Safety & Health		
<b>Date Created</b>				<b>Due Date</b>		
07/06/2023 13:03 MDT				07/25/2023		
<b>Date Implementation Complete</b>	<b>Date Closed</b>					
07/18/2023	08/31/2023					
<b>Days Open</b>						
56						
<b>Actions Taken</b>						
I sent an email to my LAFD counterpart informing them of this issue and uploaded it here. See attached OE for closure.						
<b>Action Owner</b>				<b>Issue Owner</b>		
Erika Gorman - 210753				Gail Helm - 114849		
<b>Type</b>				<b>Causal Analysis Lead</b>		
Corrective				Thomas Harrison - 353050		
<b>Long Term</b>						
N						
<b>Applicable Causes</b>						
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>		
IMC-2023-0066	A6	Training Deficiency	Apparent			
<b>Comments</b>						
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>	
1	Gorman, Erika	07/18/2023	15:21	Implementation	Implementation Task Completed.	
2	Helm, Gail	07/18/2023	15:27	Verify Action	Verify Action Task Completed.	
3	Palalon, Chris	08/31/2023	16:16	MRB Review	EMRB approved to close on 8/31/23. See EMRB Closure Review Meeting Minutes on 8/31/23 in documents as OE.	
4	Palalon, Chris	08/31/2023	16:16	MRB Review	MRB Review Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
Anne Forde - 361875						
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 13:03 MDT	Forde, Anne	07/06/2023 13:03 MDT
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 13:03 MDT	AUTO-GENERATED	07/07/2023 15:11 MDT
Implementation	Completed	Gorman, Erika	AUTO-GENERATED	07/07/2023 15:11 MDT	Gorman, Erika	07/18/2023 15:21 MDT
Verify Action	Completed	Helm, Gail	Gorman, Erika	07/18/2023 15:21 MDT	Helm, Gail	07/18/2023 15:27 MDT
Quality Review	Skipped		Helm, Gail	07/18/2023 15:27 MDT	Helm, Gail	07/18/2023 15:27 MDT
PAAA Review	Skipped		Helm, Gail	07/18/2023 15:27 MDT	Helm, Gail	07/18/2023 15:27 MDT
MRB Review	Completed	EMRB	Helm, Gail	07/18/2023 15:27 MDT	Palalon, Chris	08/31/2023 16:16 MDT
Close	Completed		Palalon, Chris	08/31/2023 16:16 MDT	Palalon, Chris	08/31/2023 16:16 MDT

Attachments	Uploaded By	Date Uploaded
LAFD radiation monitoring.pdf	Gorman, Erika	07/18/2023 15:21 MDT
EMRB Closure Review Meeting Minutes 8.31.23.pdf	Palalon, Chris	08/31/2023 16:16 MDT

**From:** [Erika H. Gorman](#)  
**To:** [Saiz, Jeff](#)  
**Subject:** LAFD radiation monitoring  
**Date:** Tuesday, July 18, 2023 3:17:00 PM

---

Good afternoon Chief Saiz,

I was part of the Root Cause Analysis Team that reviewed the incident that occurred on May 8, 2023 in Dome 230, Area G, TA-54. 3 Employees entered the dome and smelled a strong odor, began feeling ill, left the dome, and eventually were transported to LAMC by LAFD. During LAFD's initial response to Dome 230 to perform VOC and radiation monitoring, LAFD personnel reported back to the BC that they were getting readings of 225 millirem/hr. Shortly thereafter, LANL HazMat corrected the readings to 0.2-0.3 millirem/hr, which are normal rad readings for Dome 230. In the meantime, though, those elevated readings caused quite a bit of concern.

While it is not N3B's role to determine the cause of this error, I was assigned the action of interfacing with LAFD to let you know what we found so you can investigate if you wish.

Thank you,

**Erika H. Gorman**  
**Emergency Preparedness Coordinator**  
N3B Los Alamos  
c. (505) 695-8998  
e. [erika.gorman@em-la.doe.gov](mailto:erika.gorman@em-la.doe.gov)

EMRB Extension/Closure Review

Date: 08-31-23

Prepared By: ERIN TAVAROSI

Accuracy/Approval: *[Signature]*

Title: CAS SPECIALIST

Title: CAS SUPERVISOR

Date: 08-31-23

Date: 08-31-23

IM Number: 1M-2022-0187-02										Comments
Voting Member										EMRB ON 08/31 DETERMINED OF OF UPDATED 409 IS REQUIRED FOR CLOSURE, ROLL BACK AND RE-ASSIGN TO ELLEN GAMMON, AND ENTER EXTENSION
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2023-0253-13										Comments
Voting Member										Darcy to email training training spreadsheet as additional CE. CLOSE ACTION PER EMRB ONCE ADDITIONAL CE IS RECEIVED
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2022-0338-00										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2022-0338-12										Comments
Voting Member										CLOSE
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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IM Number: 1M-2022-0317-00										Comments
Voting Member										ROLLBACK TO AMANDA TO ATTACH COPY OF TRAINING RECORDS W/ T23 ATTENDEES HIGHLIGHTED AS ADDITIONAL CE, THEN RE-SUBMIT FOR EMRB DENIED PROCESS EXTENSION TO 9/10/23 PER GME
ELI FOR ROBERT	DAVID	ETLIDH	JESSICA FOR LARRY							
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EMRB Extension/Closure Review

Date: 08-31-2023Prepared By: ERIN TAVAKOSIAccuracy/Approval: [Signature]Title: CAS SPECIALISTTitle: CAS SUPERVISORDate: 08-31-2023Date: 08-31-2023

IM Number: <u>117-2023-0390-07</u>										Comments
Voting Member										
ELI FOR ROBERT	DAVID	EILIDH	JESSICA FOR LARRY							ROLLBACK AND PROCESS EXTENSION TO 11-01 TO ALLOW ACTION OWNER TO UP-LOAD SUFFICIENT CLOSURE OF. ACTION OWNER SELF IDENTIFIED THAT CLOSURE REQUIREMENTS HAD NOT BEEN MET
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IM Action					
<b>Details</b>					
<b>Generated From</b>			<b>System Identifier</b>		
N3B-IM-2023-0390			IMA-2023-0555		
<b>Current State</b>			<b>Responsible Organization</b>		
Implementation			CH-TRU		
<b>Action to be performed</b>					
Revise N3B Building Emergency Plan's to designate employee chemical exposure with any medical symptoms as a medical condition requiring 911 to be called immediately.					
<b>Action Closure Requirements</b>					
Provide OE of revised Building Emergency Plans.					
<b>Originator</b>			<b>Originator's Organization</b>		
Anne Forde - 361875			Environment, Safety & Health		
<b>Date Created</b>			<b>Due Date</b>		
07/06/2023 12:44 MDT			10/27/2023		
<b>Date Implementation Complete</b>	<b>Days Open</b>				
	83				
<b>Actions Taken</b>					
<b>Action Owner</b>			<b>Issue Owner</b>		
David Telles - 143175			Gail Helm - 114849		
<b>Type</b>			<b>Causal Analysis Lead</b>		
Corrective			Thomas Harrison - 353050		
<b>Long Term</b>					
N					
<b>Applicable Causes</b>					
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>	
IMC-2023-0066	A6	Training Deficiency	Apparent		
<b>Comments</b>					
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>
1	Palalon, Chris	07/10/2023	18:09	Implementation	Reassigned Action Owner from Eli Gerlach to David Telles who owns Emergency Management. Please see the attached email in documents as OE.
<b>Notifications</b>					
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>			
Anne Forde - 361875	Y	N			
<b>Due Date Change Requests</b>					
<b>Identifier</b>	<b>Reason for Change</b>	<b>Original Date</b>	<b>Proposed Date</b>	<b>Disposition</b>	
N3B-IM-2023-0390-02-CHG01	The initial completion date proposed is unachievable as this issue was assigned to me on July 13, 2023. There are three BEPs that require this revision. This change will require each BEP to go through the	08/01/2023	10/27/2023	Approved	

Due Date Change Requests				
Identifier	Reason for Change	Original Date	Proposed Date	Disposition
	Document Control and approval process before this issue can be closed. We are working with Health & Safety to come up with common language from their revised policy/procedure to ensure the flow down of requirement. H&S provided the language to be inserted into each BEP on Tuesday, 7/18/2023			

Workbook						
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 12:44 MDT	Forde, Anne	07/06/2023 12:44 MDT
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 12:44 MDT	AUTO-GENERATED	07/07/2023 15:11 MDT
Implementation	Cancelled	Gerlach, Elijah	AUTO-GENERATED	07/07/2023 15:11 MDT	Palalon, Chris	07/10/2023 18:09 MDT
Implementation	Working	Telles, David	Palalon, Chris	07/10/2023 18:09 MDT		
Attachments				Uploaded By		Date Uploaded
RE New Assignment IM Action; N3B-IM-2023-0390-02.msg				Palalon, Chris		07/10/2023 18:09 MDT
Dome 230 RCA Final 6.29.23 Signed.pdf				Telles, David		07/19/2023 06:42 MDT

**From:** David M. Telles [David.Telles@EM-LA.DOE.GOV]  
**To:** Chris Mae S. Palalon [ChrisMae.Palalon@EM-LA.DOE.GOV]  
**Subject:** RE: New Assignment: IM Action; N3B-IM-2023-0390-02  
**Sent:** Mon 7/10/2023 11:30 AM GMT-06:00  
**Importance:** Normal

I agree. This action belongs to me.

Thank you  
David

David M. Telles  
Director, Safeguards and Security  
Cell (Work): (505) 412-3121  
Office: (505) 257-7644  
Email: [David.Telles@em-la.doe.gov](mailto:David.Telles@em-la.doe.gov)



1200 Trinity Drive Suite 150, Los Alamos, NM 87544

---

**From:** Chris Mae S. Palalon <ChrisMae.Palalon@EM-LA.DOE.GOV>  
**Sent:** Monday, July 10, 2023 10:36 AM  
**To:** David M. Telles <David.Telles@EM-LA.DOE.GOV>  
**Cc:** Eli Gerlach <Elijah.Gerlach@EM-LA.DOE.GOV>  
**Subject:** RE: New Assignment: IM Action; N3B-IM-2023-0390-02

Hi David,

Eli suggested that this IM should be reassigned to you. If you concur, I will reassign this task to you.

Thanks,  
Chris Mae Palalon  
Contractor Assurance Specialist  
Longenecker and Associates, a critical subcontractor to N3B Quality Assurance program  
Environment, Safety, Health and Quality  
c. (505) 709-7929  
e. [ChrisMae.Palalon@em-la.doe.gov](mailto:ChrisMae.Palalon@em-la.doe.gov)



1200 Trinity Dr. Suite 150, Los Alamos NM 87544

---

**From:** Eli Gerlach <[Elijah.Gerlach@EM-LA.DOE.GOV](mailto:Elijah.Gerlach@EM-LA.DOE.GOV)>  
**Sent:** Monday, July 10, 2023 6:43 AM  
**To:** Chris Mae S. Palalon <[ChrisMae.Palalon@EM-LA.DOE.GOV](mailto:ChrisMae.Palalon@EM-LA.DOE.GOV)>  
**Subject:** FW: New Assignment: IM Action; N3B-IM-2023-0390-02

This needs to be moved to David Telles, he owns Emergency Management.

**From:** [ApplicationSupport@em-la.doe.gov](mailto:ApplicationSupport@em-la.doe.gov) <[ApplicationSupport@em-la.doe.gov](mailto:ApplicationSupport@em-la.doe.gov)>

**Sent:** Friday, July 7, 2023 3:11 PM

**To:** Eli Gerlach <[Elijah.Gerlach@EM-LA.DOE.GOV](mailto:Elijah.Gerlach@EM-LA.DOE.GOV)>

**Subject:** New Assignment: IM Action; N3B-IM-2023-0390-02

## New Assignment

Hi Elijah,

You have a new assignment:

### IM Action - Implementation:

☐ [IM Action; N3B-IM-2023-0390-02](#)  
N3B-IM-2023-0390-02

### All My Assignments\*:

40

[Assignments](#)

0

[Due soon \(next 7 days\)](#)

6

[Overdue](#)

*\* These counts do not include tasks assigned to your teams or tasks where you are an alternate.*

**Thanks,**  
The DevonWay Team

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Powered by [DevonWay](#).

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**N3B Root Cause Analysis**  
N3B-IM-2023-0390

**Individuals Experienced Medical Symptoms  
While Performing a Regulatory Inspection at  
TA-54, Area G, Dome 230**

Conducted 05/31/2023 to 06/29/2023

Prepared By:	Gene Vitullo	N3B Root Cause Analyst, BWXT Corporate Reach-back	
Reviewed & Approved By:	Bob Macfarlane	N3B Environmental, Safety, Health & Quality Program Manager	

## Table of Contents

Introduction .....	3
Scope .....	3
Background.....	3
Key Activities – High Level Timeline.....	5
Problem Statements Summary .....	12
Team .....	14
Methodology .....	14
Barrier Analysis.....	15
Extent of Condition.....	17
Extent of Cause .....	17

## Attachments

- Attachment 1: Dome 230 Site Map
- Attachment 2: Individuals Interviewed
- Attachment 3: Documents Reviewed
- Attachment 4: Acronym List

## Introduction

Newport News Nuclear BWXT-Los Alamos, LLC (N3B) Acting Executive Officer, Bradley Smith, commissioned an independent Root Cause Analysis (RCA) consistent with an Issues Management System declaration of a “high” level incident in response to the initial medical event, and additional follow-on events, associated with individuals experiencing medical symptoms while performing a regulatory inspection at TA-54 (Area G), Dome 230. The events in question occurred May 8, 2023 through May 16, 2023.

The objective of the analysis was to develop specific and realistic corrective and/or preventive actions that are intended to prevent future recurrence of potential employee chemical exposures and operational control lapses in N3B’s safety-conscious work environment.

This RCA was performed by a team consisting of an independent consultant and N3B employees including representatives of ESH&Q, facility operations, engineering, emergency response and regulatory compliance. The team applied integrated methodologies to select the appropriate tools to investigate, analyze, determine the key facts, problems, causes, recommend corrective actions, and identify opportunities for improvement. This RCA involved a comprehensive review and analysis of relevant documents and information, and interviews of involved personnel.

## Scope

The RCA team investigated the medical event itself, and the corresponding emergency and post event investigation responses. The RCA team reviewed each of the activities for ineffective barriers, programmatic weaknesses, and human performance factors that may have contributed to responses, which were inconsistent with expectations. The objective of the RCA was to identify corrective actions as well as opportunities for improvement.

## Background

*Note: Due to minor inconsistencies between witness statements and the various reports and documents relied upon in this report, all times reported are approximate. In order to minimize confusion, the reader is directed to the Key Activities – High Level Timeline section of this RCA report.*

In compliance with Triad’s Hazardous Waste Facility Permit (HWFP), container storage units are inspected weekly or after waste has been moved. Dome 230 is a container storage unit permitted under the HWFP and, as such, is subject to regular inspections in accordance with Permit requirements.

N3B inspections of Resource Conservation and Recovery Act (RCRA) permitted units are conducted by qualified inspectors in accordance with N3B-DOP-TRU-1219. This procedure requires that personnel performing inspection activities meet facility access criteria, recognize site hazards and uphold established facility controls. Inspectors must additionally take appropriate action when unusual hazardous conditions are encountered, including immediately contacting the TA-54 Operations Center upon discovery of such a condition.

On May 8, 2023, following a planned evacuation drill conducted at the TA-54 administrative area, three Regulatory Inspectors (RIs) conducted a pre-job briefing prior to initiation of HWFP inspections. The plan of the day (POD) included inspections of multiple permitted units located within Area G, including Dome 230. The three RIs entered Area G by vehicle and proceeded with multiple planned RCRA facility inspections prior to arriving at Dome 230.

At approximately 1109 hours, two of the three RIs entered Dome 230 from the southeast entrance for the purpose of conducting the RCRA inspection (see Dome 230 site map provided in Attachment 1 for referenced locations). Waste handling operations, including drum mining and transfers of waste from the



High Energy Real Time Radiography (HERTR) to Dome 230 were underway by CH-TRU Waste Handling Operators. During the waste handling operation, the roll-up door (see Attachment 1) was open and no odors were reported by the workers in this area. The waste handling operations continued in Dome 230 until approximately 1120 hours.

Approximately 25-30 minutes after entering Dome 230, the two RIs who were actively performing the inspection noted an odor similar to paint thinner in the vicinity of columns 2 and 5 (see Attachment 1). The RIs conducted further investigation of the immediate area to identify the source of the odor. The third RI, upon rejoining the inspection group, also noted an odor similar to paint thinner, resulting in all three RIs promptly exiting the dome.

At 1136 hours, the RI, who was acting as the Person in Charge (PIC), called TA-54 OpsCenter to notify of the odor encountered within Dome 230, and that all three RIs reported individuals who were experiencing physical symptoms of illness. The OpsCenter made notifications by text to the Field Operations Manager (FOM) and the Field Operations Director (FOD), and the facility entered into abnormal response procedure N3B-AOP-TRU-3003, Material Release or Spill. The RIs were transported from Dome 230 to TA-54 OpsCenter by vehicle.

At 1200 hours, the RIs arrived at the TA-54 OpsCenter with one employee showing worsening symptoms, including nausea and dry heaving. This situation prompted a call to 911 and the facility entered into N3B-ERP-TRU-3002, Emergency Response Plan (ERP). Emergency responders from Los Alamos Fire Department (LAFD) arrived at the TA-54 OpsCenter, followed shortly thereafter by Triad's Incident Response Commander (IRC) and Triad HazMat. Immediate assessment of the individuals began by LAFD Medics and the first RI was transported by LAFD to LAMC, with the remaining two RIs following shortly thereafter. Medical staff provided further assessment of the three RIs at LAMC. All three RIs were released from LAMC by 1515 hours (Release times: 1446, 1451 and 1513 hours), and then returned to TA-54. Although no diagnosis was provided, all three RIs were issued 2-days of stay at home work restrictions.

While the RIs were being assessed at the TA-54 OpsCenter, LAFD proceeded to Dome 230 to perform monitoring for volatile organic compounds (VOCs) and radiation. Initially, LAFD reported elevated radiation monitoring results of 225 millirem/hr. However, this was subsequently determined to be incorrect by Triad HazMat Responders. The actual readings collected in Dome 230 were 0.2-0.3 millirem/hr., which are normal radiation levels expected for Dome 230.

At approximately 1303 hours, the N3B Shift Operations Manager (SOM) transferred control of the facility to the Triad IRC and at 1344 hours, unified command was established between the IRC, Triad HazMat and LAFD. Shortly thereafter, preparations began for a reconnaissance effort of Dome 230 by Triad HazMat. This effort included air monitoring for oxygen, Lower Explosive Limit (LEL), Carbon Monoxide (CO), Hydrogen Sulfide (H<sub>2</sub>S), VOCs and radiation contamination as well as visual indications for open containers or possible sources of chemical exposure that may produce an odor. The monitoring did not identify any abnormal conditions. At approximately 1430 hours, HazMat determined the facility to be safe, and at approximately 1430 hours, control of the facility was relinquished to the N3B SOM, and all external responders exited the facility and Site. TA-54 OpsCenter exited abnormal operating procedures (Material Release or Spill and ERP), and released all facilities except Dome 230 to normal operations. Dome 230 was subsequently posted for restricted access pending further evaluation. The FOD requested that the CH-TRU ESH Manager perform further investigation of Dome 230 for VOCs in support of resumption of normal operations.

The requested follow-up action was conducted the morning of May 9, 2023, and no abnormal conditions or unusual odors were detected. A status meeting was conducted with stakeholders (i.e., N3B, EM-LA and DOE Headquarters) to discuss Dome 230 reentry and recovery actions. Upper management was made aware of the Industrial Hygienist (IH) personnel entry at this meeting- (Note: The IH entry was deemed inappropriate by upper management and an Event Meeting/Fact Finding was scheduled for May 23, 2023 at 0830 hours). Notification of the event was provided to New Mexico Environment Department (NMED), Hazardous Waste Bureau.

On May 10, 2023, N3B began development of a recovery and sampling plan to restore Dome 230 to normal operations.

On May 11, 2023, N3B met with DOE to provide an update of the status of Dome 230 and the path forward to resume normal operations. Entry was made into Dome 230 by CH-TRU for the purpose of completing extensive facility IH and RadCon monitoring. N3B upper management subsequently met with DOE to provide updated information.

On May 15, 2023, results from the high volume air samples collected were received, indicating no abnormal activity was detected.

On May 16, 2023, the initial Event Meeting was held and fact finding began.

## Key Activities – High Level Timeline

The three high-level timelines presented below are intended to orient the reader to the series of activities leading up to and following the described event. Three timelines were required to address the N3B employee illnesses, and post event issues within Dome 230.

*Note 1: During review of critiques, witness statements, occurrence reports, external organization response reports and OpsCenter center logs variations in times were noted; however, any discrepancies noted were determined to be insignificant in relation to this causal analysis. Because of the variations noted, all times referenced in this report are approximate.*

*Note 2: Throughout the timeline, “RIs” refer to the three (3) N3B employees who experienced the illness symptoms.*

### Dome 230 Initial Event (05/08/2023) Timeline

05/08/2023 0727hrs	05/08/2023 0846hrs	05/08/2023 0847hrs	05/08/2023 0930hrs	05/08/2023 1109hrs	05/08/2023 1136hrs	05/08/2023 1140hrs
N3B RIs participated in a site evacuation drill.	Waste Operations personnel completed dome rounds.	RCRA inspection pre-job brief was conducted with the RIs.	RIs (3) began inspections of RCRA Permitted Facilities, starting at Dome 283.	RCRA inspection of Dome 230 was started. A total of 9 facility RCRA inspections were completed prior to arrival at Dome 230. Note: Two (2) of the RIs entered at 1109hrs. The third RI joined them shortly after a hygiene break in route to Dome 230.	Problem (1) RIs exit Dome 230 and report odor and physical symptoms to the OpsCenter. Communication lacked verbalization of symptom severity, which did not trigger an immediate 911 call.	The OpsCenter entered into Material Release or Spill Procedure, and arranged transportation of employees from Dome 230 to the OpsCenter.

Colored cells describe facts that resulted in problem statements developed within this Report.

05/08/2023 1150hrs	05/08/2023 1200hrs	05/08/2023 1212hrs	05/08/2023 1225hrs	05/08/2023 1230hrs	05/08/2023 1234hrs	05/08/2023 1240hrs
TA-54 Ops Center notified N3B OccMed, who directed the Ops Center to transport employees to Triad OccMed. (Not executed, see 1200hrs)	Upon arrival at the OpsCenter, the employees' exhibited worsening physical symptoms and 911 was immediately called. The OpsCenter entered into ERP.	LAFD arrived and evaluated the RIs.	Triad IRC, HazMat and Protective Force arrived at the OpsCenter	The first RI was transported to LAMC.	Problem (2) & Problem (3) LAFD entered Dome 230 and performed Rad survey and air monitoring for VOCs. LAFD reported an errant Rad meter reading of 225 millirem/hr versus actual reading of 0.2/0.3 millirem/hr. Errant information was reported through unofficial channels to EM-LA Leadership.	The second and third RIs were evaluated and are transported to LAMC.
05/08/2023 1403-1425hrs	05/08/2023 1430hrs	05/08/2023 1436hrs	05/08/2023 1446-1515hrs	05/08/2023 Critical Note:	Blank Cell	Blank Cell
Triad HazMat arrived, entered Dome 230, performed air and Rad monitoring then exited the area. No abnormal conditions were identified.	Triad HazMat declared an "all clear" from the emergency response. Command and control was returned to N3B.	OpsCenter exited Abnormal Operations Procedures (AOP 3003 & ERP 3002) and released operations to all facilities, except, Dome 230, which was posted for restricted access.	Following medical evaluation, the RIs were released from LAMC. (Release times: 1446, 1451 and 1513hrs). The employees returned to TA-54.	The LAMC Doctor gave RIs a 2-day away from work restriction. No specific diagnosis for the symptoms was provided.		

**Dome 230 IH Re-entry Event (05/09/2023) Timeline**

05/08/2023 1436hrs	05/08/2023 1538hrs	05/08/2023 1715hrs	05/08/2023 1925hrs	05/09/2023 0630-0700hrs	05/09/2023 0700-0716hrs	05/09/2023 Critical Note:
The OpsCenter exited Abnormal Operations Procedures (AOP-3003 & ERP 3002) and released operations to all facilities except Dome 230 which was posted for restricted access.	The FOD requested the CH-TRU ESH Manager to perform a follow-up investigation for VOCs at Dome 230 on 05/09/2023.	CH-TRU ESH Manager acknowledged FOD request and intent to perform request on 05/09/2023	S&H Director acknowledged request from FOD and asked CH-TRU ESH Manager to evaluate the need for respiratory protection prior to reentry.	IH Professional, concluded no IH need for respiratory protection, and then contacted RadCon Manager to ask if respiratory protection was needed to reenter Dome 230. The RadCon Manager stated that no respiratory protection was needed for entry.	Problem (4) ESH&Q PM and CH-TRU PM discussed IH and RadCon planned actions to enter Dome 230 and conduct surveys and atmospheric monitoring.	Problem (4) ESH&Q PM and CH-TRU PM were not aware that Acting Executive Officer and EM-LA were under the assumption that no access into Dome 230 was going to take place.

05/09/2023 0717-0819hrs	05/09/2023 0953hrs	05/09/2023 1200hrs	05/09/2023 1433hrs	06/06/2023	Blank Cell	Blank Cell
IH Professionals perform monitoring (Altair 5x) in Dome 230 and no abnormal atmospheric issues were detected, results were reported to OpsCenter.	IH results were reported via email to senior management (i.e., ESH&Q PM, CH-TRU PM).	During the N3B Dome 230 status update meeting, N3B senior management was informed of the IH monitoring. The Recovery Manager was not informed that a reentry was performed.	Because of the confusion regarding access control approvals for Dome 230 at the time of the IH professionals' reentry, bioassay analysis was deemed appropriate to be consistent with the previous day entries.	Reports of "No Intake" was received for four (4) of the ten (10) bioassays taken. Triad analysis laboratory shut-down for 2 weeks (C-NR).  Updated 06/28/2023: Remaining six (6) bioassay results reported as "No Intake" from Triad laboratory.		

**Dome 230 Rad and IH Reconnaissance Event (05/11/2023) Timeline**

05/10/2023	05/10/2023	05/10/2023 0830hrs	05/10/2023 1315hrs	05/11/2023 0845hrs	05/11/2023 1000hrs	05/11/2023 1415-1420hrs
Problem (5) & Problem (6) N3B IH did not have requisite VOC monitoring equipment (with the exception of one working PID) on-site to perform reentry monitoring and assessment.	Problem (5) & Problem (6) N3B dispatched personnel to obtain requisite IH VOC monitoring equipment from WIPP and Triad.	A status meeting between EM-LA and N3B occurred to update actions of the Recovery Plan. The group agreed to meet again with additional detail at 1300hrs.	A follow up status meeting between EM-LA and N3B occurred to update details of the Recovery Plan. A determination was made to conduct work under an emergency work scope package.	A status meeting between EM-LA and N3B was conducted to address questions regarding availability, selection and calibration of IH monitoring equipment for reentry.	A comprehensive pre-job briefing to emergency work package was conducted for reentry into Dome 230 for radiological and IH monitoring	N3B IH & RP re-entered Dome 230 to perform monitoring (Rad and IH used Emergency Work Log Work Package # WT-2023-0387).

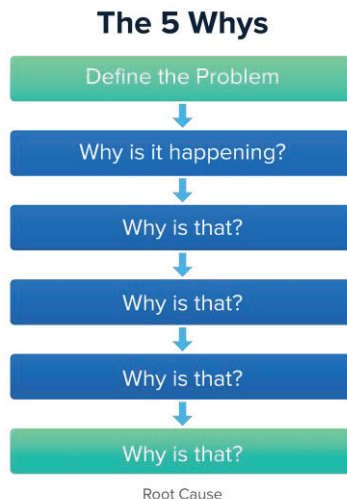
05/11/2023 1623hrs	05/11/2023 1734hrs	05/11/2023 1851hrs	05/17/2023 1919hrs	05/17/2023 Critical Note	05/18/2023	Blank Cell
Reentry monitoring effort was completed. No abnormal conditions were identified.	Post job debrief conducted.	Rad high volume sampler results reported. No abnormal data was reported.	Problem (5) & Problem (6) Report received from external laboratory on Summa Canisters used for VOC monitoring on 05/11/2023. Report indicated no results because canisters were not properly configured (i.e., missing critical parts) for operability.	Problem (5) & Problem (6) Summa Canisters were not available at N3B and were sourced externally from WIPP and Triad. N3B IH either did not understand, or did not receive, the instructions for use of the externally sourced equipment.	A report was received from an external laboratory on Passive Lapel Personal Monitoring VOC Badges. No abnormal data was reported.	

### Pest Control Uncontrolled Entry into Dome 230 Timeline

05/16/2023	05/16/2023 0930hrs	05/16/2023 1106hrs	05/16/2023 1107hrs	05/16/2023 1143- 1146hrs	05/16/2023 1430hrs	Blank Cell
Dome 230 restrictions were discussed at the POD. Area G Maintenance Superintendent (1) was at the POD. Pest Control work in Area G on the POD for 05/16/2023. A shift order restricting unauthorized entry into Dome 230 was in place, and discussed at the POD.	Problem (4) Pest Control crew on-site and received pre-job briefing by Maintenance Superintendent (2). Briefing did not discuss Dome 230 restriction. Maintenance Superintendent (1) did not communicate the Dome 230 restrictions to the other Maintenance Superintendents. Escort did not attend the briefing.	OpsCenter received a notification from a Waste Storage Supervisor of a witnessed exit of Pest Control personnel and escort from Dome 230.	OpsCenter contacted pest control crew escort to determine if entry into Dome 230 was made, and escort confirmed the entry. OpsCenter requested escort and pest control crew to remain in vehicles and await Radcon support at the OpsCenter.	Radcon performed surveys and determined NDA.	Problem (4) During critique investigation the escort admitted to not following access control requirements for entry into Area G, nor posting at Dome 230.	

### Why Process

The Team evaluating the Dome 230 event employed a commonly used RCA technique called “The 5 Whys” process (See chart below). While it is called “The 5 Whys” process, the number of whys needed to reach the primary (aka Root Cause) causal element of each problem is not required to be exactly 5.





## Problem Statements

The RCA Team identified the following problems associated with the initial response and follow-up to this event.

Identified Problems (“Whys”), Causes and Recommended Actions:

- (1) N3B personnel did not immediately call 911 upon recognition/reporting of medical symptoms directly related to a possible chemical exposure.

Why? Exposed employees, and their supervisor, did not immediately recognize the significance of medical symptoms, which can and did increase in severity, directly related to a possible chemical exposure.

Why? When calling the Operations Center, potentially exposed RIs did not clearly verbalize symptom severity that would indicate a need for an immediate 911 call.

Why? TA-54 BEP does not mention chemical exposure as a major injury, requiring 911 to be called immediately.

Cause: Current training of N3B employees, managers and supervisors, and TA-54-BEP protocols, do not recognize how chemical exposures, particularly respiratory, can develop into rapidly escalating medical conditions requiring immediate medical attention.

Recommendations:

- (1) Provide training to N3B employees, managers and supervisors on the need for immediate medical attention for employees exhibiting any medical symptoms involving a possible chemical exposure.
  - (2) Revise N3B BEPs to designate employee chemical exposure with any medical symptoms as a medical condition requiring 911 to be called immediately.
- (2) Los Alamos Fire Department (LAFD) communicated radiological monitoring meter reading data in error (order of magnitude higher than actual) resulting in confusion as to conditions within Dome 230.

Note: LAFD is an external organization, and not within the scope of this root cause analysis to determine the cause of their error.

Recommendation: Appropriate N3B/Triad personnel who interface with LAFD communicate the issue with LAFD for their independent review and resolution.

- (3) Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading reported by LAFD was incorrect. The invalidated initial reading was miscommunicated as an order of magnitude higher than the actual level in the facility, which led to an unnecessary level of concern within higher levels of EM-LA and DOE-HQ.

Note: EM-LA is an external organization, and not within the scope of this root cause analysis to determine the cause of communication issue.

Recommendation: Appropriate N3B management who interface with EM-LA will communicate the issue with EM-LA for their independent review and resolution.

- (4) Entries were made into Dome 230 following the event without knowledge, alignment or approval of all required stakeholders.

- Why? Communications were not formalized for alignment between N3B Senior Management and the Facility Operations Director (FOD) on requirements, approvals and expectations for re-entry of Dome 230.
- Why? The signs on the entrances to Dome 230 were ambiguous as to the need for additional OpsCenter approval for entry.
- Why? IHS believed they were authorized to access Dome 230 after obtaining POD activity approval in the OpsCenter and did not need to make a separate call to the OpsCenter prior to entering the Dome 230.
- Why? The Escort for the pest control crew failed to read and sign the Shift Order communicating the access restrictions to Dome 230 and did not brief escorted personnel on access restriction to Dome 230. (Specific to Pest Control Escort Personal Accountability Event)
- Why? There is a fundamental disconnect in expectations regarding the prerequisites and requirements necessary (work documents, qualifications, etc.) for IH post event entries, including the use of data provided by external response personnel.
- Why? Senior personnel brought perspectives and approaches from other site experiences that differ, and were not reconciled across N3B Departments.

Cause: N3B does not have a formal, documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities.

Recommendation: N3B needs to update existing procedures, and develop a specific comprehensive re-entry/recovery procedure.

- (5) N3B was unable to quickly source critical industrial hygiene monitoring equipment for needed reentry and more comprehensive analysis, following release from the emergency response.

- Why? The Service Agreement/Work Authorizations (SAWA) process did not work as expected.
- Why? N3B Safety & Health Programs (S&H) lacked adequate equipment ordering details and specifications to facilitate procurement or rental timeliness.

Cause: N3B lacks a "rapid" procurement and rental process to obtain, and receipt inspect critical emergency response equipment during and immediately following an emergency.

Recommendations:

- (1) N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.
- (2) N3B needs to investigate the issues/gaps associated with use of the SAWA agreement during this event that did not work as expected.

- (6) N3B was unable to execute a timely and comprehensive suite of atmospheric monitoring for volatile organic compounds (VOC) immediately following a potential release in Dome 230.

- Why? N3B S&H did not have the requisite suite of VOC monitoring equipment on-site (i.e., Passive [Adsorbent] Badges, and Summa Canisters) to perform the more comprehensive monitoring necessary for the event.
- Why? N3B S&H personnel did not have adequate information to properly deploy monitoring equipment (i.e., Summa Canisters) externally sourced for reentry monitoring.



**Cause:** N3B S&H did not perform an adequate facility hazard assessment for the plausibility of a VOC release associated with TRU waste, which would have identified equipment, other than PIDs and Draeger Tubes, necessary to provide more comprehensive monitoring. Additionally, only one PID was functional and the Draeger tubes were expired.

**Recommendation:** N3B needs to perform a comprehensive facility hazard assessment to identify all anticipated exposure concerns. Based on the assessment, S&H needs to ensure necessary onsite equipment is available, as well as rapid procurement and rental capabilities.

## Problem Statements Summary

On May 8, 2023, three N3B employees were completing RCRA inspections in Dome 230 when they encountered a chemical odor and began to feel ill. While no direct cause was identified for the reported exposures, the team did evaluate and disposition some possible scenarios discussed in the Chemical Exposure Scenarios section of this report. The following is a summary of the identified problems:

N3B personnel did not immediately call 911 when they began to experience symptoms. During the onset of symptoms, the employees did not recognize the event as a chemical exposure that could rapidly escalate into a medical emergency. Multiple N3B procedures need to be revised to stress the recognition of symptoms and appropriate notifications.

Radiological monitoring data was communicated from LAFD to Incident Command, then relayed from EM-LA to DOE HQ prior to recognition that the meter reading that was reported by LAFD was errant. The incorrect initial reading communicated was an order of magnitude higher than the actual level in the facility and led to unnecessary level of concern within higher levels of EM-LA and DOE-HQ.

There were two entries made into Dome 230 following the initial event. The first was a post event entry for follow-up IH monitoring. Several departments at N3B have differing opinions on the correctness associated with the IH entry. In addition, there is a difference of opinion on the correctness of previously performed facility releases based on external response personnel confirmatory information. The second was the unauthorized pest control entry where the escort failed to fulfill his duties as an escort.

N3B S&H had not historically performed an adequate facility hazard assessment for the plausibility of a VOC release associated with TRU waste, which would have identified a more comprehensive suite of VOC monitoring equipment to be readily deployable for this type of event. Because of this inadequate supply of IH monitoring equipment, comprehensive air monitoring was not performed in a timely manner following the initial event. The lack of readily available IH equipment also highlighted that there is not a process to obtain emergency equipment in a timely manner.

The event was an Occupational Safety & Health Administration (OSHA) recordable injury, and therefore negatively affected N3B's Total Recordable Cases (TRC) rate. The event was determined to be reportable under DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information* (ORPS).

## Chemical Exposure Source Scenarios

During the investigative process and interviews conducted by the Dome 230 RCA Team, three (3) scenarios were identified as possible causes of the chemical exposures reported by the workers while performing an inspection in Dome 230.

*Note: For inspection location where chemical odors were identified, and scenario discussions below, refer to Attachment (1) Dome 230 Map.*

<u>Scenario 1</u>	One of the Triad HazMat team responders commented on ongoing and active contractor construction work approximately 0.80 miles East-Southeast in White Rock.
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) The distance from White Rock to the Dome 230 location (0.80 miles) and the concentration of an airborne contaminant that would be needed to reach Dome 230, as well as the fact that White Rock is down grade in topography.</li> <li>(2) The wind direction and speed documented at the time of the event was from the North to South at 18mph, which does not support transport of chemical vapors, if actually occurring, from the construction site to Dome 230.</li> <li>(3) The chemical concentration at, and dispersed from White Rock, had the wind direction been a factor, would have to had been at such a high concentration that it would have caused issues directly at the construction site and around the exterior portions of Dome 230, which would have been noted by the employees prior to entry.</li> </ol>
<u>Scenario 2</u>	A separate team of N3B Waste Handlers were moving drums into Dome 230 through the west rollup door approximately 150 feet opposite of the RIs location (between columns 2 and 5). This scenario was investigated because it was reported by the RIs as a potential source of the odor.
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) The distance from the two work groups and air concentration in between would not support a point source concentration at the location where the workgroup experienced the chemical odors.</li> <li>(2) There is no mechanical air movement within Dome 230 that would draw a chemical odor from the roll-up door to the area where the chemical odor was present.</li> <li>(3) The workers moving the drums into Dome 230 did not report any unusual odors during transfer of the drums from the High Energy Real Time Radiography to Dome 230.</li> </ol>
<u>Scenario 3</u>	<p>On 31 May 2023, members of the Dome 230 RCA Team visited Dome 230 to familiarize themselves with the event location. During the familiarization walk-down, the team members requested the IH technician present to perform PID readings directly at the vent location on 28 floor level drums located (14 per row) between columns 2 and 5. The request to survey these specific drum vents with a PID was based on this being the area where the workers involved in the event smelled the odor. Previous surveys were general area versus point source at the drum vents. Two of the 28 drum vents surveyed (Drums 69342 and 91479) indicated VOC readings on the PID. The readings were 13 ppm at the drum 69342 vent and 7 ppm at the drum 91479 vent, and in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents.</p>
Disposition:	<p>The Team concluded that this was not a plausible cause. The conclusion was based on the following:</p> <ol style="list-style-type: none"> <li>(1) Follow-up vent surveys on drums 69342 and 91479 were performed on 06/07/2023 and 06/08/2023. On 06/07/2023 the readings were 17.7 ppm at the drum 69342 vent and 13.0 ppm at the drum 91479 vent, and again in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents. On 06/08/2023, the readings were 15.0 – 89.1 ppm at the drum 69342 vent and 2.6 – 20.8 ppm at the drum 91479 vent. Again, in each case the meter readings returned to zero when the PID was lifted 6-8 inches away from the drum vents.</li> </ol>

- (2) In discussion with the TRU Waste Programs Director (SME) following the visit to Dome 230, the SME indicated that VOCs could reasonably be assumed to be present at the drum vents, given the purpose of the vents and the waste constituent profiles.
- (3) A burst-release of VOCs from drums 69342 and 91479 was considered, and plausibility was limited to two scenarios. (1) A significant temperature rise in Dome 230 causing a volume-pressure variant. The ambient temperatures on the days leading up to and the day of the event varied approximately between 55 and 65 degrees Fahrenheit. The Dome 230 interior temperature, while not directly taken, would be consistent with the temperature change. (2) An intermittent thermal-chemical reaction within drums 69342 and 91479. Temperature readings were requested by the RCA Team. Temperatures were taken on 06/09/2023 once IH obtained access to an Infrared Laser Thermometer (See Problem (5) & (6)). Multiple temperature readings were taken on the top and sides of drums 69342 and 91479. The temperature readings ranged from the high-50s to mid-60s degrees Fahrenheit. Temperature readings were performed on additional random drums in the vicinity of columns 2 and 5; those readings were consistent with the temperature readings on drums 69342 and 91479.

Note: Contained in this Report is an “open item” recommendation for N3B to evaluate if any further monitoring of these drums is necessary, or appropriate.

## Team

The core team was comprised of the following individuals

- Erika Gorman: Causal Team Member, Emergency Preparedness Coordinator, N3B
- Thomas Harrison, Causal Team Member, Longenecker & Associates Reach-back
- Justin Kirkes: Causal Team Member, QA Specialist, Longenecker & Associates
- Nico Randall: Causal Team Member (part time), Environmental Field Operation Technician, N3B
- Luis Santana: Causal Team Member, Sr. Manager Facility Operations, N3B
- Gene Vitullo: Causal Team Lead, Corporate Reach-back Employee, BWXT
- Jennifer von Rohr: Causal Team Member, Environmental Professional, N3B
- David Wirkus: Causal Team Member, Director of Radiation Protection, N3B

The team worked with many individuals directly and indirectly involved in the Dome 230 events, as well as consulted with various Subject Matter Experts (SME). A complete list of contacted individuals can be found in Attachment 3.

## Methodology

A careful and in-depth review of the sequence of events (timeline), and the barriers (barrier analysis) that could or should have prevented the events contained in this report. The “5 Why” process was a key tool used to identify the causal factors.

## Barrier Analysis

Based on the information collected during the causal analysis, and based on discussions with individuals involved with the Dome 230 events, the team identified barriers that could have prevented the problems identified in this report. The analysis identifies whether barriers were present, absent, effective, or ineffective.

Barrier	Type of Control	Analysis – Present? Effective? Absent?	Why was it Effective and or Ineffective?	Potential Cause?
Formal Re-entry and Recovery Procedure	Administrative	Absent	N/A	N3B does not have a formal documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities.
Pre-Job Briefing	Administrative	Present – Partially Effective	IH personnel briefed the plan and actions to be taken but did not document a formal pre-job brief.  Pest Control crew did receive a formal pre-job brief but did not cover access prohibition to Dome 230.	Dome 230 access restrictions were not covered during the pre-job brief and Dome 230 was entered without authorization (Pest Control incident). IH personnel assumed access granted at OpsCenter to perform scheduled POD activity including access to Dome 230.
Pause/Stop Work Procedure	Administrative	Present – Partially Effective	RCRA Inspector did not immediately pause, leave the area, and notify the Ops Center.	RCRA Inspectors try locating the source of the smell.
Building Emergency Plan (BEP) Procedure	Administrative	Present – Partially Effective	BEP states that when an emergency occurs workers should contact 911, then the OpsCenter.	BEP does not provide guidance for contacting 911 for a chemical exposure with symptoms/injuries.
Posting/Signage	Administrative	Present – Ineffective	Sign was placed on the facility, but could have provided more specificity on entry approvals.	IH personnel assumed access granted at OpsCenter to perform scheduled POD activity included access to Dome 230.  Escort for Pest Control crew did not adhere to the requirements of posted signage.
Emergency Response Procedure	Administrative	Present - Effective	Emergency Response Procedure was adhered to, once initiated.	Procedure does not contain recovery guidance.

Barrier	Type of Control	Analysis – Present? Effective? Absent?	Why was it Effective and or Ineffective?	Potential Cause?
Escort Responsibilities (Pest Control Incident)	Administrative	Present – Ineffective	Multiple controls were in place but not adhered to.	Escort failed to read and sign Shift Order for Dome 230 Access Prohibition and thoroughly brief Pest Control crew on the facility's changed conditions and access prohibition to Dome 230.
Chemical Management Procedure	Administrative	Present – Ineffective	Workers failed to call 911 immediately after a chemical related exposure	Workers failed to recognize the significance of an abnormal odor and immediate symptoms in one of the workers.
Material Release or Spill Procedure	Administrative	Present – Effective	Material Release or Spill procedure was adhered to once initiated.	N/A
Senior Supervisory Watch (SSW)	Administrative	Present – Effective	SSW focused on technical aspects of evolution and overall oversight.	N/A
Service Authorization and Work Agreement (SAWA)	Administrative	Present - Partially Effective	Lacks specifications for equipment needs and emergency procurement or rental.	SAWA lacks a “rapid” procurement and rental process to obtain critical emergency response equipment during and immediately following an emergency.
Los Alamos Fire Department (LAFD) Emergency Response	Administrative	Present – Partially Effective	Inaccurately communicated radiological monitoring data from Dome 230.	Unknown, LAFD responsibility to assess.
N3B Industrial Hygiene Monitoring Capability	Administrative	Present – Partially Effective	S&H was unable to execute comprehensive atmospheric monitoring for VOCs in a timely manner. S&H only had one working PID, and the requisite Draeger tubes were expired.	Inadequate facility hazard assessment, and comprehensive suite of VOC monitoring equipment unavailable, for plausible chemical events.

## Extent of Condition

Without an adequate and comprehensive facility hazard assessment for the plausibility of exposure scenarios associated with N3B processes and operations, vulnerabilities will remain where necessary monitoring equipment will not be available (or capable of being rapidly sourced) for immediate response to those plausible events.

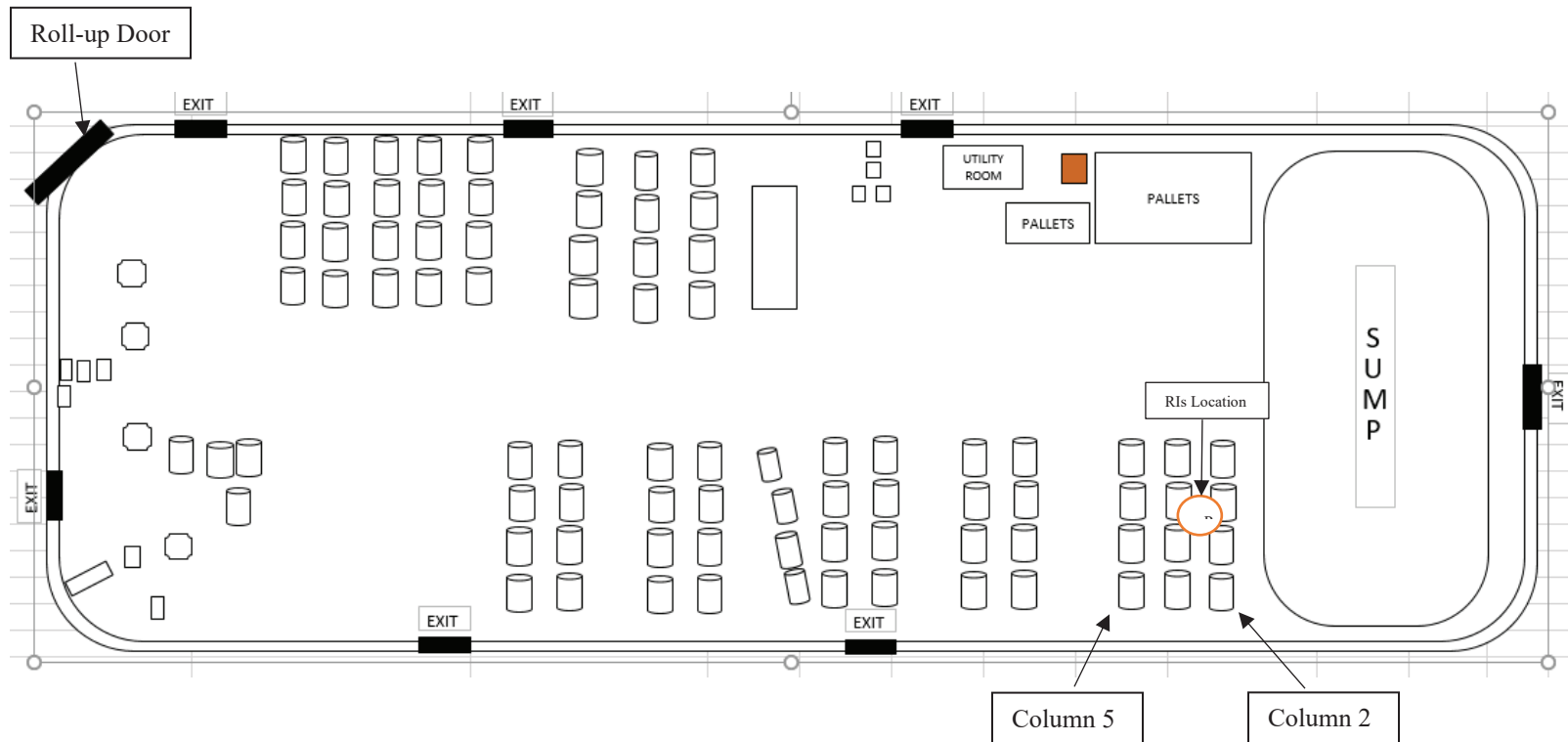
## Extent of Cause

N3B lacks a formal documented re-entry/recovery procedure that delineates communication expectations, responsibilities, stakeholders, approvals and access controls/postings for post-event activities. Absent effective corrective measures for issues identified in this report, N3B is likely to repeat similar problems and causes in the future.

## Open Items

- (1) The RCA Team was informed by one of the RCRA Inspectors that blood was drawn by medical responders on the way to the hospital. This was the only patient who had blood drawn based on interviews, and witness statements. The patient who had the blood drawn volunteered to check to see if the blood was analyzed, and provide that information to N3B OccMed. The patient contacted LAFD and was told that the person who could provide that information would not be available until July 08, 2023. Finding out if the blood drawn was actually analyzed, and if so, the results could provide additional valuable information on the exposures. Obtaining this information must be done following all of the requirements of The Health Insurance Portability and Accountability Act.
- (2) Scenario (3) of the Chemical Exposure Source Scenarios section of this Report recommends N3B S&H evaluate if any further monitoring of the two specific drums noted to have VOC readings at the drum vents is necessary, or appropriate. The N3B S&H Director should formally resolve the need for performing additional monitoring of drums 69342 and 91479, between columns 2 and 5 in Dome 230.

## Attachment 1: Dome 230 Site Map



## Attachment 2: Individuals Interviewed

Name	Title	Organization
Erica Lopez	Occupational Case Management Specialist	N3B CH-TRU
Rosa Angus	Environmental Field Operations Tech	N3B CH-TRU
Ellen Gammon	Senior Director, Waste Management	N3B CH-TRU
Nico Randall	Environmental Field Operations Tech	N3B CH-TRU
Luis Rivera	Industrial Hygienist	N3B CH-TRU
Randy Martinez	Senior Supervisor, Regulatory Compliance	N3B CH-TRU
Nichole Lundgard	ENS Program Manager	N3B CH-TRU
Alice Doswell	BWXT Corporate Reach-back	BWXT
Robert Macfarlane	EHS&Q Program Manager	N3B CH-TRU
William Reed	Manager, Safety & Health	N3B CH-TRU
Luis Rivera	Industrial Hygienist	N3B CH-TRU
Zachary Martinez	Nuclear Operator	N3B CH-TRU
Gail Helm	Facility Operations Director	N3B CH-TRU



### Attachment 3: Documents Reviewed

Number	Document Title	Revision	Notes
N3B-AOP-TRU-3003	<i>Material Release or Spill</i>	0	
N3B-AP-P300	<i>Integrated Work Management</i>	1	
N3B-AP-P300-1	<i>Integrated Work Control Process</i>	1	
N3B-AP-TRU-1001	<i>General Site Hazards and Controls</i>	0	
N3B-AP-TRU-1002	<i>Access Control</i>	4, IPC-1	
N3B-AP-TRU-1101	<i>Pre-Job Briefings</i>	1	
N3B-BEP-TRU-3001	<i>TA-54 East Building Emergency Plan (BEP)</i>	2	
N3B-DI-HIS-0014	<i>Industrial Hygiene Air, Swipe and Bulk Sampling/Monitoring</i>	0	
N3B-DOP-TRU-1219	<i>RCRA Inspections and Notifications</i>	3	
N3B-ERD-54-230-00593	<i>Evaluation of Dome 230 Radiological and Industrial Hygiene Data</i>	0	
N3B-ERP-TRU-3002	<i>Emergency Response</i>	0	
N3B-Form-6177	<i>Event Report</i>	1	Title of Events: Emergency Response Due to an Abnormal Odor Observed at TA-54, Area G, Dome 230; Follow-up Action to an Abnormal Odor at TA-54, Area G, Dome 230; Three Individuals Enter Dome 230 for Pest Control Activities While the Dome is Posted as "NO ENTRY";
N3B-Form-6159	<i>Eye Witness Statement Interview Form</i>	0	21 individual statements collected
N3B-P101-14	<i>Chemical Management</i>	0	
N3B-P101-19	<i>Safety Signs, Labels and Tags</i>	0	
N3B-P102-2	<i>Occupational Injury and Illness Response, Reporting and Investigation</i>	0	
N3B-P315	<i>Conduct of Operations Manual</i>	0	
N3B-P322-1	<i>Causal Analysis and Corrective Action Development</i>	0	
N3B-P322-4	<i>Issues Management</i>	1	
N3B-POL-ESH-0003	<i>Hazard Communication and Chemical Hygiene Plan</i>	0	
N3B-POL-QAT-0019	<i>Notification, Investigation and Learning from Events</i>	2	
N3B-SOP-RP-0005	<i>Radiological Emergency Response</i>	1	
WT-2023-0387	<i>Perform Reconnaissance-Level Radiological and Industrial Hygiene Surveys in Dome 230</i>	0	

#### Attachment 4: Acronym List

BEP	Building Emergency Plan
CO	Carbon Monoxide
DOE	Department of Energy
EM-LA	Environmental Management – Los Alamos
ENS	Engineering & Nuclear Safety
EOSC	Emergency Support Emergency Operations Center
ERP	Emergency Response Procedure
ESH&Q	Environmental, Safety, Health and Quality
FOD	Facility Operations Director
FOM	Facility Operations Manager
H <sub>2</sub> S	Hydrogen Sulfide
HERTR	High Energy Real Time Radiography
HWFP	Hazardous Waste Facility Permit
IH	Industrial Hygiene
IRC	Incident Response Commander
LAFD	Los Alamos Fire Department
LAMC	Los Alamos Medical Center
LEL	Lower Explosive Limit
N3B	Newport News Nuclear and BWXT
NDA	Non-detectable Activity
NMED	New Mexico Environmental Department
OccMed	Occupational Medicine Organization
OpsCenter	Operations Control Center (N3B)
ORPS	Occurrence Reporting and Processing of Operations Information
OSHA	Occupational Safety & Health Administration
PIC	Person in Charge
PID	Photo Ionization Detector
POD	Plan of Day
RadCon	Radiological Controls
RCA	Root Cause Analysis
RCRA	Resource Conservation and Recovery Act
RI	RCRA Inspectors
RP	Radiation Protection
S&H	Safety and Health
SAWA	Service Authorization Work Agreement
SME	Subject Matter Expert
SOM	Shift Operations Manager
SSW	Senior Supervisory Watch
TRC	Total Recordable Cases
Triad	Triad National Security, LLC
VOC	Volatile Organic Compounds
WIPP	Waste Isolation Pilot Plant

Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-02				Close		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
The initial completion date proposed is unachievable as this issue was assigned to me on July 13, 2023. There are three BEPs that require this revision. This change will require each BEP to go through the Document Control and approval process before this issue can be closed. We are working with Health & Safety to come up with common language from their revised policy/procedure to ensure the flow down of requirement. H&S provided the language to be inserted into each BEP on Tuesday, 7/18/2023						
<b>Originator</b>				<b>Originator's Organization</b>		
David Telles - 143175				Environment, Safety & Health		
<b>Date Created</b>				<b>Date Closed</b>		
07/19/2023 06:29 MDT				08/01/2023		
<b>Days Open</b>				<b>Disposition</b>		
13				Approved		
<b>Rationale for Disposition</b>						
EMRB voted to approve this extension on 8/1/23.						
<b>Original Date</b>				<b>Proposed Date</b>		
08/01/2023				10/27/2023		
<b>Reviewer</b>						
EMRB						
<b>Comments</b>						
<b>#</b>	<b>By</b>	<b>Date</b>	<b>Time</b>	<b>State</b>	<b>Comment</b>	
1	Palalon, Chris	08/01/2023	17:05	Review	Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
David Telles - 143175						
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Telles, David	Telles, David	07/19/2023 06:29 MDT	Telles, David	07/19/2023 06:29 MDT
Review	Completed	EMRB	Telles, David	07/19/2023 06:29 MDT	Palalon, Chris	08/01/2023 17:05 MDT
Close	Completed		Palalon, Chris	08/01/2023 17:05 MDT	Palalon, Chris	08/01/2023 17:05 MDT
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
911 language used.msg					Telles, David	07/19/2023 06:28 MDT
EMRB Closure Review Meeting Minutes 8.1.23.pdf					Palalon, Chris	08/01/2023 17:04 MDT

**From:** Eli Gerlach [Elijah.Gerlach@EM-LA.DOE.GOV]

**To:** David M. Telles [David.Telles@EM-LA.DOE.GOV]

**Subject:** language used

**Sent:** Tue 7/18/2023 4:03 PM GMT-06:00

**Importance:** Normal

**Note:** If there is any question about whether or not the injury/illness/exposure requires immediate and emergency care, workers shall contact 911.

Eli Gerlach, CSP, STS

Environment Safety and Health Program Director

Newport News Nuclear BWXT Los Alamos (N3B)

Environmental, Safety, Health and Quality

C. 505-551-2864 O. 505-257-7650

E. [Elijah.Gerlach@em-la.doe.gov](mailto:Elijah.Gerlach@em-la.doe.gov)



1200 Trinity Drive, Suite 150, Los Alamos NM 87544

# Extension

EMRB Extension/Closure Review

Prepared By: Anne Fride

Title: CAS Specialist

Date: 8/11/2023

Date: 8/11/2023

Accuracy/Approval: Larry Dell

Title: CAS Senior Advisor

Date: 08/10/2023

IM Number: <u>2020-051-03 CHGS</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						9/28/23 Approved
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IM Number: <u>2023-0054-01</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						9/28/23 Approved
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IM Number: <u>2023-0390-02</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						10/27/23 Approved
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Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						08/31/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: <u>Im-2023-0041-38</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						09/29/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: <u>2023-0041-07</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						09/29/23
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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Extensions

EMRB Extension/Closure Review

Date: 8/1/23

Prepared By:

Anne Frule

Accuracy/Approval:

Lampden

Title:

CAS Specialist

Title:

CAS Senior Advisor

Date:

8/1/2023

Date:

06/01/2023

IM Number: <u>2022-0361-65 Chg 03</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>	<u>Jeff</u>					<u>9/14/23 Approved</u> <u>Larry Cant vote on his issue</u>
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IM Number: <u>2023-0390-01</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>	<u>Jeff</u>					<u>Eli cant vote</u> <u>10/24/23 Approved</u>
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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Voting Member										
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<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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Voting Member										
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Voting Member										
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IM Number:										Comments
Voting Member										
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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# Closure

EMRB Extension/Closure Review

Prepared By: Anne Enle

Title: CAS Specialist

Date: 8/1/23

Date: 8/1/23

Accuracy/Approval: Larry Ben

Title: CAS Senior Advisor

Date: 08/01/2023

IM Number: <u>IM 2023-0045-25</u>										Comments
Voting Member										<u>"Can't close to a Draft"</u> <u>Roll Back for implementation</u> <u>Get an extension</u> <u>Action - Bobby Rappe</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: <u>IM-2023-0045-26</u>										Comments
Voting Member										<u>Assign new Action items to</u> <u>Roll Back</u> <u>Bobby Rappe</u> <u>once plan is completed they</u> <u>can reference the SIP-</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: <u>2023-0045-29</u>										Comments
Voting Member										<u>Roll Back</u> <u>Reference drawing doesn't</u> <u>#15 Bobby Rappe reference</u> <u>Link, Trap &amp; Qual. needed</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number: <u>2023-0045-09</u>										Comments
Voting Member										<u>Apposed to</u> <u>close</u>
<u>Larry</u>	<u>David</u>	<u>Robert E</u>	<u>Vini</u>	<u>Eli</u>	<u>Jeff</u>					
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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IM Number:										Comments
Voting Member										
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IM Number:										Comments
Voting Member										
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IM Action						
<b>Details</b>						
<b>Generated From</b>				<b>System Identifier</b>		
N3B-IM-2023-0390				IMA-2023-0554		
<b>Current State</b>				<b>Responsible Organization</b>		
Implementation				CH-TRU		
<b>Action to be performed</b>						
Provide training to N3B employees, managers and supervisors on the need for immediate medical attention for employees exhibiting any medical symptoms involving a possible chemical exposure.						
<b>Action Closure Requirements</b>						
Upload roster or training documentation as OE.						
<b>Originator</b>				<b>Originator's Organization</b>		
Anne Forde - 361875				Environment, Safety & Health		
<b>Date Created</b>				<b>Due Date</b>		
07/06/2023 12:31 MDT				10/26/2023		
<b>Date Implementation Complete</b>	<b>Days Open</b>					
	83					
<b>Actions Taken</b>						
<b>Action Owner</b>				<b>Issue Owner</b>		
Elijah Gerlach - 358766				Gail Helm - 114849		
<b>Type</b>				<b>Causal Analysis Lead</b>		
Corrective				Thomas Harrison - 353050		
<b>Long Term</b>						
N						
<b>Applicable Causes</b>						
<b>Identifier</b>	<b>Code</b>	<b>Code Description</b>	<b>Type</b>	<b>Description</b>		
IMC-2023-0066	A6	Training Deficiency	Apparent			
<b>Notifications</b>						
<b>Person</b>	<b>Closure Notice</b>	<b>Opt-in Comments</b>				
Anne Forde - 361875	Y	N				
<b>Due Date Change Requests</b>						
<b>Identifier</b>	<b>Reason for Change</b>	<b>Original Date</b>	<b>Proposed Date</b>	<b>Disposition</b>		
N3B-IM-2023-0390-01-CHG01	Extension being requested by Tom Harrison as the Cause Analysis actions were entered for 8/1/2023 originally. This will give the action owner time to complete by 8/24/23.	08/01/2023	10/26/2023	Approved		
<b>Workbook</b>						
<b>Event</b>	<b>Status</b>	<b>Assigned To</b>	<b>Created By</b>	<b>Created On</b>	<b>Finished By</b>	<b>Finished On</b>
Initiate	Completed	Forde, Anne	Forde, Anne	07/06/2023 12:31 MDT	Forde, Anne	07/06/2023 12:39 MDT
Pending Cause Analysis	Completed	Holding Tank	Forde, Anne	07/06/2023 12:39 MDT	AUTO-GENERATED	07/07/2023 15:11 MDT
Implementation	Working	Gerlach, Elijah	AUTO-GENERATED	07/07/2023 15:11 MDT		



Change Request						
<b>Details</b>						
<b>Generated From</b>				<b>Current State</b>		
N3B-IM-2023-0390-01				Close		
<b>Responsible Organization</b>						
CH-TRU						
<b>Reason for change</b>						
Extension being requested by Tom Harrison as the Cause Analysis actions were entered for 8/1/2023 originally. This will give the action owner time to complete by 8/24/23.						
<b>Originator</b>				<b>Originator's Organization</b>		
Anne Forde - 361875				Environment, Safety & Health		
<b>Date Created</b>				<b>Date Closed</b>		
07/20/2023 09:53 MDT				08/01/2023		
<b>Days Open</b>				<b>Disposition</b>		
12				Approved		
<b>Rationale for Disposition</b>						
EMRB voted to approve this extension on 8/1/23.						
<b>Original Date</b>				<b>Proposed Date</b>		
08/01/2023				10/26/2023		
<b>Reviewer</b>						
EMRB						
<b>Comments</b>						
#	By	Date	Time	State	Comment	
1	Palalon, Chris	08/01/2023	13:29	Review	Proposed Date Updated From: 24-Aug-2023 To: 26 October 2023	
2	Palalon, Chris	08/01/2023	17:08	Review	Task Completed.	
<b>Notifications</b>						
<b>Person</b>						
Anne Forde - 361875						
<b>Workbook</b>						
Event	Status	Assigned To	Created By	Created On	Finished By	Finished On
Initiate	Completed	Forde, Anne	Forde, Anne	07/20/2023 09:53 MDT	Forde, Anne	07/20/2023 09:53 MDT
Review	Completed	EMRB	Forde, Anne	07/20/2023 09:53 MDT	Palalon, Chris	08/01/2023 17:08 MDT
Close	Completed		Palalon, Chris	08/01/2023 17:08 MDT	Palalon, Chris	08/01/2023 17:08 MDT
<b>Attachments</b>					<b>Uploaded By</b>	<b>Date Uploaded</b>
EMRB Closure Review Meeting Minutes 8.1.23.pdf					Palalon, Chris	08/01/2023 17:08 MDT

# Extension

EMRB Extension/Closure Review

Prepared By: Anne Fride

Title: CAS Specialist

Date: 8/11/2023

Date: 8/11/2023

Accuracy/Approval: Larry Dell

Title: CAS Senior Advisor

Date: 08/10/2023

IM Number: <u>2020-051-03 CHGS</u>										Comments
Voting Member										
<u>Larry</u>	<u>David</u>	<u>Robert</u>	<u>Vince</u>	<u>Eli</u>						9/28/23 Approved
<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	
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Extensions

EMRB Extension/Closure Review

Date: 8/1/23

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Accuracy/Approval:

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8/1/2023

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06/01/2023

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Closure

EMRB Extension/Closure Review

Prepared By: Anne Enle

Title: CAS Specialist

Date: 8/1/23

Date: 8/1/23

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Title: CAS Senior Advisor

Date: 08/01/2023

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# Industrial Hygiene Air, Swipe and Bulk Sampling/Monitoring

Next review date removed in accordance  
with VAR-2023-1004 for N3B-P311-1

Effective Date: 02/19/2021

~~Next Review Date:~~ ~~02/19/2024~~

## Responsible Manager

Stephanie Griego	/ 140892	/ Signature on File	/ 02/17/2021
<i>Safety and Emergency</i>	<i>Z#</i>	<i>Signature</i>	<i>Date</i>
<i>Management Programs</i>			
<i>Director</i>			

**REVISION HISTORY**

<b>Document No./ Revision No.</b>	<b>Effective Date</b>	<b>Action</b>	<b>Description</b>
N3B-DI-IHS-0014, R0	02/19/2021	New	Supersedes blue-sheeted procedure N3B-OSH-LIHSM-20-001, N3B-OSH-LIHSM-22-001, N3B-OSH-LIHSM-31-001.

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
TITLE PAGE.....	1
REVISION HISTORY .....	2
TABLE OF CONTENTS.....	3
1.0 INTRODUCTION .....	5
1.1 Purpose.....	5
1.2 Scope and Applicability .....	5
1.3 Background .....	5
2.0 RESPONSIBILITIES .....	6
2.1 Environment, Safety and Health (ES&H) Manager.....	6
2.2 Exposure Assessment Program Lead .....	6
2.3 Industrial Hygiene and Safety Professionals.....	7
2.4 Industrial Hygiene and Safety Technicians.....	7
3.0 EQUIPMENT AND TOOLS.....	8
4.0 PRECAUTIONS AND LIMITATIONS.....	8
5.0 PROCEDURE.....	8
5.1 Sampling Strategy .....	9
5.1.1 Data Quality Objective(s).....	9
5.1.2 Sampling Plan Development .....	10
5.2 Sampling/Monitoring .....	13
5.3 Analytical Data Review and Calculations.....	14
5.4 Air Sample Data Analysis .....	15
5.4.1 Determining Data Analysis Technique .....	17
5.4.2 One or Two Samples Collected.....	17
5.4.3 Rules-based Percent OEL Analysis (3 to 5 samples collected).....	18
5.4.4 Statistical Analysis (6 or more samples collected).....	19
5.4.5 Censored Data Analysis .....	21
5.4.6 Bayesian Decision Analysis Approach .....	21
5.5 Peer Review, Documentation, and Reporting .....	22
5.5.1 Peer Review.....	22

5.5.2	Reporting Personal Air Monitoring Data (Worker Notifications).....	22
5.5.3	Reporting all Other Industrial Hygiene Data.....	23
5.5.4	Documentation of Results .....	23
6.0	TRAINING .....	23
7.0	RECORDS PROCESSING.....	23
8.0	ACRONYMS AND DEFINITIONS .....	24
8.1	Acronyms .....	24
8.2	Definitions.....	26
9.0	REFERENCES .....	27
10.0	FORMS .....	29
11.0	ATTACHMENTS.....	29
	Attachment 1. Personal Breathing Zone Air Sampling.....	30
	Attachment 2. Area Air Sampling.....	38
	Attachment 3. Guidance on Collecting Various Types of Samples.....	40
	Attachment 4. Air Monitoring Equipment Calibration.....	46
	Attachment 5. Direct Reading Instruments.....	49
	Attachment 6. Sample Results Adjustments .....	53
	Attachment 7. Minimum Air Sample Volume Calculations.....	58
	Attachment 8. Swipe Sampling.....	59
	Attachment 9. Bulk Sampling.....	63



## **1.0 INTRODUCTION**

### **1.1 Purpose**

This desktop instruction (DI) describes the processes for planning for, collecting, analyzing the results of, and reporting on Industrial Hygiene (IH) related air, swipe, and bulk samples. It also includes guidance for performing IH measurements by direct reading methods. Described procedures minimize error and ensure repeatability by establishing uniform methodologies.

### **1.2 Scope and Applicability**

This DI applies to Industrial Hygiene and Safety (IH&S) personnel who perform IH sampling and monitoring in support of Newport News Nuclear BWXT - Los Alamos, LLC (N3B) operations. Sampling and monitoring are inclusive of sample method, media utilized, techniques (equipment utilized), analysis, data interpretation, and documentation. The overall sampling process is highly dependent on professional judgment of IH&S personnel and this expertise is applied during execution of this DI.

Resultant sampling/monitoring data are documented in the Open Range Comprehensive Tracking System (CTS). General information on using CTS is provided in N3B-GDE-IHS-0001, *Comprehensive Tracking System User Guide*.

Some substances have specific regulatory requirements. This DI is used in conjunction with extended standards in Occupational Safety and Health Administration (OSHA) 29 CFR 1910, for additional regulatory guidance. The extended standards provide guidance for carcinogens and highly toxic substances used in the work place. These standards include 20 CFR 1910.1001, *Asbestos*, through 1910.1053, *Respirable Silica*. In addition, 10 CFR 850, *Chronic Beryllium Disease Prevention Program*, and 10 CFR 851, *Worker Safety and Health Program*, include worker notification requirements for some specific agents (e.g., beryllium [Be]).

### **1.3 Background**

IH sampling and/or monitoring may be required:

- in support of exposure assessments (EA), also known as Health Risk Assessments (HRA) to characterize personnel exposure to chemical or physical hazards and to recommend controls or evaluate the acceptability of in-place, selected controls (e.g., ventilation),
- for periodic monitoring to verify historical sampling results,

- for on-going periodic sampling to ensure regulatory compliance (e.g., lead standard requirements),
- to investigate indoor air quality complaints or other employee concerns that may be related to an exposure to a chemical or physical hazard,
- for area or item release,
- to guide selection of Personal Protective Equipment (PPE),
- when decommissioning operational areas and/or releasing an area or item,
- during spill response and when evaluating the effectiveness of spill clean-ups,
- for accessing compliance with housekeeping levels in operational areas when they can contribute to personnel exposure (e.g., Pb), and/or
- other situations where an IH&S Professional determines that IH sampling and/or monitoring is appropriate.

## **2.0 RESPONSIBILITIES**

### **2.1 Environment, Safety and Health (ES&H) Manager**

- Ensures that IH&S personnel who perform sampling/monitoring have the appropriate training and qualifications and are authorized to perform the work.
- Determines and manages resources to ensure IH&S support of project activities.
- Oversees the implementation of this DI in area of responsibility.
- Works with project personnel to identify and communicate new and revised activities that may require sampling/monitoring.
- Designates IH&S Professionals to perform sampling/monitoring and peer reviews.
- Ensures requisite and appropriate sampling equipment and supplies are maintained to support project activities.

### **2.2 Exposure Assessment Program Lead**

- Serves as the point of contact for questions about sampling requirements.
- Provides technical guidance to IH&S Professionals and Techs, as necessary.
- Ensures this DI is consistent with regulatory requirements and updates this DI, as necessary.

## **2.3 Industrial Hygiene and Safety Professionals**

- Determine and document the need for sampling/monitoring requirements.
- Create and document a sampling strategy, when applicable.
- Conduct sampling/monitoring for potential exposure risks, as described in this DI.
- Document field observations, personnel data, selected sampling methods, sample collection, equipment use and calibration data.
- Analyze sample results as soon as practical and per regulatory requirements, when applicable.
- Document sampling/monitoring activities using applicable sample forms or document equivalent information in field notes.
- Enter sampling information, monitoring data, and analytical results, as applicable, into the CTS database, and link the sampling data to CTS records.
- Generate an Industrial Hygiene report, including related findings and recommendations.
- Ensure that data are peer reviewed prior to release.
- Upon review and resolution of comments, distribute the report results in PDF form via email or equivalent to the Responsible Line Manager (RLM) and sampled employee and an abbreviated, redacted report (i.e., personally identifiable information [PII] removed) to affected employees if applicable.
- Contact the appropriate IH&S Program Lead (e.g., lead [Pb], silica [Si]), whenever an exposure is reported above the applicable occupational exposure limit (OEL) prior to releasing the report for review.
- Perform peer reviews, as requested.

## **2.4 Industrial Hygiene and Safety Technicians**

- Perform sampling/monitoring-related duties as directed by ES&H Manager and/or IH&S Professional.
- Work with and under the guidance of a Certified Industrial Hygienist or IH&S Professional to define and complete sampling, as necessary.

### **3.0 EQUIPMENT AND TOOLS**

- CTS
- Specific sampling/monitoring equipment and supplies for each sampling/monitoring technique are noted in the applicable attachment.

### **4.0 PRECAUTIONS AND LIMITATIONS**

When performing field activities with potential hazardous exposures, this DI shall be used in conjunction with a work control document (WCD) prepared in accordance with N3B-AP-P300-1, *Integrated Work Control Process*. The potential for health and safety hazards to be present in the sampling area, as well as the hazards associated with the element or material being sampled/monitored, will need to be assessed and evaluated on a case-by-case basis. The minimum required PPE will be protective gloves, generally nitrile, but will depend on the elements or material being sampled. The hazard and risk assessment (N3B-DI-IHS-0001, *Industrial Hygiene Exposure Assessments*) should guide the sampler to the necessary PPE beyond protective gloves.

Personnel performing field activities must have training and/or qualifications in accordance with requirements for area access (e.g., radiological controls) or substance or hazard specific programs (e.g., noise, silica), as applicable.

During the planning process, it must be determined if any regulated waste material will be generated in the process of collecting swipe or bulk samples. An environmental professional should be contacted to determine waste disposition requirements.

During the planning process, it must be determined if any of the surfaces to be sampled are potentially radiologically contaminated. The presence or potential presence of radioactivity may require the collected samples to be monitored for contamination and/or a sacrificial sample collected to be used to assess contamination levels in the collected samples. In addition, sampling equipment and supplies may require radiological monitoring prior to leaving the area. Consult with the assigned Radiological Control Technician (RCT) and incorporate any radiological control requirements in the WCD.

All personal data documented during sampling is considered PII and shall be handled in accordance with N3B-P204-1, *Controlled Unclassified Information*.

### **5.0 PROCEDURE**

The process of IH hygiene sampling and monitoring consists of (1) designing a sampling strategy to ensure that the data generated is suitable for the intended use (i.e., fit for purpose); (2) collecting samples followed by laboratory analysis and/or performing monitoring using direct-read instruments; (3) reviewing the data for usability; (4) analyzing the data; and (5) reporting on the data. Each of these major steps is covered in Subsections

5.1 through 5.5, respectively.

In addition, tools to facilitate these major steps are provided in attachments to this DI. A component of ensuring data suitability is to collect sufficient sample to achieve the desired sensitivity based on the laboratory's limit of quantification (LOQ). Equations to determine the appropriate volume of sample and the time necessary to collect that volume are provided in Attachment 7, *Minimum Air Sample Volume Calculations*.

Guidance on performing various types of sampling are provided in the following attachments:

- Attachment 1. *Personal Breathing Zone Air Sampling*,
- Attachment 2. *Area Air Sampling*,
- Attachment 8. *Swipe Sampling*, and
- Attachment 9. *Bulk Sampling*.

Instrument specific information on various types of direct-reading instruments is provided in Attachment 5, *Direct Reading Instruments*.

Some analytes or categories of analytes (e.g., dust, silica, metals) have specific sampling nuances that may be required by regulation or are otherwise important to ensure that the resultant data are representative of the conditions. Details on some of these parameters that are applicable to N3B activities are provided in Attachment 3. *Guidance on Collecting Various Types of Samples*. The information in this attachment, and documents referenced therein, may be useful for developing the sampling strategy and collecting samples for included substances.

Air sampling techniques require use of a calibrated sampling system. The process for performing pre- and post-sampling calibration is described in Attachment 4, *Air Monitoring Equipment Calibration*.

Results reported by the laboratory may require further calculations or adjustments prior to making decisions based on the data. Information and equations for performing some of the common calculations are provided in Attachment 6, *Sample Results Adjustments*.

## **5.1 Sampling Strategy**

### **5.1.1 Data Quality Objective(s)**

#### **IH&S Professional**

- [1] IDENTIFY the physical or chemical agent(s) to be sampled AND the rationale for sampling.

- [2] IDENTIFY any regulatory or procedural requirements that mandate minimum sampling requirements and the sampling goals necessary to assure resultant data will be suitable for the intended use.
- OSHA has specific requirements for conducting initial and periodic sampling for several known carcinogens and toxic materials (e.g., 29 CFR 1910.1025, *Lead*, 10 CFR 850, *Chronic Beryllium Disease Prevention Program*).
  - Guidance on some substance specific requirements (e.g., Be, asbestos, silica) is provided in Attachment 3, *Guidance on Collecting Various Types of Samples*.
  - In the absence of such requirements, the strategy should be selected to adequately characterize exposures as either “acceptable”, “uncertain”, or “unacceptable”.
- [3] DETERMINE the applicable limit (i.e., compliance OEL, guidance threshold, or working threshold [See Section 10, Definitions]) for each physical and/or chemical agent(s) to be measured.
- Generally, 10 CFR 851 requires compliance with the 2016 American Conference of Governmental Industrial Hygienists (ACGIH) – Threshold Limit Values (TLV).
  - For swipe sampling, there may be housekeeping limits for surface contamination.

### **5.1.2 Sampling Plan Development**

**NOTE 1:** A formal sampling plan is not required for all sampling events. However, the guidance in this section is applicable for all sampling events, even if a formal sampling plan will not be generated.

**NOTE 2:** Additional information that may be helpful in generating the sampling plan is provided in the attachments to this DI.

**NOTE 3:** Real-time instrument readings are more appropriately used to determine compliance with ceiling levels, to identify whether personal sampling is indicated, or to reveal whether controls need to be improved before performing personal sampling. The results of general area or grab samples should not be used for comparing employee exposure with the OSHA Permissible Exposure Limit (PEL) or ACGIH TLV except in rare circumstances.

## **IH&S Professional**

- [1] DETERMINE the type of sampling/monitoring to be performed. Methods available to the industrial hygienist include the following:
  - Integrated air monitoring (e.g., breathing zone, area, continuous oxygen sensors, diffusion badges).
  - Direct read instruments (e.g., multi-gas meters, photoionization detector [PID], Fourier-transform infrared [FTIR] spectrometer).
  - Surface sampling using dissolvable swipes to measure loose surface content (e.g., Pb, Be).
  - Bulk sampling to identify material content (e.g., asbestos, silica, metals).
- [2] DETERMINE the analytical method to be followed.
  - National Institute of Occupational Safety and Health (NIOSH), OSHA, American Society for Testing Materials (ASTM), and other nationally recognized organizations develop sampling methods that provide extensive information on how to properly collect and prepare samples for shipment to the analytical laboratory. Check with the analytical laboratory or the local senior IH&S Professional or Exposure Assessment Program Lead if a method cannot be found for the agent to be sampled.
- [3] DETERMINE which laboratory the samples will be sent to. The N3B Sample Management Office (SMO) can provide assistance, as necessary.
  - An American Industrial Hygiene Association (AIHA)-accredited (or equivalent) laboratory for all sample analysis.
- [4] IDENTIFY the personnel, area, and/or items to be sampled.
  - Try to sample the workers with the greatest exposure potential or those workers performing activities with the worst-case exposure potential. In cases where many workers will perform the same or similar activities, the evaluated workers can be organized into similar exposure groups (SEG). The results of sampling performed for a given worker in this group can then represent all workers in that grouping.
  - Identify the higher at risk population, based on knowledge of the operation, scientific references such as NIOSH Topics, (e.g., silica exposure), and qualitative (e.g., professional judgment). Results can then be applied to the selection or assessment of controls and to the group as a whole, provided the work technique is not identified as the main contributor to individual's sample results.



- For bulk sampling, select a representative sample of material to be characterized. If sampling for asbestos, reference regulatory guidance for direction and the number of required samples.
  - For swipe samples, reference regulatory guidance if sampling for asbestos and beryllium. For other metals, when sampling is used to evaluate general housekeeping practices, focus on the area where work is performed and then floors, table tops, phone(s), and other surfaces where a work activity may result in surface metal contamination.
  - Additional information is available in Attachment 3, *Guidance on Collecting Various Types of Samples*.
- [5] OBTAIN existing data for the process, if available.
- [6] DETERMINE the number of samples to take.
- Try to collect at least six samples to help with the decision making process (air sampling). Refer to Figure 5-1, as necessary.
  - Ensure that sufficient samples are collected to meet applicable regulatory requirements (e.g., Be).
- [7] DETERMINE the quantity/volume of sample that is needed to obtain the required detection limit.
- Refer to the analytical method and/or contact the laboratory, as necessary, to obtain this information.
  - Information on calculating volumes for air samples is provided in Attachment 7, *Minimum Air Sample Volume Calculations*.
- [8] DETERMINE how many field blanks are required.
- One field blank, or a minimum of 10% of the total number of samples, is the minimum for air and swipe samples.
  - The specific method may require more field blanks. For example, NIOSH Method 7400 for asbestos and other fibers requires a minimum of two field blanks, even for a single asbestos sample.
- [9] IF a formal sampling plan will developed, THEN DOCUMENT the following information, at a minimum, in the sampling plan:
- Sampling location(s) and/or personnel to be sampled
  - Sampling method and media
  - Sample volumes/times/area



- Sampling pump flow rates, as applicable
- Number of field blanks to collect
- Other blanks (e.g., media blanks), if required by the laboratory
- Potential interferences and/or other sampling considerations

## **5.2 Sampling/Monitoring**

### **IH&S Professional/Tech**

- [1] COLLECT equipment and supplies to support sampling/monitoring.
- [2] PERFORM sampling.
  - Sampling must be done in accordance with a sampling plan, if generated.
  - Guidance on the applicable sampling technique is provided in the attachments to this DI.
- [3] DURING the sample collection process, COLLECT the requisite number of field blanks. Details on collecting field blanks are provided in the applicable attachment for the sampling technique.
- [4] IF a release sample is required when sampling in radiological areas, THEN PREPARE a sacrificial, representative (area or personnel) sample for analysis and release.
- [5] COMPLETE chain of custody(s) (COC).
- [6] SEAL each sample and blank with a custody seal OR PACKAGE the samples and blanks together in a zip-lock bag and place the custody seal on the outermost container.
  - Do not place a custody seal over sample label information.
  - When using centrifuge tubes or other containers that close securely, each sample does not need a seal if they are placed in a bag or box with an affixed security seal.
- [7] ENSURE that samples from radiological areas have a documented release by an RCT.
- [8] PLACE the samples and blanks in zip-lock bags.

**NOTE:** Samples should be submitted to the analytical laboratory as soon as practical following collection.

- [9] OBSERVE sample storage and handling requirements for the specific analytical method from the time the samples are collected until delivered to the N3B SMO.
- [10] COMPLETE a Shipping Classification Determination Checklist, per N3B-SOP-SDM-1102, *Sample Receiving and Shipping by the N3B Sample Management Office*.
- [11] IF the samples cannot be submitted immediately to the laboratory THEN PLACE them in a secure location to ensure sample integrity. The location must also preclude sample cross-contamination.
- [12] TRANSPORT the samples and blanks to the N3B SMO for shipment to the designated laboratory.
- [13] OBTAIN a copy of the signed COC from the SMO when delivering the samples.

### 5.3 Analytical Data Review and Calculations

**NOTE 1:** Preliminary review should be completed the same day that the sample results are received, if practical, to determine if results indicate a risk of overexposure, as applicable. Final calculations should be completed within two weeks of receipt of results or as required by regulation.

**NOTE 2:** Sample results may be reported with a less than sign (<) in front of a number, which is referred to as left-censored or censored data. These results may be the same value as the limit of detection (LOD), also known as the method detection limit (MDL) or detection limit (DL), or the reporting limit (RL), also known as the LOQ.

#### **IH&S Professional/Tech**

- [1] ENSURE the sample identifications and other data match those listed on the COC.
- [2] VERIFY that the requested analyses have been performed, results are provided for each analyte for each sample submitted, and these results are reported in accordance with the applicable standard.
- [3] RECONCILE any discrepancies.
- [4] REVIEW the laboratory control sample(s) (LCS) recovery(s) is (are) to determine if they are within the specified range.

- [A] IF the recovery for an LCS is outside the specified limits (should be flagged by the laboratory), THEN CONTACT the laboratory to discuss the validity of the sample results. If the recovery is high, the sample results could be biased high. Conversely, if the recovery is low, the sample results could be biased low.
- [B] DOCUMENT any potential impact of a failed LCS on the sample data in CTS.
- [5] REVIEW field blank results.
  - [A] IF field blanks have reported values below the RL or LOQ, THEN no action is necessary.
  - [B] IF field blanks have reported values above the RL or LOQ, THEN CONSULT with the laboratory and the Exposure Assessment Program Lead to determine potential impacts on the data.
- [6] IF preliminary data review indicates that the results indicate a risk of overexposure THEN TAKE the following actions:
  - [A] NOTIFY the ES&H Manager.
  - [B] IF the results exceed acceptable exposure limits without regards to PPE in use, THEN consult with the Exposure Assessment Program Lead.
  - [C] IF directed by the ES&H Manager or the Exposure Assessment Program Lead to report the results to the applicable RLM and workers prior to generating an official report THEN NOTIFY applicable personnel.
- [7] COMPLETE final calculations (e.g., Time-Weighted Average [TWA], Short-Term Exposure Limit [STEL], OEL adjustments for extended shifts, normalized to appropriate unit of measure), as applicable.
  - Additional information is provided in Attachment 6, *Sample Result Adjustments*.
- [8] COMPARE calculated results to the standard (e.g., TLV, OEL).

## **5.4 Air Sample Data Analysis**

This section describes various statistical tools that may be utilized to analyze air sample data depending on the number of samples taken. During the data analysis phase, including any time necessary for additional sampling, the exposure will remain “uncertain” until the exposure can be judged “acceptable” or “unacceptable”.

Figure 5-1 depicts the data analysis process described in the following subsections.

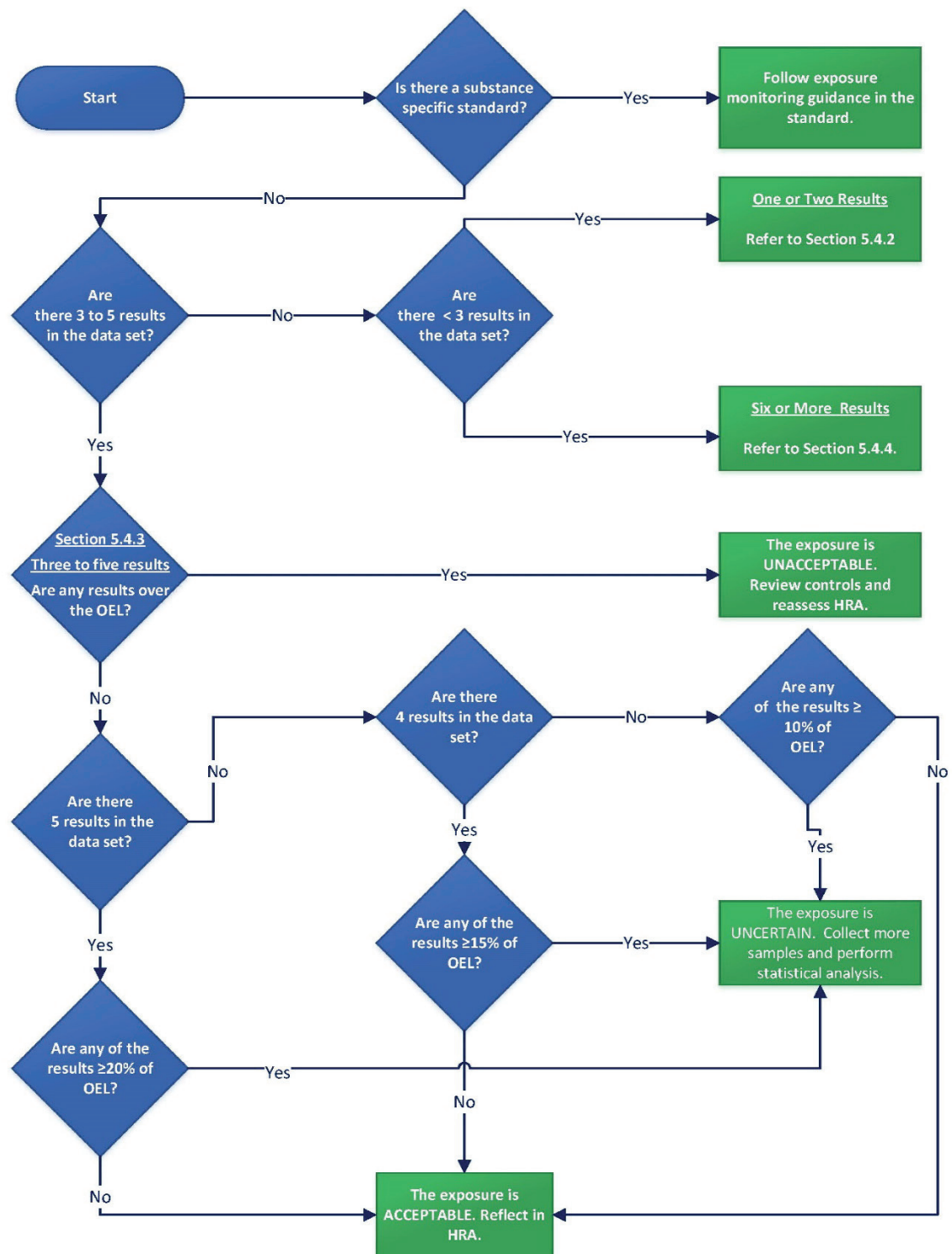


Figure 5-1. Air Sample Data Analysis Process Flowchart

#### 5.4.1 *Determining Data Analysis Technique*

**NOTE:** The local senior IH&S Professional or Exposure Assessment Program Lead may be consulted, as necessary, to assist in selection of the data analysis technique.

##### **IH&S Professional**

- [1] IF sampling was performed in accordance with an OSHA or Department of Energy (DOE) substance-specific standard, THEN FOLLOW the exposure acceptability requirements in the respective standard.
- [2] IF data are censored THEN GO TO Section 5.4.5.
- [3] IF there are less than six sample results and the work is similar, THEN PERFORM a Bayesian analysis (Section 5.4.6) OR RELY on professional judgement and note that the data results are uncertain and may require the collection of additional data if possible.
- [4] SELECT the appropriate data analysis method based on the number of samples collected.
  - [A] IF 1 or 2 samples were collected, THEN GO TO Section 5.4.2.
  - [B] IF 3 to 5 samples were collected, THEN GO TO Section 5.4.3.
  - [C] IF 6 or more samples were collected, THEN GO TO Section 5.4.4.

#### 5.4.2 *One or Two Samples Collected*

**NOTE:** The preference is for a minimum of three samples to be collected, whenever achievable. However, there will be cases where the exposure acceptability decisions have to be made using only one or two samples.

##### **IH&S Professional**

- [1] REVIEW the results compared to the OEL. The exposure can be considered acceptable if the sample results meet one of the following conditions.
  - The results are less than 10% of the OEL.
  - The sample results are less than the RL (or LOQ) and the RL (or LOQ) is less than 50% of the OEL.
- [2] IF one the conditions in Step [1] is not met, THEN the exposure profile is considered unacceptable.
  - [A] REVIEW controls AND ADJUST, if needed.

- [B] VERIFY that the Hazard Risk Assessment (HRA) reflects the unacceptable exposure profile, if not, adjust the HRA.

#### 5.4.3 Rules-based Percent OEL Analysis (3 to 5 samples collected)

**NOTE:** Whenever there are at least three samples or results, but less than six, the data set can be evaluated for exposure acceptability using a rules-based analysis. This approach assumes a lognormal distribution, has a confidence level less than 95%, and does not represent a specific variance level.

#### **IH&S Professional**

- [1] REVIEW the sample results AND DETERMINE if any of the results exceed the applicable OEL.
  - [A] IF yes, THEN the exposure profile is considered unacceptable.
    - [a] REVIEW controls AND ADJUST, if needed.
    - [b] VERIFY that the HRA reflects the unacceptable exposure profile, if not, reassess.
- [2] IF there are 5 sample results THEN DETERMINE if any of the results exceed 20% of the selected OEL.
  - [A] IF yes, THEN the exposure profile is uncertain.
    - [a] COLLECT more samples
    - [b] PERFORM a statistical analysis.
  - [B] IF no, THEN the exposure profile is acceptable.
    - [a] UPDATE the HRA, as necessary, to reflect the exposure profile.
- [3] IF there are 4 sample results THEN DETERMINE if any of the results exceed 15% of the selected OEL.
  - [A] IF yes, THEN the exposure profile is uncertain.
    - [a] COLLECT more samples
    - [b] PERFORM a rules-based or statistical analysis, as applicable.
  - [B] IF no, THEN the exposure profile is acceptable.
    - [a] UPDATE the HRA, as necessary, to reflect the exposure profile.

[4] IF there are 3 sample results THEN DETERMINE if any of the results exceed 10% of the selected OEL.

[A] IF yes, THEN the exposure profile is uncertain.

[a] COLLECT more samples

[b] PERFORM a rules-based or statistical analysis.

[B] IF no, THEN the exposure profile is acceptable.

[a] UPDATE the HRA, as necessary, to reflect the exposure profile.

#### **5.4.4 Statistical Analysis (6 or more samples collected)**

##### **IH&S Professional**

[1] REVIEW the sample results AND DETERMINE if any of the results exceed the applicable OEL.

[A] IF yes, THEN the exposure profile is considered unacceptable.

[a] REVIEW controls AND ADJUST, if needed.

[b] VERIFY the HRA reflects the unacceptable exposure profile. If not, reassess.

[2] OBTAIN descriptive statistics for the data set with interest in the mean, median, standard deviation (SD), geometric mean (GM), geometric standard deviation (GSD), and the percent above the OEL. Ideally, the following criteria will be met:

- Mean plus two SDs is less than the OEL,
- GM times the GSD is less than the OEL, and
- Zero percent above the OEL.

**NOTE 1:** Even if the conditions in Step [2] are not met, the exposure or exposure profile could still be considered acceptable by reviewing inference statistics.

**NOTE 2:** The following step is optional and may be performed at the discretion of the IH&S Professional.

[3] SCREEN the data for acceptability, if desired, using the following:

[A] CALCULATE the median value of the data set.

[B] MULTIPLY the median value of the data set by 2, 4, and 6.

[C] DIVIDE each by the selected OEL.

[D] MULTIPLY by 100 to convert to percent.

[E] IF the highest value exceeds the OEL THEN the assumption can be made that the 95<sup>th</sup> percentile will exceed the OEL.

[4] OBTAIN inference statistics to determine if the data set fits a lognormal and/or normal distribution using a Shapiro Wilk test (sometimes referred to as the W-test) or a log probability plot.

**NOTE:** Air sampling exposure data for a SEG is generally considered to be lognormally distributed. Noise dosimetry exposure data for a SEG as percent dose is lognormally distributed but as dBA is normally distributed.

[5] IF the data set fits a normal or lognormal distribution, THEN PROCEED to Step 7.

[6] IF the data set does not fit a normal or lognormal distribution THEN TAKE the following actions:

[A] ANALYZE the sample results for outliers.

[a] IF outlier(s) is(are) observed, THEN REMOVE the outlier(s) AND REANALYZE data set.

[B] COLLECT additional samples AND REEVALUATE.

[C] In the interim, CONSIDER the exposure profile as uncertain.

[a] REVIEW controls AND ADJUST, if needed.

[b] VERIFY the HRA reflects the uncertain exposure profile and any adjustment to controls. If it does not, reassess.

**NOTE:** The UTL<sub>95%,95%</sub> means there is 95% confidence in the calculated 95<sup>th</sup> percentile value.

[7] CALCULATE the UTL<sub>95%,95%</sub>.

[A] IF the UTL<sub>95%,95%</sub> is less than the OEL, THEN the exposure profile is judged acceptable.

[B] IF the UTL<sub>95%,95%</sub> is greater than the OEL, THEN the exposure profile is judged uncertain.

[a] REVIEW controls AND ADJUST, if needed,

[b] VERIFY the HRA reflects the uncertain exposure profile and any adjustment to controls. If it does not, reassess, and

[c] COLLECT additional samples, if deemed necessary, based on statistical data review.



#### 5.4.5 *Censored Data Analysis*

Censored data (data points to the left of the distribution) can present a challenge when determining if the exposure profile is acceptable. When dealing with censored data, contact the local senior IH&S Professional or Exposure Assessment Program Lead to discuss the best approach for evaluating the data set, as necessary.

The censored data should be evaluated using the following considerations:

- Evaluate the censored data as a percentage of the OEL. Ideally, each censored data point will have sufficient air volume to provide a value at less than 10% of the selected OEL.
- Evaluate the level of censored data in the data set. The larger degree of censoring relative to the closeness to the OEL, the less accurate censored data analysis becomes.
- Evaluate the “less than” value being used for the censored data; is it the LOD, also known as the DL, or the LOQ, also known as the RL? Preferably, the analytical laboratory is using the LOD.
- Determine how to deal with multiple censored data values within a data set. Maximum Likelihood Estimation (MLE) is the preferred method for dealing with censored data. The details of this method goes beyond inclusion in this DI. For additional information, contact the Exposure Assessment Program Lead.

#### 5.4.6 *Bayesian Decision Analysis Approach*

**NOTE:** This technique is not a standalone approach to statistical analysis. Rather, it is a complimentary approach that can be used to confirm a preliminary analysis. Bayesian Decision Analysis (BDA) strengths are tied to small result sets, censored data, and examining the upper tail of a data set distribution (e.g., BDA can be completed using either IHDA-Student or IHDataAnalyst).

#### **IH&S Professional**

- [1] CALCULATE descriptive and compliance statistics using IHDataAnalysis or a similar software package (e.g., EPA ProUCL).
- [2] APPLY Bayesian statistical methods.
- [3] DETERMINE the true 95<sup>th</sup> percentile exposure and AIHA Exposure Rating category.

## **5.5 Peer Review, Documentation, and Reporting**

### **5.5.1 Peer Review**

**NOTE:** The purpose of the peer review is to verify data quality and technical accuracy. Peer reviews may happen at various times during the data analysis process and are required prior to results being reported. If the calculated results are greater than the OEL, the peer review process should be completed as soon as practical (same day preferable).

#### **IH&S Professional**

- [1] REQUEST a peer review.

#### **Peer Reviewer**

- [2] PERFORM peer review AND PROVIDE input to the initiating IH&S Professional.

#### **IH&S Professional**

- [3] RESOLVE any questions and/or differing opinions from peer review before proceeding.

### **5.5.2 Reporting Personal Air Monitoring Data (Worker Notifications)**

#### **IH&S Professional**

- [1] PROVIDE written notification with findings and recommendations to affected workers and managers.
- Ensure that OSHA or 10 CFR 850/851 worker notification requirements for specific agents (e.g., Be, Pb, cadmium [Cd], hexavalent chromium [CrVI], benzene, formaldehyde, methylene chloride) are followed.
  - The notification can be generated via CTS or in memo form.
  - Memos sent to employees can only have a summary result and their own personal data. Other names must redacted.
  - If the results indicate that personnel should be included in a medical monitoring program, per N3B-P102-1, *Medical Surveillance and Certification Program*, include this information in the notification.
- [2] ATTACH the notification(s) to the sampling survey in CTS, as applicable.
- [3] PROVIDE a non-redacted copy of the results to Occupational Medicine.

### **5.5.3 Reporting all Other Industrial Hygiene Data**

#### **IH&S Professional**

- [1] REPORT sample results to the RLM and other applicable personnel.
- [2] ATTACH the notification(s) to the sampling survey in CTS, as applicable.

### **5.5.4 Documentation of Results**

#### **IH&S Professional/Tech**

- [1] COMPLETE documentation of the sampling in the CTS database.
  - Documentation includes all analytical laboratory reports, COC, and the electronic data deliverable(s) (EDD). When attaching a CSV data file to CTS, it is preferable to select “xlsx” as the uploaded file format as this will make it easier to retrieve and read in the future.
- [2] SUBMIT a copy of the report (summary) to N3B Records Management.

## **6.0 TRAINING**

Training requirements for IH&S personnel are provided in N3B-QS-IHS-0001, *Industrial Hygiene and Safety Qualification Standard*.

## **7.0 RECORDS PROCESSING**

Records generated by the performance of this procedure are protected and processed as described.

Sampling surveys are to be documented/recorded in the CTS database. N3B Records Management receives a copy of summary reports (see Section 5.5).

Completed records that are no longer required for field use/reference shall be managed in accordance with N3B-P1020-1, *N3B Records Management*.

When the records are no longer needed for current business, transfer all records to N3B Records Management custody according to N3B-P1020-1, *N3B Records Management*.

Record Identification	Record Type Determination	Protection/Storage Methods
Sampling plans	<b>Federal Record (Non-QA)</b> Temporary	Supervision <b>shall</b> ensure all records are managed, maintained and stored according to N3B-P1020-1, <i>N3B Records Management</i> .
Sampling surveys (sampling/monitoring data)	<b>Federal Record (Non-QA)</b> Temporary	
Notifications (memos, emails associated with monitoring)	<b>Federal Record (Non-QA)</b> Temporary	

## 8.0 ACRONYMS AND DEFINITIONS

### 8.1 Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
AIHA	American Industrial Hygiene Association
ASTM	American Society for Testing Materials
BDA	Bayesian Decision Analysis
Be	beryllium
C	Ceiling
Cd	cadmium
COC	chain of custody
CrVI	Hexavalent chromium
CTS	Comprehensive Tracking System
DI	desktop instruction
DL	detection limit
DOE	Department of Energy
EA	exposure assessment
EDD	electronic data deliverable
EMI	electromagnetic interference
ES&H	Environment, Safety and Health
FTIR	Fourier-transform infrared (spectrometer)
GM	geometric mean

GSD	geometric standard deviation
Hg	mercury
HRA	Health Risk Assessment (also known as an exposure assessment)
ICP	inductively coupled plasma
IH	Industrial Hygiene
IH&S	Industrial Hygiene and Safety
IOM	Institute of Occupational Medicine
ISO	International Organization for Standardization
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantification
MCEF	mixed cellulose ester filter
MDL	method detection limit
MLE	maximum likelihood estimation
N3B	Newport New Nuclear BWXT-Los Alamos, LLC
NIOSH	National Institute of Occupational Safety and Health
OEB	Occupational Exposure Banding (process)
OEL	occupational exposure limit
OSHA	Occupational Safety and Health Administration
Pb	lead
PBZ	personal breathing zone
PEL	Permissible Exposure Limit
PID	photoionization detector
PII	personally protected information
PPE	personal protective equipment
PPT	Parallel Particle Impactor
RCT	Radiological Control Technician
RL	Reporting Limit
RLM	Responsible Line Manager
SD	standard deviation
SEG	similar exposure group

Si	silica
SMO	Sample Management Office
STEL	Short-Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time-Weighted Average
WCD	work control document
WEEL	Workplace environmental exposure limit
XRD	X-ray diffraction

## 8.2 Definitions

**Activity**—Specific actions taken by an employee to implement tasks for work. The activity is defined by the RLM.

**Compliance OEL**—The lower value between the OSHA PEL, Ceiling (C), Peak and the 2016 ACGIH TLVs. There may be exceptions, for example, beryllium in accordance with 10 CFR 850 uses the OSHA 8-hour TWA as the compliance OEL.

**Comprehensive Tracking System**—An Open Range database used to track EAs, sampling data, and generate associated reports.

**Exposure Profile**—The distribution of exposures for a worker or group of workers who have been aggregated by similarity of work environment and work conditions (i.e., similar exposure group). Typically, the exposure distribution is described using the lognormal distribution model.

**Guidance Threshold**—A numerical value that is from a source, such as AIHA workplace environmental exposure levels (WEELs), NIOSH recommended exposure limits, other OELs (e.g., German MAKs), or chemical manufacturer-recommended thresholds.

**Hazardous agents**—Hazardous chemicals; physical agents (i.e., noise, temperature stresses, and nonionizing radiation); and biological agents.

**Industrial Hygiene and Safety Professional**—An individual who meets the necessary professional level core requirements and beryllium hazard assessment duty area requirements of the Industrial Hygiene and Safety Qualification Standard; or, for subcontractors working under an Exhibit F, an individual for whom the subcontractor can demonstrate equivalent knowledge and experience as approved by ES&H. For purposes of this DI, an IH&S Professional must either be an American Board of Industrial Hygiene Certified Industrial Hygienist, or work under the direction of such an individual.

**Personal Breathing Zone**—An area comprised of a hemisphere forward of the shoulders, centered at the nose, with a radius of approximately 6 to 9 inches.

**Occupational Exposure Limit**—A generic term used to represent a numerical value for an agent concentration or intensity that is allowable in the workplace and is averaged over some period to evaluate whether the measured concentrations are less than the allowable limit. Some substances may have several occupational exposure limits (e.g., an 8-hour TWA, STEL of 15 minutes, and a concentration [C-Ceiling] that should not be exceeded during any part of the worker exposure).

**Similar Exposure Group**—A group of workers having the same general exposure profile for the agent(s) being assessed because of the similarity and frequency of the activities and tasks they perform, the process with which they work, and the similarity of the way they perform the tasks.

**Working Control Document**—A work package or technical procedure developed in accordance with N3B-AP-P300-1, *Integrated Work Control Process*.

**Working Threshold**—A threshold established in the absence of a compliance OEL and guidance threshold. It is a numerical value that the IH&S Professional has determined to be reasonable and acceptable based on toxicological properties, epidemiology studies, or other scientific methodology, like NIOSH Occupational Exposure Banding (OEB) process.

## 9.0 REFERENCES

- 10 CFR 850, *Chronic Beryllium Disease Prevention Program*
- 10 CFR 851, *Worker Safety and Health Program*
- 29 CFR 1910, *Occupational Safety and Health Standards* (General Industry)
  - 1910.1000 TABLE Z-1 – TABLE Z-1 Limits for Air Contaminants
  - 1910.1000 TABLE Z-2 – TABLE Z-2
  - 1910.1000 TABLE Z-3 – TABLE Z-3 Mineral Dusts
  - 1910.1001 – Asbestos
  - 1910.1025 – Lead
  - 1910.1200 – Hazard Communication
  - 1910.1450 – Occupational exposure to hazardous chemicals in laboratories
- 29 CFR 1926, *Occupational Safety and Health Standards* (Construction)
  - 1926.1101 – Asbestos
- ACGIH TLVs® and BEIs®, *Threshold Limit Values for Chemical Substances*

*and Physical Agents*

- American Industrial Hygiene Association, *A Strategy for Occupational Exposure Assessment*, 2015
- ASTM D6966, *Standard Practice for Collection of Settled Dust using Swipe Sampling Methods for Subsequent Determination of Metals*
- ASTM D7659, *Standard Guide for Strategies for Surface Sampling of Metals and Metalloids for Worker Protection*
- Brookhaven National Laboratory, IH75190, *Surface Swipe Sampling for Metals*, Rev23, 6/23/2017
- DOD G 440.1-1B, *Worker Safety and Health Program for DOE*, USDOE, Washington, DC 20585
- N3B-AP-P300-1, *Integrated Work Control Process*
- N3B-DI-IHS-0001, *Industrial Hygiene Exposure Assessments*
- N3B-DI-IHS-0011, *Asbestos*
- N3B-DI-IHS-0012, *Beryllium Hazard Assessment and Inventory Management*
- N3B-GDE-IHS-0001, *Comprehensive Tracking System User Guide*
- N3B-P101-21, *Chronic Beryllium Disease Prevention Program*
- N3B-P101-32, *Worker Exposure Assessments*
- N3B-P101-35, *Occupational Exposure to Lead*
- N3B-P102-1, *Medical Surveillance and Certification Program*
- N3B-P204-1, *Controlled Unclassified Information*
- N3B-P1020-1, *N3B Records Management*
- N3B-POL-ESH-0004, *Occupational Exposure to Silica*
- N3B-QS-IHS-0001, *Industrial Hygiene and Safety Qualification Standard*
- N3B-SOP-SDM-1102, *Sample Receiving and Shipping by the N3B Sample Management Office*
- NIOSH Manual of Analytical Methods
- NIOSH Occupational Exposure Sampling Strategy Manual
- Occupational Safety and Health Administration Technical Manual, Section II, Chapter 1, *Personal Sampling for Air Contaminants*



- Occupational Safety and Health Administration Technical Manual, Section II, Chapter 2, *Surface Contaminants, Skin Exposure, Biological Monitoring and Other Analyses*
- OSHA Chemical Sampling Information
- OSHA Sampling and Analytical Methods
- OSHA T-006-01-0104-M, *Evaluation Guidelines for Surface Sampling Methods*, Salt Lake Technical Center

## **10.0 FORMS**

- N3B-Form-6343, *Air Sampling Data Sheet*
- N3B-Form-6344, *Direct-Reading Instrument Data Sheet*
- N3B-Form-6345, *Swipe and Bulk Sampling Data Sheet*

## **11.0 ATTACHMENTS**

Attachment 1. *Personal Breathing Zone Air Sampling*

Attachment 2. *Area Air Sampling*

Attachment 3. *Guidance on Collecting Various Types of Samples*

Attachment 4. *Air Monitoring Equipment Calibration*

Attachment 5. *Direct Reading Instruments*

Attachment 6. *Sample Result Adjustments*

Attachment 7. *Minimum Air Sample Volume Calculations*

Attachment 8. *Swipe Sampling*

Attachment 9. *Bulk Sampling*

## **Attachment 1. Personal Breathing Zone Air Sampling**

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### **1.0 INTRODUCTION**

Exposures are typically measured by collecting personal breathing zone (PBZ) samples. In rare instances, breathing zone sampling may not be feasible because of the lack of a personal sampling/analytical method for the chemical of concern or other considerations of the workplace environment.

Breathing zone samples may be collected in the following two ways:

- Continuous PBZ air sample for full-shift or STEL exposure monitoring. The sampling device is attached to the worker and worn continuously during the sampling period. This method is preferred because it continuously collects air for the entire sampling period. The sampling device can be a pump and media or a data-logging, real time monitor.
- Grab sample collected in the breathing zone of the worker. The sampling device is held by the Industrial Hygienist within the breathing zone of the worker. For example, a detector tube hand pump or a direct read-monitor may be used to collect one or a series of grab samples from within the breathing zone of the worker.

#### Full-shift Sampling

Full-shift PBZ samples must be representative of the monitored worker's regular exposure to hazardous agents. Full-shift samples should aim for a collection during the majority of the work shift. The sampler should be removed from the worker during breaks or other periods when there is no exposure to the hazardous agent. This rule should only be deviated from when the worker performs the work for a short period of time and has no exposure for the remainder of the shift.

#### STEL and Ceiling Sampling

Short duration sampling is performed to evaluate short-term exposures when there is a STEL or C standard to compare against. These samples are normally collected for a 15-minute duration. When collecting these samples, ensure that enough air is collected to meet both the method collection parameters for (1) the minimum air volume collected and (2) the maximum flow rate permitted by the method. In some cases, the OEL may specify a different time period for ceiling sampling (e.g., a 30-minute period). Refer to the OEL in all cases to confirm. See 29 CFR 1910.1000 Table Z-2 for maximum peak above ceiling for some toxic materials.

In some cases, short duration sampling may be performed by the Industrial Hygienist as a diagnostic method to identify specific tasks or processes within the full shift that contribute to overall exposure. Unless collected in series for the full shift, these short-term samples would not be used for assessing worker exposure.

## **2.0 EQUIPMENT AND SUPPLIES**

**NOTE 1:** Not all equipment listed here is required for all sampling/monitoring events. Conversely, there may be other equipment required, which may be obtained through the ES&H Manager.

**NOTE 2:** The manufacturer's instructions, including operating procedures, limitations, and precautions for these instruments should be reviewed before use.

- Sampling equipment (e.g., pump and media)
- Pump calibration equipment with current calibration
- MSA Altair-5 (for confined spaces, oxygen levels, explosive atmospheres, and toxins)
- Jerome Mercury (Hg) meter
- Photovac PID for organic vapor
- Portasens II for non-volatile contaminants (e.g., acids, chlorine)
- TSI DustTrak II for particulates
- Dräger CMS automated system
- Diffusion (passive) samplers - verify that the badges have not exceeded their shelf life.

## **3.0 SAMPLING PROCEDURES**

### **3.1 Pre-Sampling Activities**

#### **IH&S Professional/Tech**

- [1] CALIBRATE the sampling equipment to be used, as required, according to the applicable instructions in Attachment 4, *Air Monitoring Equipment Calibration*.
- [2] BUMP TEST the instrument using a known calibration standard, as applicable.
- [3] ENSURE that the battery charge level on the equipment is sufficient for the sampling duration, as applicable.

- [4] FAMILIARIZE supervisors and workers with the sampling equipment and the logistics of sampling prior to sampling (e.g., during the pre-job briefing).
  - Stress the importance of not removing or tampering with the sampling equipment.
  - Instruct workers to notify IH&S or their supervisor if the sampler required temporary removal (e.g., traveling offsite for lunch, changing PPE).

### **3.2 Sampling with Air Pumps**

**NOTE:** Do not transfer a sample being collected from one worker to another worker. For example, if a worker performing a task in the morning is replaced by another worker in the afternoon, change the media for the second worker. In all cases, conduct separate samples for separate workers.

#### **IH&S Professional/Tech**

- [1] DURING the sampling event, RECORD all field data for entry into CTS.
  - Data can be recorded on N3B-Form-6343, on an approved handheld device, a desktop computer, or in a laboratory notebook.
  - Print legibly for all handwritten field notes.
- [2] PLACE the monitoring equipment on the worker in accordance with the following:
  - Attach the monitoring equipment so that it does not interfere with work performance or safety of the worker.
  - Attach the collection device to the shirt collar or as close as practical to the nose and mouth in the worker's breathing zone.
  - The inlet should be oriented in a downward vertical position to avoid gross contamination from airborne debris.
  - The length of the tubing connecting the collection device to the sampling pump should not be excessive and should be secured to the worker to help prevent the tubing from being snagged or interfering with the worker's job function.
  - The inlet for the cyclone should be oriented so that it faces away from the worker.
  - The practice of placing the sampling media inside PPE applies only to PPE that is not intended to provide respiratory protection, such as welding helmets. PBZ sampling is done outside the PPE to determine if the correct assigned protection factor is being applied. If a welding helmet is used, collect the sample inside the welding helmet.

- [3] TURN ON the sampling pump and record the start time.
- [4] AFTER starting the pump, OBSERVE the pump operation briefly to make sure it is operating correctly.
- [5] REGULARLY MONITOR the sampling throughout the day AND RECORD relevant observations. Unless otherwise specified in the sampling plan, the sample collection time should be based on the information provided in Table A1-1.
  - Strive to sample for at least the minimum sampling time/air volume prescribed in the NIOSH or OSHA sampling method. Exceptions to this guideline would be when anticipating or observing the sampling medium becoming overloaded during sampling. See definition for additional information on overloaded samples.
  - Ensure that the sampler remains properly assembled and that the hose does not become pinched or detached from the sampling device or from the pump.

**Table A1-1. Air Sample Sampling Times**

Type of Sample	Sampling Time
Full shift TWA (e.g., 8-10 hour work shifts)	90% to 100% of shift duration or until task is complete
Short-term (STEL)	15-minute
Ceiling (C)	15-minute

- [6] WHILE the worker is at lunch or on break in a clean area, REMOVE the sampling pump from the worker AND PLACE in pause or standby mode.
  - Turn off or remove sampling pumps immediately before a worker leaves a potentially contamination area.
  - The sample media should be capped when the sampling pump is removed from the worker to prevent possible loss of contamination and accidental contamination.
  - If these areas might also be contaminated and are considered part of the workplace, then continue sampling and assess the need for sampling for surface contamination.
- [7] IF the media needs to be replaced during the sampling event THEN CHANGE the media AND RECORD the stop time for the media being removed/start time for the new media.

- [8] DURING the sampling event COLLECT the required number of field blanks.
- Field blanks should be opened in the workplace but not used to take samples.
  - Field blanks should be handled, stored, and shipped in the same manner as the samples.
- [9] WHEN the sampling period is concluded, TURN OFF the pump AND RECORD the stop time.
- [10] IF the pump was turned on and off during the day and the sampling media was not changed, THEN RECORD the total time that the pump ran.
- [11] IF sampling media was changed during the sampling, THEN NOTE the sampling times for each media used.
- [12] REMOVE the collection media from the pump.
- [13] CAP OR CLOSE the media AND SEAL it before it leaves your custody.
- The seal should be attached across the sample inlet and outlet so that evidence of any tampering is visible.
  - Press the seal onto the cassette to ensure that the adhesive adheres firmly to the sampling media surface.
- [14] POST-CALIBRATE sampling pumps within 24 hours before recharging the battery.
- [A] DETERMINE if the post-calibration result deviates more than 5% from the pre-calibration flow rate using the following equation:

$$\% \text{ variation} = \frac{\text{pre\_sampling rate} - \text{post\_sampling rate}}{\text{pre\_sampling rate}} * 100 \quad \text{Eq. A1-1}$$

- [B] IF the variation is greater than 5% THEN the sample is considered suspect and should be voided. A voided sample should not be submitted for analysis and reasons for voiding the sample documented in field notes.

### 3.3 Sampling with Passive (Diffusive) Samplers

**NOTE:** Do not transfer a sample being collected from one worker to another worker. For example, if a worker performing a task in the morning is replaced by another worker in the afternoon, change the media for the second worker. In all cases, conduct separate samples for separate workers.

**IH&S Professional/Tech**

- [1] REVIEW the manufacturer's instructions, including limitations, for passive samplers, as necessary.
  - [A] ENSURE sampling conditions are consistent with the limitations of the sampler before proceeding.
- [2] DURING the sampling event, RECORD all field data for entry into CTS.
  - Data can be recorded on N3B-Form-6343, on an approved handheld device, a desktop computer, or in a laboratory notebook.
  - Print legibly for all handwritten field notes.
- [3] RECORD the sampling site temperature and barometric pressure (may be done at any time during the sampling).
- [4] PLACE the monitoring equipment on the worker in accordance with the following:
  - Attach the monitoring equipment so that it does not interfere with work performance or safety of the worker.
  - Attach the collection device to the shirt collar or as close as practical to the nose and mouth in the worker's breathing zone.
  - The practice of placing the sampling media inside PPE applies only to PPE that is not intended to provide respiratory protection, such as welding helmets. PBZ sampling is done outside the PPE to determine if the correct assigned protection factor is being applied. If a welding helmet is used, collect the sample inside the welding helmet.
  - Care should be taken to ensure the diffusion membranes are not torn during sampling, as this will invalidate the sample.
- [5] RECORD the start time.
- [6] REGULARLY MONITOR the sampling throughout the day AND RECORD relevant observations.
  - Strive to sample for at least the minimum sampling time prescribed in the NIOSH or OSHA sampling method.
  - Because passive samplers are small and light-weight, they are easily turned over so that the sampling face is not exposed or they may be covered by loose clothing. Ensure that these do not occur, otherwise, the sample will be invalid.

- [7] WHILE the worker is at lunch or on break in a clean area, REMOVE the sampler from the worker OR CAP the sampler.
  - The sample media should be capped when the sampler is removed from the worker to prevent possible loss of contamination and accidental contamination.
  - Cap and remove sampler immediately before a worker leaves a potentially contamination area.
  - If these areas might also be contaminated and are considered part of the workplace, then continue sampling and assess the need for sampling for surface contamination.
- [8] DURING the sampling event COLLECT the required number of field blanks.
  - Diffuser sampler blanks should be briefly opened in the field in an area on-site where no contamination is expected and then immediately resealed with manufacturer's materials.
  - Field blanks should be handled, stored, and shipped in the same manner as the samples.
- [9] IF visual badge defects are observed during or after sampling THEN CONSIDER the sample results unreliable AND VOID the sample.
- [10] WHEN the sampling period is concluded, CAP OR CLOSE the media AND SEAL it before it leaves your custody.

### **3.4 Grab Sampling**

**NOTE 1:** Grab samples represent the conditions at the actual time/duration of sampling. Grab samples are typically used to evaluate if personal or full-shift area samples should be taken or if it is safe to enter an area with a potential acute hazard.

#### **IH&S Professional/Tech**

- [1] IF using a direct-reading instrument, THEN REFER TO Attachment 5 for additional information, as necessary.
- [2] COLLECT samples from, or approximate to, the worker's breathing zone, as appropriate.
  - Collect at least one sample measurement when the highest chemical exposure occurs, or most likely occurs, to estimate a worker's exposure compared with short-term or ceiling OELs.
  - Additional measurements may be needed based on job complexity and exposure potentials.



- [3] DOCUMENT the sampling/monitoring on N3B-Form-6343 or N3B-Form-6344, as applicable, or on field notes.
- [4] COMPARE the grab sample result(s) to Table A1-2 to determine if personal air sampling is necessary.

<b>Table A1-2. Grab Sample Result Assessment</b>		
<b>Sample Result(s)</b>	<b>Exposure Level</b>	<b>Personal Airborne Sampling</b>
Less than 10% OEL-TWA, or 10% STEL or C	Acceptable	Not required
Greater than or equal to 10% OEL-TWA, or 10% STEL or C	Inconclusive	Required

## **Attachment 2. Area Air Sampling**

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### **1.0 INTRODUCTION**

General area air samples may be used (1) to determine if reentry into a contaminated area is warranted or if areas adjacent to locations with possible hazardous atmospheres are contaminated, (2) to verify the effectiveness of a negative pressure enclosure, or as a screening measurement to validate initial qualitative exposure judgements.

The sampling equipment for area air sampling (as opposed to grab samples) is typically an air pump with collection media, which is used during a shift and then sent to an AIHA-certified laboratory for analysis. Sampling using sampling media must still be carried out using a recognized NIOSH, OSHA, or other approved method. Real time instruments, such as a particulate counter (e.g., TSI) or a PID can also be used to collect general area samples.

General area air samples require the instrument and media be placed in a fixed location within the work area, as opposed to a personal sample collected in a worker's breathing zone. General area air samples are typically collected over a full shift or a significant part of a shift (the length of the job with a potential to create the hazardous atmosphere). Except in rare instances, area air monitoring analytical results may not be used for OEL compliance determinations. Area air samples may be used for assessing worker exposures only in cases where there are safety concerns for the use of personal air sampling equipment (e.g., a confined space) or where no feasible personal sampling method exists.

### **2.0 EQUIPMENT AND SUPPLIES**

Typically, the same type of equipment is used for personal air sampling and area air sampling. Refer to Attachment 1 for a list of equipment and supplies.

The following real-time instruments are capable of data-logging for a full -shift sample:

- PID for organic vapor
- Portasen II for non-volatile contaminants (e.g., acids, chlorine)
- TSI Dust Trak II for particulates.

### **3.0 SAMPLING PROCEDURES**

#### **3.1 General Area Air Sampling**

The procedures for collecting area air samples are found in Attachment 1 and are not repeated here.

### **3.2 General Air Sampling Results**

General area sampling may be used to ensure that adjacent work areas do not have levels of airborne hazards at or above OELs (e.g., work areas adjacent to asbestos abatement, silica during cement cutting, epoxy application). The results are compared to the OEL for the hazard of concern to ensure the controls are adequate or to determine if PBZ monitoring is necessary. The results are not, however, compared to the OEL for compliance with exposure limits in evaluating personal exposure in the breathing zone. Be advised that general air sampling is only a screening method to determine if additional PBZ monitoring is necessary, whether reentry into a contaminated area is warranted, if areas adjacent to locations with possible hazardous atmospheres are contaminated, or to verify the integrity of a negative pressure enclosure during remediation or asbestos abatement operations. Although results are compared with available OELs, they are not used to determine OEL compliance. Because of the nature of general air sampling results, decisions regarding interpretation of results should be discussed with a qualified IH&S Professional.

## Attachment 3. Guidance on Collecting Various Types of Samples

### 1.0 INTRODUCTION

Some analytes or categories of analytes (e.g., dust, silica, metals) have specific sampling nuances that may be required by regulation or are otherwise important to ensure that the resultant data are representative of the conditions. Details on some of these parameters that are applicable to N3B activities are provided in this attachment. In some cases, N3B maintains a substance-specific program that contains additional information, as referenced herein.

### 2.0 TYPES OF SAMPLES/ANALYTES

#### 2.1 Air Sample - Total Particulates

Total particulates are collected using filters without the use of cyclones or Institute of Occupational Medicine (IOM) samplers. Just the filter is used, either open-face or the standard filter inlet. The type of filter is prescribed by the NIOSH or OSHA method used for collection.

#### 2.2 Air Sample - Respirable Fraction

When using a cyclone to collect the respirable fraction of particulates, use a clean cyclone and filter at a flow rate appropriate to the cyclone being used. Table A2-1 provides flowrates for three types of cyclones. Note that the appropriate flow rate to collect respirable particulates varies greatly - from 1.7 L/min for the 10 mm nylon cyclone to 4.2 L/min for the GK2.69 cyclone. Higher volumes allow the cyclone to detect much lower levels of hazardous respirable particulates over a shift; however, it is important not to overload the filter. Make certain that the cyclone inlet faces away from the person being monitored. If the cyclone is not listed in Table A2-1, follow manufacturer's instructions.

**Table A2-1. Cyclone Flow Rate Settings for Respirable Dust**

Cyclone	Flow Rate (L/min)
10 mm nylon	1.7
GK2.69	4.2
SKC Aluminum	2.5

Disposable Parallel Particle Impactor ® (PPI) Samplers provide a precise match to the International Organization for Standardization (ISO) 7708/CEN criteria in the OSHA Silica Rule and NIOSH respirable dust methods and are a preferable method for measuring some particulate's (e.g., silica). Manufacturer's instructions for pump calibration and

sampling are required to be followed. Preloaded pre-weighed filters are available for total particulate and respirable measurements on one sampling media.

## **2.3 Crystalline Silica**

When assessing workplace exposures to airborne crystalline silica, OSHA requires use of a respirable-particle-size-selective sampler that conforms to ISO criteria, such as one of the cyclones or PPIs as described above, and evaluation of samples using specific analytical methods.

Respirable dust samples for quartz, cristobalite, and tridymite are analyzed by X-ray diffraction (XRD). XRD is the preferred analytical method because of its sensitivity, minimum requirements for sample preparation, and ability to identify polymorphs (different crystalline forms) of free silica.

To confirm the presence of quartz or cristobalite in respirable samples, or to assess the presence of other substances that may interfere in the analysis of respirable samples, some analytical labs require a bulk sample to be submitted in addition to the personal samples for silica analyses. Verify with the analytical lab before collecting samples.

Test the cyclone and filter cassettes for leaks before using to avoid gross failure in the field.

Bulk samples should be submitted for all silica analyses if possible. Submit approximately 20-milliliter (ml) samples in an appropriately sealed container within a zip-lock bag. Bulk samples have the following purposes:

- To confirm the presence of crystalline silica (quartz, cristobalite, and/or tridymite) in the workplace or to assess the presence of other substances that may interfere in the analysis of respirable samples.
- To determine the approximate percentage of crystalline silica (quartz, cristobalite, and/or tridymite) in the bulk sample.
- To allow the laboratory to chemically resolve interferences that cannot otherwise be resolved (and therefore, a bulk sample must be representative of workplace dust).

Bulk samples should be collected in the following order of preference:

- A representative settled-dust (e.g., rafters, top of equipment, window sills) sample.
- A bulk sample of the raw material used in the manufacturing process.

- The type of bulk sample submitted to the SMO should be cross-referenced to the appropriate air samples. The reported results of bulk sample analysis for various forms of crystalline silica will be approximate because of the difficulty in matching the bulk material's matrix and particle size with the calibration standards used during analysis.

N3B's silica control program is described in N3B-POL-ESH-0004, *Occupational Exposure to Silica*.

## 2.3 Metals (General)

### Air Samples

- Collect metal fumes and particulates using a three-stage 37-millimeter (mm), 0.8-micrometer ( $\mu\text{m}$ ) mixed cellulose ester filter (MCEF) cassette for a total particulate sample. Be careful not to overload the filter.
- When sampling for welding fumes, the filter cassette must be placed inside the welding helmet to obtain an accurate measurement of the employee's exposure. Welding fume samples are normally taken using a 37-mm MCEF and cassette. If these cassettes will not fit inside the helmet, 25-mm MCEF and cassettes can be used. Extra care must be taken not to overload the smaller 25-mm MCEF when sampling.
- The practice of placing the sampling device inside PPE applies only to PPE that is not intended to provide respiratory protection, such as welding helmets or face shields. This sampling is performed to determine if respiratory protection is needed. If the PPE supplies air, such as a welding hood or an abrasive blasting hood, then the sample is placed outside the PPE.

### Bulk Samples

- Bulk samples are sometimes taken to document the source of the material present in the air. While the sampling plan is being developed, the laboratory should be consulted to determine if a bulk sample is required. Generally a 200 mg to one gram sample is sufficient (double-bagged in a zip-lock).

### Metals Analysis

- An ALHA-certified laboratory for metal analyses must be used for analyzing the metals of concern. Refer to the laboratory's most up-to-date analyte/method combinations when analyses require combinations of metals, such as welding fume exposure analyses.

- ALS Global Laboratory in Salt Lake City is AIHA-certified for metal analyses and can analyze for individual metal analytes using OSHA or NIOSH methods and for a series of metals (i.e., Panel A, B, C, or D). Panel A metal analyses is often used for analyses of welding fume exposure samples.

## 2.4 Asbestos

- Sampling for asbestos may require special qualification or certification. Refer to N3B-DI-IHS-0011, *Asbestos*, for additional information.
- Collect samples for asbestos using 0.8- $\mu$ m, 25-mm diameter MCEF cassettes that have been specially designated by the manufacturer for asbestos analysis. The filters must be contained in an electrically conductive cassette assembly that includes a 50-mm extension cowl. During collection the bottom disk is removed from the cassette and positioned with the open face of the cassette down to minimize contamination.
- Use a flow rate in the range of 0.5 to 5 L/min. For general sampling, 1-4 L/min is suggested, depending on the asbestos and dust levels; the sampler should not be overloaded with dust/asbestos, which reduce the airflow. For office environments, use flow rates of up to 5 L/min. Do not use nylon or stainless steel adapters if in-line calibration is done. Sample for as long as possible without overloading (obscuring) the filter because overloading can lead to an unreadable sample. Instruct the employee to avoid knocking the cassette and, if possible, to avoid using a compressed-air source that might dislodge the collected contaminant while sampling.
- Approximately 10% of all samples submitted should be blanks, with a minimum of two blanks in all cases.
- When possible, collect and submit a bulk sample of the material suspected to be in the air. Submit approximately 0.5 to 1 gram of material in a sealed container within a second container, such as a zip-lock.
- Analysis of asbestos air samples is performed by phase contrast microscopy. Bulk samples are analyzed by polarized light microscopy.
- For unusual sampling conditions or high flow rates, consult OSHA or NIOSH sample and analytical instructions for asbestos.

## 2.5 Beryllium Specific Requirements

- Analysis of beryllium samples must comply with 10 CFR 850, *Chronic Beryllium Disease Prevention Program*. Refer to N3B-DI-IHS-0012, *Beryllium Hazard Assessment and Inventory Management*, for additional information on sampling for beryllium.

## 2.6 Cadmium

- Neutron moderators: These are sheets of cadmium used to moderate neutrons and are used in research and calibration of radiation meters. Exposure to the oxide on the skin may be an exposure concern.
- Corrosion resistant coatings: These coatings are used to protect metals in harsh environments such as sewers. The problem arises when workers heat the cadmium coatings, such as with an oxy-acetylene torch, in the course of disassembling the component. Suspect coatings should be tested prior to any activity that could release the cadmium.
- Paint: Cadmium is found in paint with colors yellow-red. Suspect paint should be tested before sanding, grinding or abrading is performed on the painted surface.

## 2.7 Hexavalent Chromium

- Refer to N3B-P101-36, *Occupational Exposure to Hexavalent Chromium*, for additional information on sampling requirements for CrVI..

## 2.8 Lead

- Refer to N3B-P101-35, *Occupational Exposure to Lead*, for additional information on sampling requirements for lead.

## 2.9 Organic Vapors and Gases (Solid Sorbent Sampling Tubes)

- Organic vapors and gases can be collected using several different sampling media, including charcoal sampling tubes, with low-flow sampling pumps.
- Refer to the sampling plan for the specific tubes. Sampling rates may need to be reduced or smaller air volumes (half the maximum) may need to be sampled when the humidity is greater than 90% or when relatively high concentrations of other organic vapors are present.
- Immediately before sampling, break off the ends of the flame-sealed tube to provide an opening approximately half the internal diameter of the tube. Wear eye protection when breaking ends and use care not to cut yourself. Do not use the charging inlet or the exhaust outlet of the pump to break the ends of the tube. Tube holders and cutters should be used to protect the sampled person from sharp ends of sampling tubes.
- The smaller section of the sampling medium is the backup section, and it should be positioned closest to the sampling pump. If directional arrows are present on the sampling tubes, point the arrow towards the pump. The tube should be held or attached in an approximately vertical position during sampling. Draw air to be



sampled directly into the inlet of the tube. Generally, this air should not pass through any hose or tubing before entering the tube except in cases where a short piece of tubing is used to protect the end of the sampling tube (e.g., use of two tubes in series).

- Cap the tube with the supplied plastic caps immediately after sampling and apply a custody seal. The custody seal should cover the end caps. If the seal does not cover the end caps, tape the ends of the seal using clear plastic tape so that it is secure and tamper-resistant. Do not ship air samples with bulk samples (package separately).

## **Attachment 4. Air Monitoring Equipment Calibration**

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### **1.0 INTRODUCTION**

Primary calibration devices have their accuracy verified through a routine calibration schedule. A sticker on the side of the instrument will indicate the calibration status. The calibrators come with ranges of reliable airflow measure ranges, so the primary calibrator used for metal fume sampling low-flow sample collection (e.g., 50 ml/min) will most likely be a different primary source from that used for calibration of asbestos area asbestos fiber sampling.

The principles of sampling pump calibration apply whether using adsorbent tubes or any type of cassette for sample collection; pre- and post -calibration should use a sampling train that includes a filter and tube that are virtually identical to that used in actual sampling.

Check to be sure the equipment battery is charged or changed before the start of sampling.

It is recommended that the primary calibration instrument, shall not be used in contaminated environments (e.g., corrosive, dusty) because dust that flows through the calibrator piston area may scratch the glass and piston inside the calibrator.

Properly functioning and calibrated calibrators have an accuracy of approximately 99%. Use the appropriate calibrator for the flow being measured. It is recommended that the flow rates obtained from these devices be reported to three significant figures. For example, a flow rate shown as 1.006 L/min should be reported as 1.01 L/min.

### **2.0 CALIBRATION PROCEDURES**

#### **2.1 Air Pumps**

##### **IH&S Professional/Tech**

- [1] **PERFORM** the calibration at the pressure and temperature at which the sampling is to be conducted.
  - [A] **IF** this calibration environment is not possible, **THEN CONSULT** the sampling pump's operating manual to determine if the air volume needs to be adjusted for temperature and pressure.
- [2] **RUN** the pump for 5 minutes before voltage check and calibration.
- [3] Using a pre- loaded filter (or other sampler) for the sampling method, **TURN ON** the pump and adjust the rotameter (if so equipped) to the appropriate flow rate.
- [4] **PRESS AND RELEASE** the Read button for a single measurement. **PRESS AND HOLD** the Read button for consecutive measurements.

- [5] ADJUST the sampling pump to the correct flow rate using the calibrator results. Adjust the sampling pump while it is running.
- [6] CONFIRM that the sampling pump is adjusted properly AND TAKE additional calibrator readings. Three or more consecutive readings should be taken and should be within about 2% of each other and then averaged.
- [7] REPEAT the procedures described above for all pumps to be used for sampling. The same cassette and filter may be used for calibrations involving the same sampling method. Do not perform the calibration with the actual cassette and filter intended for sampling.

## **2.2 Cyclones or Open-Face Filters**

**NOTE 1:** If the manufacturer has provided an appropriate calibration adapter/shroud, using a 1-liter jar may be unnecessary. Follow manufacturer's instructions when using a calibration adapter/shroud.

**NOTE 2:** Open-face cassettes are used for asbestos and other chemicals such as isocyanates, crotonaldehyde, and glutaraldehyde.

### **IH&S Professional/Tech**

- [1] PERFORM the calibration at the pressure and temperature at which the sampling is to be conducted.
  - [A] IF this calibration environment is not possible, THEN CONSULT the sampling pump's operating manual to determine if the air volume needs to be adjusted for temperature and pressure.
- [2] SET UP the calibration apparatus as indicated in manufacturer's instructions.
- [3] TEST for leaks as follows:
  - [A] PLACE the manufacturer-supplied leak-test accessory (short piece of latex with a yellow plug) over the inlet (top port).
  - [B] PRESS AND HOLD the Stop button AND THEN PRESS the ON button. The display should read "Leak Test, Invert & Push Read".
  - [C] INVERT the unit AND PUSH Read.
  - [D] TURN the unit upright AND ALLOW it to stand. Make sure that the piston is at the top of the cell.
  - [E] ALLOW the calibrator to stand until the piston falls; this may take as long as 15-20 min. The unit will display "Test OK Press Read" if it passes the test.
  - [F] REPEAT the leak test with the leak-test accessory over the outlet (bottom port).

- [3] PLACE the open-face filter cassette or cyclone assembly in a 1-liter jar. The jar is provided with a special cover.
- [4] CONNECT the tubing from the electronic bubble meter to the inlet of the jar.
- [5] CONNECT the tubing from the outlet of the cyclone holder assembly or from the filter cassette to the outlet of the jar and then to the sampling pump.
- [6] CALIBRATE the pump with a light load (typically a 5- $\mu$ m, 37-mm filter) AND a heavy load (created by slightly pinching the tubing).
- [7] Post-sampling, RECALIBRATE the pump with a light load (typically a 5- $\mu$ m, 37-mm filter) AND a heavy load (created by slightly pinching the tubing). All readings must be within 5% of each other.

### **3.0 MAINTENANCE AND CARE OF ELECTRONIC CALIBRATORS**

Do not use liquid solvents or abrasive cleaners to clean the calibrator; wipe only with a cloth lightly dampened with water.

Store the instrument in a clean, dry place and with the unit on charge, if possible.

Bios recommends that the unit be recalibrated by the manufacturer annually.

## **Attachment 5. Direct Reading Instruments**

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### **1.0 INTRODUCTION**

The manufacturer's instructions on limitations on the use and accuracy of the results, and methods of interpretation of readings, should be applied to all direct-reading instruments. Become familiar with and follow the manufacturer's recommendations for operation of direct-reading equipment prior to use. NIOSH/OSHA methods are not applicable for direct-reading instruments.

### **2.0 INSTRUMENT SPECIFIC DETAILS**

#### **2.1 TSI DustTrak**

Use this monitor as a screening device to estimate total or respirable dust levels. The monitor is non-specific; it measures the airborne mass concentration of dust and not specific toxic substances.

Some instruments are calibrated to a specific type of dust (e.g., Arizona road dust) and may not give accurate results for dusts with different size distributions. The monitor may give erroneous readings due to differences in collection efficiency for large particle sizes when measuring total dust.

#### **2.2 Direct-reading Monitors**

Direct-reading gas monitors available for use include instruments for measuring carbon monoxide, hydrogen sulfide, combustible gases, organic vapors, and oxygen, mercury, acid gases, and total dust.

Ensure that the instrument is calibrated and determine that the battery charge is sufficient.

Readings should be taken as frequently as necessary to adequately characterize the exposure.

#### **2.3 Direct-reading Detector Tubes**

Direct-reading detector tubes should be used primarily as a screening tool. Samples are to be taken in the breathing zone of the worker or the anticipated breathing zone of a worker during a work activity. Detector tubes may be used to determine which areas should receive full-shift samples. They may also be used concurrently with full shift samples to trace sources of exposure and track variations in exposure levels throughout the work shift.

Consult the manufacturer's instructions for information on interferences and relative standard deviations for the specific tube as well as the number of strokes, time between strokes, time for allowing color development, and temperature, humidity, and atmospheric pressure effects. Reliable readings may not be possible when interferences are present.

Detector tubes must be used with the pump supplied by the manufacturer because different manufacturer's pumps may have different flow rates. Flow rate determines the adsorption rate for the chemical reactions that produce the color change or length of stain.

Consider the effects of temperature on chemical reaction speed. Tubes can be warmed in the winter by placing loose tubes in an inside pocket for approximately 15 minutes before use.

Avoid exposing tubes to prolonged high temperatures (e.g., automobile trunks in the summertime). Refrigerated storage is recommended. Useful life can be adversely affected by improper care.

Calibrate detector tube pumps using the manufacturer's methods. For colorimetric detector tubes, verify that the tubes have not exceeded their shelf life. Visually inspect the piston pump or bellows for cracks and defects. Perform a leak test per manufacturer's instructions. If the piston pump or bellows malfunctions are observed during sampling, the results are considered unreliable and the survey must be voided.

Where the color changes in gradation, the point at which the color change can first be detected is the endpoint. If the indication occurs at an angle, use the average reading of the longest and shortest discoloration as the endpoint.

Document the post-sample calibration.

When interpreting the results of detector tube sampling, apply the largest relative standard deviation for the exposure range that is reported by the manufacturer. After the standard deviation has been applied, if screening results exceed the action level, then perform full-shift sampling.

## **2.4 MSA Altair-5**

When measuring explosive levels in atmospheres where the identity of the explosive contaminant is known, calibrate the meter using the manufacturer's recommended calibration gas and use the manufacturer's response curves/conversion charts for that explosive contaminant.

When measuring explosive levels in atmospheres where the identity of the explosive contaminant is not known or no manufacturer's response curve is available for the explosive contaminant, calibrate the meter with either propane or pentane (consult the manufacturer of the particular meter) because they fall in the middle of the relative sensitivity/response chart; most gases and vapors will respond within a reasonable safety margin. This calibration, combined with an alarm set point of 10% of the lower explosive limit, minimizes the differences in meter readings that result from the relative response of the combustible sensor. The closer the relative response is to 1.0, the more accurate the

reading. In an atmosphere where the identity of the explosive contaminant is not known, readings taken on a meter calibrated with methane usually underestimates the lower explosive limit.

Because some substances (e.g., silicones, halogenated hydrocarbons) reduce the meter's sensitivity or poison its combustible sensors or filaments, try using methane to check the meter's sensitivity to methane. This check is not a recalibration but an addition to the propane or pentane calibration. This type of meter is not used to determine personal exposures to organic vapors.

Each meter approved for potentially explosive atmospheres will be labeled with the approved classes, groups, and approving organization. Only use the meter for the classes and groups for which it is approved. Do not use a meter without an approval label.

Meters are not allowed in locations where fire or explosion hazards may exist unless the meter is certified intrinsically safe for the type (group) of atmosphere present. When replacing batteries, use only those specified on the safety approval label.

Consult and comply with manufacturer's instructions and directions regarding the operation, capabilities, and limitations of the meter. Meters shall be used only for their designed purpose and within the limitations specified by the manufacturer.

Many meters will not give reliable results in oxygen-deficient atmospheres. For this reason and other obvious safety considerations, always measure the oxygen content of the location first.

Certain contaminants, including (but not necessarily limited to) silicones, silicates, lead-containing compounds, halogenated hydrocarbons, acrylonitrile, carbon disulfide, formaldehyde, styrene, high concentrations of hydrogen sulfide, or high concentrations of other combustible gases, may reduce the meter's sensitivity or poison its sensors or filaments and produce false readings or failure. At times, sensitivity can first be lost with respect to methane. The meter may therefore calibrate with and respond appropriately to other gases but have reduced sensitivity to or not respond to methane. Try using methane to check the meter's sensitivity to methane. This check is not a recalibration but an addition to the usual calibration.

Electromagnetic interference (EMI) resulting from the use of portable radios in close proximity to some meters can cause erratic or lower-than-normal readings of the meters. Temperatures outside the manufacturer's recommended range for the meter can cause erratic readings of the meter.

## **2.5 Oxygen Meter**

Following manufacturer's guidelines, calibrate the meter in air known to contain 20.9% oxygen and outside the space to be tested. Consult and comply with manufacturer's instructions and directions regarding the operation, capabilities, and limitations of the meter. Meters shall be used only for their designed purpose and within the limitations specified by the manufacturer.

Changes of altitude or atmospheric pressure can affect the performance of some meters, requiring the meter to be calibrated for existing conditions.

EMI, resulting from the use of portable radios in close proximity to some meters, can cause erratic or lower-than-normal readings of the meter.

Temperatures outside the manufacturer's recommended range for the meter can cause erratic readings of the meter.



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## Attachment 6. Sample Results Adjustments

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### 1.0 INTRODUCTION

To properly calculate an employee's TWA exposure, professional judgment is necessary to decide what assumption(s) should be made regarding the exposure during unsampled work periods. For example, if the work shift is 8 hours and sampling was conducted for 7 hours and 15 minutes, a zero exposure can be assumed for the unsampled period or it can be assumed that exposure is equal to the TWA over the sampled period. In addition, sample results may need to be adjusted for non-traditional work schedules, standard specific requirements, and/or due to mixture of more than one hazardous substance. The equations in Section 2 describe these calculations.

### 2.0 CALCULATIONS

#### 2.1 Zero Exposure Assumed for All Unsampled Periods

If a zero exposure is assumed for all unsampled periods, the resulting TWA is calculated per Equation A6-1 below. The person conducting the sampling should document on the sampling data sheet reasons/circumstances that explain the employee's time of non-exposure (e.g., lunch break, operation completed).

$$TWA = \frac{C_1T_1 + C_2T_2 + \cdots C_nT_n}{T_{shift}} \quad \text{Eq. A6-1}$$

Where:

TWA – Time-weighted average contaminant concentration

C<sub>x</sub> – Concentration of the contaminant for sample x

n – Total number of samples collected

T<sub>x</sub> – Sample collection time in minutes for sample x

T<sub>shift</sub> – Duration of shift in minutes (480 minutes for an 8-hour work shift)

**NOTE:** Equation A6-1 assumes that the average contaminant concentration during any unsampled portion(s) of the work shift is zero (0). Field observations by the person conducting the sampling should determine if the zero exposure assumption is supportable. The denominator in Equation A6-1 must be selected based on the total minutes in the actual work shift.

## 2.2 Equal Exposure Assumed for All Unsampled Periods

When equal exposure is assumed for sampled and unsampled periods, the resulting TWA is calculated per Equation A6-2. The person conducting the sampling should document on the sampling data sheet reasons/circumstances that explain the employee's unsampled time(s) in sufficient detail to document that this assumption is supportable.

$$TWA = \frac{C_1T_1 + C_2T_2 + \cdots C_nT_n}{T_1 + T_2 + \cdots T_n} \quad \text{Eq. A6-2}$$

Where:

- TWA – Time-weighted average contaminant concentration
- C<sub>x</sub> – Concentration of the contaminant for each sample (x)
- n – Total number of samples collected
- T<sub>x</sub> – Sample collection time in minutes for sample x

**NOTE:** Equation A6-2 assumes that the contaminant concentration during any unsampled portion(s) of the work shift is equal to the average exposure for all sampled portions of the work shift. This is a conservative estimate of exposure, which is biased in favor of the worker.

## 2.3 Non-traditional Work Schedules

Non-traditional work schedules and the TWA-Standards based on 8-hour exposures may not provide appropriate protection when non-traditional work schedules are used (e.g., four 10-hour days per week). Analyzing the full-shift exposure measured during a non-traditional work schedule requires that the 8-hour OEL be adjusted to account for differences in the number of exposure (i.e., work) hours and recovery (i.e., non-work) hours. The following adjustments are not applicable to STEL, ceiling, or excursion limit OELs.

**NOTE:** The only required OEL adjustment for extended work schedules is for lead in construction and general industry.

The adjustments in Equations A6-3 and A6-4 below are based on the Brief and Scala model for unusual work shifts. This conservative model accounts for both increased work shift exposures and decreased recovery time (i.e., non-occupational exposure periods). The following are some general application guidelines for the Brief and Scala model:

- Apply adjustments only for extended work shifts/weeks, defined as >7 hours per day or >35 hours per week. Do not use these equations for shortened work schedule adjustments (i.e., the OEL shall NEVER be adjusted upward for

shortened workdays or weeks). In addition, neither adjustment equation is appropriate for 24-hour (i.e., continuous) exposure.

- Do not make PEL adjustments when the chemical is a primary irritant (i.e., PEL based on sensory irritation effects). In such cases, the chemical action is based on "compartmental" vice whole body effects. Furthermore, the irritation threshold is probably independent of the number of hours worked (i.e., exposed).

Equation A6-3 is used to adjust the OEL if the workweek is less than seven days.

$$\text{Adjusted OEL} = \text{OEL} * 8 \text{ hours} * \frac{24 - h}{16} \quad \text{Eq. A6-3}$$

Where:

h        – number of hours worked (exposure) per day

**NOTE:** Equation A6-3 is based on the assumption of 8 hours per traditional work day with a 16 hour recovery (exposure-free) time.

This adjusted OEL is then used for comparison with the employee's TWA exposure and upper or lower confidence limits as appropriate, calculated using the applicable form of Equation A6-1 or A6-2 (i.e., making assumptions about the concentration during the unsampled portion of the work shift). The traditional assumptions are that the average exposure during the unsampled period is either equal to zero or equal to the average exposure during the sampled period. Any other assumptions are difficult to support and should be used rarely and with adequate documentation.

If the non-traditional work schedule involves work on all 7 days of the week, adjust the OEL as shown in Equation A6-4.

$$\text{Adjusted 7 day workweek OEL} = \text{OEL} * 40 \text{ hours} * \frac{168 - h}{128} \quad \text{Eq. A6-4}$$

Where:

h        – number of hours worked (exposure) per week

**NOTE:** Equation A6-4 is based on the assumption of 168 hours per traditional 7-day workweek with 128 hour recovery (exposure-free) time in that week.

## 2.4 Adjustments Mandated by OSHA in Some Standards

Adjustments are mandated by OSHA in some standards (e.g., Pb). The OSHA model accounts for increased work shifts only (i.e., no adjustment for decreased worker recovery time). The adjustments, shown in Equations A6-5 and A6-6, are based on whether the chemical acts as an acute or cumulative (chronic) hazard. OSHA has a chemical

categorization table displaying the hazard category. The OSHA model can be used to adjust for work shifts from 15 minutes to 24 hours per day. The acute hazard equation is intended to modify the PEL to a dose no greater than that of an 8-hour exposure at the PEL. The cumulative hazard adjustment is meant to prevent excessive accumulation following many days (years) of exposure such that workers exposed more than 40 hours per week will not develop body burdens greater than those of workers in a normal 8-hour day, 40-hour week schedule. If a chemical is considered both an acute and a chronic hazard, calculate both adjustments and apply the more conservative PEL.

$$\text{Adjusted PEL (Acute Hazard)} = \text{PEL} * \frac{8 \text{ hours}}{h_{\text{day}}} \quad \text{Eq. A6-5}$$

$$\text{Adjusted PEL (Cumulative Hazard)} = \text{PEL} * \frac{40 \text{ hours}}{h_{\text{week}}} \quad \text{Eq. A6-6}$$

Where:

$h_{\text{day}}$  – number of exposure hours per day

$h_{\text{week}}$  – number of exposure hours per week

## 2.5 Mixtures

### Additive Effects

Mixtures of chemicals with additive effects may be compared to a normalized OEL. First, calculate the concentration of the mixture's individual components as a fraction of the OEL for that component (i.e., normalized to the OEL). Next, sum these values as shown in Equation A6-7:

$$\text{Mixtures summed, normalized OEL} = \frac{C_1}{OEL_1} + \frac{C_2}{OEL_2} + \dots \frac{C_n}{OEL_n} \quad \text{Eq. A6-7}$$

Where:

$C_x$  – concentration of contaminant x

$OEL_x$  – OEL for contaminant x

n – number of contaminants in the mixture

If the "mixture summed, normalized OEL" is greater than one, the measured mixture level is considered to exceed the OEL for the mixture.

### Independent Effects

If the chemical substances in the mixture have different biological actions (i.e., independent effects), the data must not be combined into a single exposure value; instead, the concentration of each chemical substance must be separately compared to its OEL.

**Synergistic effects**

If the chemical substances in the mixture have synergistic effects, interpret data on a case by case basis, with great caution. Toxicological synergy is a situation where two chemicals that separately might be considered safe are toxic because they are present together.

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## Attachment 7. Minimum Air Sample Volume Calculations

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The limit of quantitation of the analytical procedure establishes the minimum required volume of air for a sample. The minimum sample volume and the required sample time can be computed using Equations A7-1 and A7-2:

$$\text{Minimum sample volume (liters)} = LOQ/OEL * OEL \text{ Fraction} \quad \text{Eq. A7-1}$$

Where:

LOQ – analytical limit of quantification (µg) for the contaminant

OEL – OEL for the contaminant

OEL Fraction – desired fraction of OEL

$$\text{Required sample time (minutes)} = \frac{Vol}{Flow \text{ Rate}} \quad \text{Eq. A7-2}$$

Where:

Vol – minimum sample volume (liters)

Flow Rate – sample flow rate (liters/minute)

Be careful when using laboratory results that are less than the limit of quantification, especially when ordering an inductively coupled plasma (ICP) scan for metals that gives results for a standard set of 14 metals. If "metal Z" was not present in the process being sampled, do not use the "less than" result to make any evaluation of exposure to "metal Z". The minimum sampling time and volume should be identified to obtain a limit of quantification at or below the action level for the analyte prior to sampling and should be listed in the sampling plan.

## **Attachment 8. Swipe Sampling**

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### **1.0 INTRODUCTION**

The swipe procedure described is primarily for the collection of samples from hard, relatively smooth nonporous surfaces. The swipe procedure is less effective for collecting samples from surfaces with substantial texture – such as rough concrete, brickwork, textured ceilings, and soft fibrous surfaces like upholstery and carpeting. Bulk sampling may be more effective for surfaces with substantial texture.

This attachment covers the collection of settled particulate matter on surfaces and materials. These samples are collected in a manner that will permit subsequent extraction and determination of the element(s) or material(s) using laboratory analysis techniques using recognized and approved methods.

### **2.0 EQUIPMENT AND SUPPLIES**

**NOTE:** Not all items listed below are required for all sampling events.

- Tamper seal tape or zip strips
- Protective gloves (nitrile or other suitable material depending on element or material to be sampled)
- Forceps for grabbing items or materials
- Sampling form (N3B-Form-6345)
- Chain-of-custody form (CTS or analytical laboratory)
- Plastic bag for waste items
- Length measuring device preferably capable of measuring to the nearest  $\pm 0.1$  cm
- Labels or marker to label sample container(s)
- Documentation for capturing the layout of sample locations within the building/area/room
- Disposable (single use only) templates are optional, examples may include:
  - Beryllium: 100 cm<sup>2</sup> and/or 900 cm<sup>2</sup>
  - Perchlorates: 1 ft<sup>2</sup>
- Wipe sample media (Whatman® No. 541 hardened ashless filter, 47 mm circle; Ghost Wipes; or alternative sampling media, if specified by the analytical laboratory)
- Sample containers by media type:

- Ghost Wipes: Plastic centrifuge (50 ml conical) tubes
- Whatman® filter: 50 ml centrifuge tubes or plastic petri dishes, 50 mm by 9 mm (Gelman Part Number #7232 or equivalent) for laboratory analysis
- Other container specified by the analytical laboratory when using other sampling media
- Deionized water or other solvent depending on the element or material to be sampled:
  - Whatman® filter: wet using 200 µL fixed volume pipetter (Barnsted/Thermolyne Repipet Jr. or equivalent)
  - Other wetting agent recommended by the analytical laboratory (e.g., ethanol if samples must be dried quickly for radiological evaluation)

**NOTE:** Ghost wipes do not require a wetting agent, as they are pre-moistened.

### 3.0 SAMPLING PROCEDURE

**NOTE:** The following steps may need to be altered based on the element or material being sampled and regulatory requirements. For example, wipe sampling for CrVI requires special sampling techniques to prevent CrVI converting to trivalent chromium (CrIII) on the sampling media. Another example is wipe sampling for perchlorates. The CrVI sampling technique is outlined in the OSHA Technical Manual. The U.S. Environmental Protection Agency Method 6850 outlines the perchlorate wipe sampling technique.

#### **IH&S Professional/Tech**

- [1] OBTAIN the necessary sampling equipment and supplies based on the number and type of samples to be collected, analytical method and laboratory requirements, and special shipping considerations the desired sample media for the method and analyte of concern.
- Check with the analytical laboratory to ensure the right sample media is used, as necessary. If Whatman® filters are used and wet wiping is required, use the appropriate volume of solvent (deionized water or other organic solvent as specified by the method or analytical laboratory).
  - In some cases, using a wet wiping technique may be prohibited due to the moisture damaging the equipment, material, or parts. Contact the analytical laboratory to discuss sampling event to ensure proper sample media and supplies are used.



- [2] SELECT the sample area size for each sample location. Minimum sample area should be 100 cm<sup>2</sup> with a maximum of 900 cm<sup>2</sup> for beryllium analysis while ft<sup>2</sup> may be appropriate for other analytes.
- [3] USE a template or measuring device to establish wiping area.
  - For areas less than the desired or needed size (e.g., 100 cm<sup>2</sup> or ft<sup>2</sup>) the entire area should be wiped.
- [4] DOCUMENT the size of the area wiped.
  - Irregular shaped sample areas may require multiple measurements to determine total area sampled.
- [5] DON new and clean disposable protective gloves suitable for protection against the analyte suspected to be present.

**NOTE:** Try to wipe using only the fingertips, not the palm of the hand. Be careful not to overload the wipe sample. An overloaded wipe sample can present analytical problems in detecting certain elements, such as Be. As a result, potential heavily loaded surfaces should be sampled by bulk sampling (see Attachment 4).

- [6] COLLECT the wipe sample as described in the following substeps and illustrated in Figure A3-1:
  - [A] HOLD the filter/wipe between the fingers AND PLACE the sample media on the surface to be sampled.
  - [B] WIPE with firm pressure (just enough to prevent tearing of the sample media) the selected area side-to-side, in an overlapping “S” or “Z” type pattern in one direction (e.g. horizontally). Tip: This technique must be modified for small or irregular sample surfaces.
  - [C] FOLD the filter/wipe in half with the “contaminated” portion inside.
  - [D] WIPE the selected area top-to-bottom, in the same overlapping “S” or “Z” type pattern in the opposite direction (e.g. vertically).
  - [E] FOLD the filter/wipe in half again with the “contaminated” portion inside.
  - [F] WIPE around the edges and corners of the sample area.
  - [G] CAREFULLY FOLD the filter/wipe in half again with the “contaminated” portion inside AND PLACE in container.

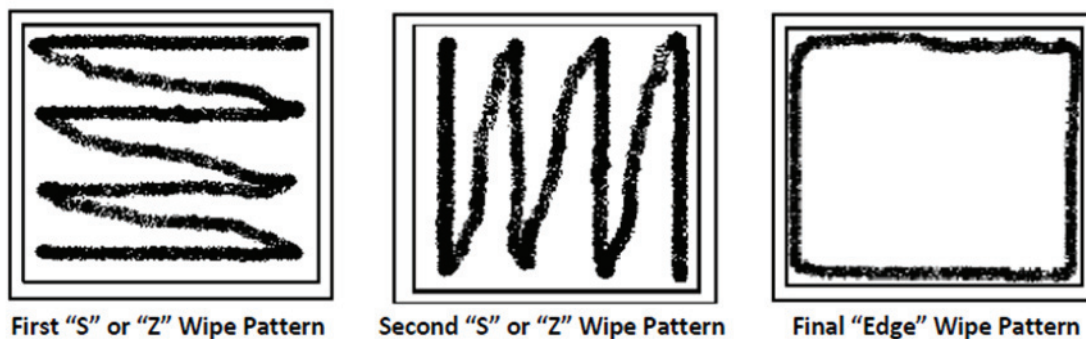


FIGURE A3-1. Diagram of "S" or "Z" Wipe Sampling Technique

- [7] REPEAT for each sample.
- [8] COLLECT the required number of field blank samples.
  - Field blanks are handled in the same manner as wipe samples except that no surfaces are wiped or touched.

#### 4.0 SAMPLE RESULT ADJUSTMENT

The sample results received from the laboratory may need to be adjusted relative to the required sample area size. The examples below describe several different adjustment scenarios.

##### Example 1

A wipe sample covering 20 square centimeters (cm<sup>2</sup>) was collected and the lab reported 50 micrograms (µg) of analyte on the wipe. The final sample result is to be in µg per 100 cm<sup>2</sup> (x µg/100 cm<sup>2</sup>).

$$50 \mu g * \frac{100 \text{ cm}^2}{20 \text{ cm}^2} = 250 \mu g/100 \text{ cm}^2$$

##### Example 2

A wipe sample covering 300 cm<sup>2</sup> was collected and the lab reported 25 µg of analyte on the wipe. The final sample result is to be in µg per 100 cm<sup>2</sup> (x µg/100 cm<sup>2</sup>).

$$25 \mu g * \frac{100 \text{ cm}^2}{300 \text{ cm}^2} = 8.3 \mu g/100 \text{ cm}^2$$

##### Example 3

A wipe sample covering 2 square feet (ft<sup>2</sup>) was collected and the lab reported 10 µg of analyte on the wipe. The final sample result is to be in µg per 1 ft<sup>2</sup> (x µg/ft<sup>2</sup>).

$$10 \mu g * \frac{1 \text{ ft}^2}{2 \text{ ft}^2} = 5 \mu g/\text{ft}^2$$

## **Attachment 9. Bulk Sampling**

---

### **1.0 INTRODUCTION**

The bulk sampling procedure covers the collection of core samples and settled material on surfaces and materials. These samples are collected in a manner that will permit subsequent extraction and determination of the element(s) or material(s) using laboratory analysis techniques using recognized and approved methods.

The following steps may need to be altered based on the element or material being sampled and regulatory requirements. For example, combustible dust sampling requires special sampling techniques to prevent the potential for rapid burning (deflagration) or violent burning with rapid release of pressure (explosion). Consult the OSHA Technical Manual for specific sampling techniques and procedures when collecting settled combustible dust.

### **2.0 EQUIPMENT AND SUPPLIES**

**NOTE:** Not all items listed below are required for all sampling events.

- Tamper seal tape or zip strips
- Protective gloves (nitrile or other suitable material depending on element or material to be sampled)
- Forceps for grabbing items or materials
- Sampling form (N3B-Form-6345)
- Chain-of-custody form (CTS or analytical laboratory)
- Plastic bag for waste items
- Length measuring device preferably capable of measuring to the nearest  $\pm 0.1$  cm
- Labels or marker to label sample container(s)
- Documentation for capturing the layout of sample locations within the building/area/room
- Micro-vacuum sample media
- Sampling pump with adjustable flow rates
- Hand brushes
- Multi-tool
- Sampling containers (e.g., bags, petri dishes, centrifuge tubes)
- Spatula or digging tool

- Conductive dust pans (aluminum)
- Sieves may be required by analytical laboratory when collecting soil samples
- Clear tape for tape samples as bulk
- Non-spark producing for potential explosive environments:
  - Sample container (e.g., 100 ml jar, petri dish, 50 ml or 15 ml centrifuge tubes)
  - Funnel for filling sample containers
  - Scoops for removing dust from cyclone containers or other ventilation equipment

### **3.0 SAMPLING PROCEDURE**

#### **IH&S Professional/Tech**

- [1] SELECT the sample locations, if not already identified. Tip: Sketch the area or use a copy of the floor plan to mark sample locations, or if outdoors, use a map to mark sample locations.
- [2] DETERMINE the sample equipment and supplies required to collect each type of bulk sample needed.
- [3] DON new and clean disposable gloves.
- [4] USING the appropriate sampling equipment, COLLECT the sample in accordance with the sampling plan, if generated, and the following general guidance:
  - Powder-type material - Collect at least one gram by sweeping or brushing the material onto a blank, white sheet of paper or into the sample container.
  - Solid-type material - Collect a sample from all layers approximately the diameter of a nickel by cutting/prying with non-sparking tools.
  - Soil material - Collect the sample using a core of the desired depth or if surface sampling only, collect at least one gram.
- [5] IF field blanks are required by the sampling plan, THEN COLLECT the requisite number of field blanks. Note: Field blanks are not typically required for bulk samples.

# N3B-DOP-TRU-1219 R.3

## RCRA Inspections and Notifications

Effective Date: 03/22/2023

Next Review Date: 03/22/2026

**Hazard Class:** ☒ Low ☐ Moderate ☐ High/Complex  
**Usage Mode:** ☐ Reference ☐ UET ☒ Both UET & Reference

The Responsible Manager has determined that the following organizations' review/concurrence is required for the initial document and for major revisions a same type and level review is required. Review documentation is contained in the Document History File:

Shift Operations Manager  
Waste Programs  
Regulatory Compliance  
Radiation Protection  
Quality Assurance  
Training  
Fire Protection

ES&H  
OCO Subject Matter Expert  
Maintenance  
Engineering  
Safety Basis  
Environmental Professional

Classification Review: ☒ Unclassified ☐ UCNi ☐ Classified

Ellen Gammon	/ 230665	/ Signature on File	/ 03/09/2023
Name (print)	Z#	Signature	Date

Responsible Manager, Facility Operations Director

Gail Helm	/ 114849	/ Signature on File	/ 03/15/2023
Name (print)	Z#	Signature	Date

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**REVISION HISTORY**

Document No./Revision No.	Issue Date	Action	Description
N3B-EWMO-DOP-20215, R.2	June, 12, 2018	Blue Sheeted	Transition from LANS.
N3B-DOP-TRU-1219, R.0	November 09, 2020	Major Revision	Revised procedure to incorporate bluesheet instructions, replace LANL terminology, and correct minor inconsistencies. Updated to new Regulatory requirements, New N3B procedure number assigned.
N3B-DOP-TRU-1219 R1	August 31, 2021	Minor Revision	Added SOM signature lines to Attachments 1, 2, and 8. Added informational NOTE to Attachment 8.
N3B-DOP-TRU-1219 R2	October 17, 2022	Major Revision	Revised to correct links, personnel/organization titles and references. Updated the permitted structures list. Updated Area G map (Appendix A) Clarified information concerning communications equipment (Appendix E and F). Minor clarification to Fire Control Equipment general capabilities (Appendix E) Changes to Area-G Demarcation Lines (Attachment 8) Assorted step and NOTE corrections/additions to clarify information or enhance usability.
N3B-DOP-TRU-1219, R3	March 22, 2023	Major	Revised to incorporate additional language for ensuring eye washes are within 55 feet of the work area (refer to N3B-IM-0045-11. Rev bars in left margin denote location of changes. No additional hazards were introduced during this revision.

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**TABLE OF CONTENTS**

<u>Section</u>	<u>Page</u>
TITLE PAGE .....	1
REVISION HISTORY .....	2
TABLE OF CONTENTS.....	3
1. PURPOSE .....	5
2. SCOPE .....	5
3. PRECAUTIONS AND LIMITATIONS.....	5
4. PREREQUISITE ACTIONS .....	7
4.1 Planning and Coordination .....	7
4.2 Materials and Equipment .....	9
5. INSTRUCTIONS—RCRA FACILITY INSPECTIONS .....	10
5.1 Inspection Requirements.....	10
5.1.1 Daily Inspection.....	10
5.1.2 Weekly Inspections.....	11
5.1.3 Area L Inspections .....	11
5.2 Preparation.....	11
5.3 New Issues .....	13
5.4 RCRA Inspections .....	15
5.5 Monthly CH-TRU Spill Kit Inventory.....	28
5.6 Weekly Evacuation Route Posting and Contingency Plan Inspection.....	29
5.7 Weekly CH-TRU Assembly Area Inspection.....	31
5.8 Quarterly Area G Fence Line Inspection .....	34
5.9 Monthly Area L, Dome 215 Holding Tank Inspection.....	35
5.10 Annual Area G and Area L, Demarcation Line Inspection.....	36
6. INSTRUCTIONS—EQUIPMENT MALFUNCTION AND NOTIFICATIONS.....	37
7. POST-PERFORMANCE ACTIVITY .....	39
7.1 Activity Closeout .....	39
7.2 Notification .....	40
7.3 Records Processing .....	41
8. REFERENCES .....	42

---

**TABLE OF CONTENTS (continued)**

---

<u>Section</u>	<u>Page</u>
<u>Appendices</u>	
Appendix A, Area G Map .....	43
Appendix B, Area L Map .....	44
Appendix C, Definitions .....	45
Appendix D, Container Integrity Write-up Guidance for RCRA Inspectors .....	46
Appendix E, TA-54 Area G Emergency Equipment .....	48
Appendix F, TA-54 Area L Emergency Equipment .....	51
Appendix G, Asphalt Pad Management .....	54
<u>Attachments</u>	
Attachment 1, Hazardous Waste Facility Inspection Record Form .....	55
Attachment 2, CH-TRU Spill Kit Inventory Sheet .....	59
Attachment 3, Weekly Area G Evacuation Route and Contingency Plan Inspection Form .....	60
Attachment 4, Weekly Area L Evacuation Route and Contingency Plan Inspection Form .....	62
Attachment 5, Assembly Area Inspection Form .....	63
Attachment 6, Area G Fence Line Inspection Form .....	64
Attachment 7, Monthly Area L, Dome 215 Holding Tank Inspection Form .....	66
Attachment 8, Annual Area G and L Demarcation Line and Pad Inspection Form .....	67



**1. PURPOSE**

This procedure provides instructions for performing Resource Conservation and Recovery Act (RCRA) inspections as required by the Hazardous Waste Permit at CH-TRU supported facilities Technical Area (TA)-54 Area G and L. Direction concerning remedial actions associated with inspection findings is also included for N3B operations and facility personnel.

These inspections are conducted to quickly identify and correct equipment malfunctions and deterioration, operator errors, and discharges that might cause or lead to a release of hazardous or mixed waste at N3B facilities.

**2. SCOPE**

The provisions of this procedure apply to Permitted Units at TA- 54, Areas G and L.

This procedure applies to personnel who perform RCRA inspections at N3B-supported facilities. RCRA Inspectors perform these inspections at N3B-supported facilities as required. Maps of the permitted areas are included in Appendix A, Area G Map, and Appendix B, Area L Map.

The requirements of this procedure may not be changed without approval of the CH-TRU Environmental Professional and the N3B Regulatory Compliance Group who are responsible for ensuring that RCRA inspections are performed in accordance with Hazardous Waste Permit.

**3. PRECAUTIONS AND LIMITATIONS**

- General site hazards and their controls for N3B-supported facilities are provided in N3B-AP-TRU-1001, General Site Hazards and Controls. Personnel performing activities associated with this procedure shall meet facility access criteria, recognize the associated site hazards, and uphold the established controls.
- Refer to and comply with the warning signs that are posted on the Tritium Storage Sheds at TA-54-1027, 54-1028, 54-1030, and 54-1041. Prior to entry, contact Radiation Protection personnel as necessary.
- Take action according to the level of responsibility and training when unusual hazardous conditions are encountered. At a minimum, when unusual hazardous conditions are encountered, personnel are to immediately contact TA-54 Operations Center.

**3. PRECAUTIONS AND LIMITATIONS (continued)**

- Smoking, eating, drinking, using smokeless tobacco products, and chewing gum are prohibited in TA-54 Areas G, L, and other areas where posted.
- Obey speed limits while operating a vehicle in the performance of this procedure, posted speed limit within TA-54 is  $\leq 15$  mph. (Area G Technical Safety Requirement, Administrative Control 5.6.9)
- Access to an N3B computer routed to the Area G share drive is required for all personnel performing this procedure to access the database link found in Section 4.1.
- At the Tritium sheds, RCT will check shed before entry may be made. Fans must be turned on prior to entry and turned off upon exit.

**4. PREREQUISITE ACTIONS**

**NOTE**     *Prerequisite Steps 4.1[1] through 4.1[5] may be performed in any order.*

**4.1 Planning and Coordination**

Appendix D, Container Integrity Write-Up Guidance for RCRA Inspectors, and Section 2.6, General Inspection Requirements of the Hazardous Waste Permit present inspection requirements applicable to all permitted hazardous and mixed waste management units. In the event of a discrepancy between the Permit and this procedure, the Permit takes precedence. Contact the N3B Regulatory Compliance for guidance resolving discrepancies.

Appendices A and B provide maps of each permitted unit (i.e., Area G, and Area L).

**Supervisor/PIC/-/RCRA Inspector**

- [1]    **ATTEND** the Plan of the Day meeting to determine applicable inspection requirements based on waste handling activities.
- [2]    **ENSURE** that the procedure is the latest revision,  
**AND DOCUMENT** on the title page.
- [3]    **ENSURE** that the performance of this activity has been authorized on the applicable facility schedule.
- NOTE**     *Additional RCRA Inspectors may be required to satisfy safety or access requirements.*
- [4]    **ENSURE** that, at a minimum, the following personnel are available, qualified, and trained to the use of this procedure:
  - RCRA inspector
  - One Environmental Professional
- [5]    **ENSURE** that a pre-job briefing is conducted for personnel involved in the performance of this procedure per N3B-DOP-TRU-1101, Pre-Job Briefings.
- [6]    **DETERMINE** the applicable inspections and the frequency of each inspection (i.e., daily, weekly, monthly, quarterly, or annually) using the chart below,  
**AND GO TO** the appropriate sections of this procedure.

**4.1 Planning and Coordination (continued)**

Inspection	Frequency	Applicable Section
Hazardous Waste Permitted Units	Daily/Weekly	5.1/5.4
Landfill Inspections	Weekly and after storm events	5.4
Area L Exterior Warning signs	Weekly	5.4
Area G Exterior Warning signs	Weekly	5.4
CH-TRU Spill Kit Inventory	Monthly	5.5
Evacuation Routes and Contingency Plans	Weekly	5.6
CH-TRU Assembly Areas	Weekly	5.7
Area G Fence Line	Quarterly	5.8
Area L, Dome 215 Holding Tank	Monthly	5.9
Area G Demarcation Lines	Annually	5.10

[7] **ENSURE** that the appropriate Hazardous Waste Facility Inspection Record Form (IRF) for the associated site is on hand during the inspection so that all applicable requirements are observed and documented.

[8] **PRINT** the applicable open Action Required (AR) forms from the Area G share drive by performing the following:

**NOTE** *The link below may be copied and pasted into Windows Explorer to access the database.*

[A] **OPEN** the applicable AR form from the database indicated below:

Z:\NUC Ops Completed Inspections

[B] **CLICK** on the drop-down menu on the left-hand side of the screen and **HIGHLIGHT** Modules.

[C] **DOUBLE-CLICK** on the “Print Open Items” button to print the report to the user’s default printer.

[9] **ENSURE** that forms are completed entirely during inspections (no blank fields).

**4.2      Materials and Equipment**

**Supervisor/PIC/RCRA Inspector**

[1]    **ENSURE** that the following tools and equipment are available, as required:

- Indelible ink pens (black, or blue, and red)
- Caution tape
- Clipboard
- Flashlights
- Measuring tapes
- Safety Cones

**5. INSTRUCTIONS—RCRA FACILITY INSPECTIONS**

This section is a stand-alone section and may be performed independently of or in conjunction with other instruction sections.

Personnel shall inspect RCRA permitted waste storage areas at CH-TRU-supported facilities within 24 hours of when waste containers are opened, moved, received, stored, treated, removed, at a minimum, weekly (if no waste is handled). Inspections are documented on Attachment 1, Hazardous Waste Facility Inspection Record Form (IRF).

The following types of observations or actions taken during the performance of this procedure shall be recorded:

- Results of any preventive and/or corrective maintenance activities including, but not limited to, maintenance on floors, secondary containment structures, unit drainage structures, and fire protection equipment at a permitted unit;
- Any malfunctions or deterioration of structures or equipment;
- Any errors affecting waste containment or compliance with the Permit;
- The locations, dimensions, and repairs of all identified cracks (i.e., width of credit card 2mm or greater) or gaps in floors or base cracks/gaps;
- Any discharges of hazardous waste, hazardous constituents, or fire suppression systems at a permitted unit;
- Any occurrences that might cause or exacerbate contamination of a permitted unit.
- Any occurrence where the following are not met:
  - The proper stacking of ignitable (D001) and reactive waste (D003) no more than two high.
  - All containers of hazardous waste with a ignitable (D001) and Reactive (D003) will have a red 4" x 4" sticker affixed to the container to ensure the proper storage requirements are met.
  - All containers of hazardous waste containing free liquids which includes corrosive liquids (D002) will have a blue 4" x 4" sticker affixed to the containers.

**5.1 Inspection Requirements****5.1.1 Daily Inspection**

Daily Inspections are completed and documented on Attachment 1, Hazardous Waste Facility Inspection Record Form (IRF). The forms are located on N3B share drive; Z:\NUC Ops Completed Inspections.

**5.1.2 Weekly Inspections**

Weekly inspections are completed and documented on Attachment 1 IRFs once each week. Weeks run from Monday to Sunday. Minimum weekly inspections are generally conducted in the units on the first day of the working week when waste is stored in the unit.

The RCRA Inspector is responsible for immediately notifying the TA-54 Operations Center and the deployed Environmental Professional of any identified upset condition such as a hazardous waste discharge.

**5.1.3 Area L Inspections**

There are ten (10) permitted structures within Area L that will be inspected. Combining the permitted structures onto IFRs will be at the discretion of Environmental Professionals and RCRA Inspectors. An example of how these permitted structures could be combined is listed below.

- [1] Dome 215
- [2] Canopy 32
- [3] Pads 35, 36 and 58
- [4] Storage shed 31, 68, 69 and 70
- [5] Building 39

Multiple IRF forms will be completed for Area L.

**5.2 Preparation****RCRA Inspector**

- [1] **OBTAIN** a clean copy of Attachment 1 for the first inspection of the week (inspection week begins on Monday) **OR USE** the existing form for subsequent inspections.
- [2] **OBTAIN** the corresponding AR forms, which contain all open AR from the previous week.
- [3] **CHECK** the inspection form and corresponding AR forms to determine which open ARs can be closed while inspecting each facility.

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**5.2 Preparation, (continued)**

**NOTE** *ARs may or may not be immediately correctable. However, implementation of a compensatory measure must be completed within 24 hours of discovery. The AR will also be assessed to determine if it is necessary to enter into the Issue Management System by the designated CH-TRU Environmental Professional. Any action taken is to be immediately documented and any plans for future actions to be taken noted on the IRF.*

- [4] **IF** an AR is closed,  
**THEN NOTE** the action taken to close and date closed. All ARs, regardless of organizational responsibility, must remain on the AR form until it is corrected.

**NOTE** *All items being inspected must have one of the following designators recorded. Per NMED, any blank boxes are not acceptable.*

- [5] **USE** the following standard designators in the corresponding box for all items inspected on the IRF:
- **OK** — Requirement met; no action is required.
  - **AR - #** — Action is required to correct the identified RCRA permit deficiency. “#” is a unique number that differentiates this open AR from all ARs discovered earlier in the current year. Sequencing and examples are provided in Appendix D, Container Integrity Write-up guidance for RCRA Inspectors. Describe each AR in Part II of the IRF, attaching additional sheets as necessary.
  - **N/A** — Entry indicates an inspection requirement that is not applicable.
  - **H** — Holiday (no work conducted).
- [6] **IF** additional designators are used,  
**THEN INCLUDE** an explanation of the meaning of the designator in Attachment 1, Part III, Comments.



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**5.3     New Issues**

**NOTE 1**     *Actionable item(s) may or may not be immediately correctable. However, implementation of a compensatory measure must be completed within 24 hours of discovery. The action item will also be assessed to determine if it is necessary to enter into the Issue Management System by the designated CH-TRU Environmental Professional.*

**NOTE 2**     *If an AR is corrected immediately, it will require marking “AR” on the IRF and a note indicating the AR was corrected during the inspection (e.g., the inspection is documented first, the correction is documented second)*

**RCRA Inspector**

- [1]     **IF** identifying a new issue,  
          **DETERMINE** if the actionable item(s) is an AR. See Appendix C, Definitions for AR. See Section 5 for applicable types of observations or actions.
- [2]     **RECORD** ARs on Part II, Comments, of Attachment 1. Guidance on writing new issues is contained in Appendix D, Container Integrity Write-up Guidance for RCRA Inspectors.
- [3]     **RECORD** items that do not meet the definition of an AR in Devonway as an action tracker. These items will be tracked to completion by ensuring corrective action are met.

**NOTE**     *Corrective actions taken in response to AR problems identified during inspections will be a high priority for the responsible person.*

- [4]     **ENTER** new issues into the inspection tracking database and spreadsheet and **SEND** out an email in RCRA Report for the N3B area inspected.

**5.3      New Issues (continued)**

**NOTE**      *The list of responsible parties in Step 5.3[5] is not all-inclusive. Additional parties may be identified. Each inspector determines the source of the actionable item(s) and identifies the appropriate responsible party. See Section 7.0 for communication of actionable items as a result of the inspections.*

[5]      **ASSIGN** a responsible party. Responsible parties may include, but are not limited to:

- Engineering (Cognizant System Engineer/Project Engineering)
- Facility Operations personnel
- First line managers/Persons-in-Charge (PICs)
- Maintenance
- Mixed low level waste team
- On-site contractors
- Project Manager
- Waste Engineers
- Waste Disposition Field Coordinators
- Waste Operations personnel

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**5.4      RCRA Inspections**

The steps in this section follow the sequence of entries on the IRF. Inspectors may perform the steps in this section in any logical order provided that all applicable inspections are performed and documented.

Consult the CH-TRU Environmental Professional or Regulatory Compliance for questions related to permitting compliance.

**NOTE:**      *Copy of IRFs will be maintained by the CH-TRU Environment Team until a full month is completed and made available for inspections.*

**RCRA Inspector**

- [1]      **REFERENCE** Attachment 1 for a list of items that must be inspected daily while in operation.
  
- [2]      **IF** an item is **NOT** required to be inspected daily **AND** an item is to be re-inspected, **THEN INSERT** a designator in the IRF box. (e.g., OK, AR)

**CH-TRU Environmental Professional/Technician**

**NOTE 1**      *A Site Identification Number is assigned to every facility by CH-TRU Environmental Professional/Technician. This allows for ease in identification.*

**NOTE 2**      *Steps 5.4[3] and 5.4[6] are performed by the CH-TRU Environmental Professional/Technician.*

**NOTE 3**      *A copy of the completed IRF will be maintained for a full month for the purposes of inspection.*

- [3]      **ENTER** the Site Identification Number (ID) on Attachment 1, Item 2 and in the header section on Page 2 of the IRF.

**RCRA Inspector**

- [4]      **ENTER** the Start Date (Monday) for the week of record on Attachment 1, Item 3 and in the header section on Pages 1 and 2 of the IRF.

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**5.4 RCRA Inspections (continued)**

- [5] **ENTER** the End Date (Sunday) for the week of record on Attachment 1, Item 4 and in the header section on Pages 1 and 2 of the IRF.

**CH-TRU Environmental Professional**

**NOTE** *Prior approval from CH-TRU Environmental Professional must be obtained to combine inspections for more than one unit.*

- [6] **CHECK** the appropriate box for the type of operation on Attachment 1, Item 5.

**RCRA Inspector**

- [7] Based on information from the Plan of the Day, **DETERMINE** where waste handling will or has occurred. Other locations of waste handling, not mentioned in the POD that may occur due to unforeseen operations, can be received from the TA-54 Operations Center.

- [8] **IF** waste was **NOT** stored in a container storage unit for the day(s) in question,  
**THEN:**

[A] **RECORD** "OK" for Item 6 (NO UNIT USE) on Attachment 1 for the day(s) in question.

[B] **IF** waste is stored,

**THEN:**

[a] **RECORD** N/A for Item 6.

[b] **GO TO** Step 5.4[9].

**NOTE** *A weekly inspection must be conducted in accordance with this procedure when OK is recorded for Daily Inspection Item 7 in the following step.*

- [9] **IF** waste was in storage in a container storage unit **AND** no waste was handled for the week in question,

**THEN RECORD** OK in Item 7 (NO WASTE HANDLING) on Attachment 1.

- [10] **IF** waste was stored in a container storage area unit **AND** waste handling was performed,  
**THEN RECORD** N/A in Item 7.

**5.4      RCRA Inspections (continued)**

- [11] **INSPECT** communication equipment for the following and **DOCUMENT** on Attachment 1, Item 8:
- Availability and proper operating condition for each piece of equipment (e.g., radios, phones, and the following alarms; evacuation alarms)
  - Equipment present in accordance with the appropriate contingency plan (refer to the applicable facility's equipment list in Appendices E and F)
  - **TEST** radios, and evacuation alarms weekly.
- [12] **INSPECT** warning signs weekly at TA-54 Area G and Area L, for the following and **DOCUMENT** on Attachment 1, Item 9:
- All signs (English/Spanish and English/Tewa) are posted prominently in accordance with the RCRA permit, as applicable
  - Posted at 50 – (ft) intervals
  - Legibility from all angles as well as from a distance of 25 ft
  - Bilingual – English/Spanish for all CH-TRU RCRA facility fence lines and gates
  - For TA-54 Area L, northern fence line: Bilingual – English/Spanish plus Tewa
  - For TA-54 Area G, northern and eastern fence lines: Bilingual – English/Spanish plus Tewa
- [13] **INSPECT** Site Security items (fences, gates, locks, and other access control equipment, as appropriate) for proper operating condition or to ensure mitigative measures have been implemented and **DOCUMENT** on Attachment 1, Item 10.
- [14] **INSPECT** roads, process floors, and other work surfaces at Treatment, Storage, or Disposal Container Storage Units (TSDs) for any condition that could lead to a spill or an accident. Inspection includes structures and base materials and malfunctions, deterioration (e.g., tears in liners/fabric, operator errors, and discharges, and **DOCUMENT** on Attachment 1, Item 11.

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**5.4      RCRA Inspections (continued)**

**NOTE 1**    *Additional information on regulatory requirements for cracks, gaps, or holes in asphalt pads is provided in Appendix G, Asphalt Pad Management.*

**NOTE 2**    *See Appendices A and B for permitted unit boundaries.*

**NOTE 3**    *Refer to the applicable facility's equipment list in Appendices E and F.*

[15]    **INSPECT** hazardous or mixed waste TSDs fire control and spill control equipment for the following and **DOCUMENT** on Attachment 1, Item 12:

- Equipment present in proper operating condition
- Equipment appropriate for the material in question
- Hose bibs, where present, inspected for proper operating condition and adequate pressure
- Fire Extinguishers
- Outdoor fire-water supply systems checked for freezing and damage
- Equipment present in accordance with appropriate contingency plans

[16]    **INSPECT** eyewashes and safety showers for the following and **DOCUMENT** on Attachment 1, Item 13:

- Proper operating condition or that scheduled routine inspections have been conducted and documented as indicated at the eyewash or safety shower (e.g., service/inspection tag) (refer to the applicable facility's equipment list in Appendices E and F)
- Stations located where the ambient temperature is less than 36 degrees Fahrenheit inspected for freezing
- Leaks, punctures, other physical damage
- Signs and/or painted letters are legible
- Eyewash shall be within 55 ft. of work area

[17]    **INSPECT** windsocks for proper operating condition and no damage and **DOCUMENT** on Attachment 1, Item 14.

**5.4      RCRA Inspections (continued)****Secondary Containment Systems**

If liquids are discovered in a secondary containment system, the liquids must be removed within 24 hours of discovery. Secondary containment systems are located in the following areas:

TA-54 Area G: -54-0144, 54-0145, 54-0146, 54-0177, 54-0230, 54-1027, 54-1028, 54-1029, and 54-1041

TA-54 Area L: Sheds -54-0031, 54-0068, -54-0069, 54-0070; concrete pad with canopy 54-0032; concrete pads 54-0035, 54-0036, and 54-0058; and building 54-0039 (Room 101 and south containment pad)

The Permittees shall initiate repairs to damaged secondary containment systems within 5 days and complete them as soon as possible, but no later than 15 days of detection unless the waste is removed or another form of secondary containment is provided.

Liners installed beneath the asphalt floor of Area G, Dome 0224 cannot be considered adequate secondary containment. If liquids are discovered in the sump, the liquid must be removed within 24 hours of discovery. Sump pumping must be documented (e.g., Operations Center logbook) and there must be a complete chemical analysis of the liquid.

Containers stored in the following locations do not require additional secondary containment because these facilities are credited with adequate containment by the RCRA permit.

TA-54 Area G: 54-0144, 54-0145, 54-0146, 54-0177, 54-0230, 54-1027, 54-1028, 54-1029, and 54-1041.

TA-54 Area L: Sheds -54-0031, 54-0068, 54-0069, and 54-0070; concrete pad with canopy 54-0032; concrete pads 54-0035, 54-0036, and 54-0058; and building 54-0039 (Room 101 and south containment pad)

**5.4      RCRA Inspections (continued)**

- [18] **INSPECT** secondary containment structures for hazardous or mixed waste operations for the following and **DOCUMENT** on Attachment 1, Item 15:
- Proper operating condition
  - Chemical coating on metal secondary containment pallets and at 54-0032 and 54-0039 shows no signs of damage or deterioration
  - Adequate capacity (minimum of 10% of the total volume of waste stored on or within the secondary containment structures or capable of containing at least 100% of the volume of the largest waste containers stored on or within the secondary containment structures, whichever is greater)
  - Presence of standing water or hazardous/mixed waste or other indication of a spill (i.e., discolored vegetation, soil, or concrete)
  - Waste containers that contain EPA Hazardous Waste Number D002 are on a secondary containment
  - Hazardous waste containers with any amount of liquid in any configuration are on a secondary containment and have a FREE LIQUIDS label affixed and a blue 4" x 4" sticker is affixed.
- [19] **INSPECT** surfaces or floors for cracks, gaps, or holes and **DOCUMENT** the location of any cracks, gaps, or holes in the secondary containment system on Attachment 1, Item 15.
- [20] **INSPECT** loading and unloading areas, including mobile NDA/NDE equipment, for signs of damage or deterioration that may lead to an accident or spill and **DOCUMENT** on Attachment 1, Item 16.
- [21] **INSPECT** run-on and run-off controls for signs of damage, erosion, ponding, any evidence of spill or leak, or other condition that could lead to a spill or an accident and **DOCUMENT** on Attachment 1, Item 17.



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**5.4 RCRA Inspections (continued)**

**NOTE** *The following is a list of RCRA permitted locations with lightning protection systems:*

- Dome 54-0033 • Dome 54-0048 • Dome 54-0049 • Dome 54-0153
- Dome 54-0224 • Dome 54-0229 • Dome 54-0230 • Dome 54-0231
- Dome 54-0232 • Dome 54-0283 • Dome 54-0375 • TA-54-0412

[22] **INSPECT** waste containers that contain ignitable or reactive wastes (EPA Hazardous Waste Numbers D001 and/or D003) to ensure that they are stored at least 50 ft from the TA boundary in an area with a functioning lightning protection system, are stacked no more than two drums high, and **DOCUMENT** deficiencies on Attachment 1, Part II.

[23] **INSPECT** hazardous waste containers stored outdoors to ensure that they are not stored

- within 5 ft of the permitted unit boundary, or
- within 5 ft of any permanent structure, or
- within 5 ft of a paved or unpaved roadway, and

**DOCUMENT** actionable items on Attachment 1, Part II.

**NOTE 1** *Containers in storage are not considered to be closed until the lid/cover is fastened in the manner the manufacturer originally intended. However, the lid may be off of a tank or container while waste is being placed into or removed from a container.*

**NOTE 2** *All containers must be dated when they arrive at the facility and no hazardous or mixed waste may be stored for greater than one year, unless specifically exempted.*

[24] **INSPECT** all tanks and containers used for storing hazardous or mixed waste for the following and **DOCUMENT** on Attachment 1, Item 18:

- Cover or lid is secured in place
- Containers stored outdoors are protected from contact with precipitation using weather protective equipment (e.g., secured tarp, drum caps) or are protected by design (e.g., transportainer, TRUPACT)
- Signs of spills or bulging containers
- Container integrity

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**5.4      RCRA Inspections (continued)**

**NOTE**      *Inner drums of a fourteen-drum payload are positioned such that the inner drum label is visible through one of the gaps between the outer rings of drums in order to verify that the inner drum is labeled. Label information is placed on a tag attached to a visible location on the outside of the fourteen-drum payload in order to verify the inner drum label.*

[25]    **INSPECT** labels and tags (e.g., fourteen-drum payload) on containers and tanks containing hazardous or mixed waste for the following and **DOCUMENT** on Attachment 1, Item 19:

- Labeled Hazardous Waste, and it lists the generator's name, address, and EPA identification number
- EPA Hazardous Waste Numbers or hazardous waste constituents
- Legible accumulation start date
- Does not possess conflicting labels
- Containers with mixed waste shall be labeled "Radioactive"

**NOTE**      *Containers containing non-hazardous waste should not be labeled with hazardous waste numbers (e.g., D001, D008, F001)*

[A]    **IF** the container holds non-hazardous waste and/or RADIOACTIVE waste, **THEN VERIFY** that the container is properly labeled NON-HAZARDOUS and/or RADIOACTIVE.

[B]    **IF** the container holds radioactive waste, **THEN VERIFY** that the container is labeled RADIOACTIVE or with equivalent wording.

[C]    **IF** a hazardous waste container labeled free liquids or has an EPA Code of D002, **THEN VERIFY** that the hazardous waste container is labeled FREE LIQUIDS and is placed in a secondary containment system, ensure that blue 4" x 4" sticker is placed on the container further describing this container as containing free liquids,(i.e., secondary containment pallets or in a permitted unit with built-in secondary containment (see Step 5.4[18]).

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**5.4      RCRA Inspections (continued)**

**NOTE 1**    *All containers with a “Free Liquid Label” must be stored on secondary containment (e.g. secondary containment pallet).*

**NOTE 2**    *All containers must be separated from incompatible materials by dikes, berms, or other physical barriers to prevent a possible reaction.*

[26]    **INSPECT** all containers and tanks containing hazardous or mixed waste for incompatibility with any other materials at that location and **DOCUMENT** on Attachment 1, Item 20.

**NOTE 1**    *Containers evaluated and determined to be of questionable integrity must be overpacked within 24 hours of discovery.*

**NOTE 2**    *The integrity of the inner drums of a fourteen-drum payload is determined by viewing the visible portion of the inner drums through the gaps between the outer ring drums and by inspecting the bottom metal pallet and plastic slipcover for signs of a release.*

[27]    **INSPECT** all containers and tanks, including the condition of all construction materials, for structural integrity, leakage, corrosion, or damage that may impact integrity and **DOCUMENT** on Attachment 1, Item 21.

[28]    **INSPECT** storage areas to ensure that adequate aisle space is maintained, in accordance with Table 2, to allow for inspection and for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment to any area of facility operation in an emergency and **DOCUMENT** on Attachment 1, Item 22.

- Containers of hazardous and mixed waste must be stored in a manner that ensures a minimum 24 inch aisle space.

[29]    **INSPECT** the containers for correct stacking and placement in accordance with Table 2, for unit-specific waste treatment or storage requirements, and Table 3, for acceptable storage areas, and **DOCUMENT** on Attachment 1, Item 22.

- Containers of ignitable and/or reactive waste must not be stacked more than 2 high.
- Containers of non-ignitable and/or non-reactive waste greater than or equal to 30 gal of hazardous waste must not be stacked more than 3 high.
- Stacked containers of greater than or equal to 30 gallons of hazardous waste must be palletized and each layer must be bound together.
- Containers with free liquids must not be stored on the third row and must be on secondary containment systems.

**5.4      RCRA Inspections (continued)**

**NOTE**      *Hazardous or mixed waste containers stored at TSDs must be on pallets, elevated, or otherwise raised to be protected from contact with accumulated liquid,*

[30]    **INSPECT** pallets for structural integrity and damage including the condition of the urethane coating on secondary containment pallets and **ENSURE** that unit-specific pallet-use requirements are satisfied, in accordance with Table 2, and **DOCUMENT** on Attachment 1, Item 23.

[31]    **IF** a pallet is found to be damaged,  
          **THEN APPLY** Caution tape to the damaged pallet and **NOTIFY** TA-54 Operations Center.

5.4 RCRA Inspections (continued)

TABLE 2 – REQUIREMENTS FOR CONTAINER STORAGE BY UNIT

	Unit <sup>1,3</sup>	Aisle Space	Physical Form	Pallets or Otherwise Elevated 4 in.	Secondary Cont. <sup>2</sup>	Stacking
Area L	31, 32, 68, 69, 70	24 in.	Solid or Liquid	Required	Optional	Containers greater than or equal to 30 gal of hazardous waste may be stacked to no more than three containers high. Stacked containers of this volume shall be palletized and each layer shall be bound together. Ignitable and/or reactive waste containers may be stacked no more than two high.
	35, 36, 39, 58	24 in.	Solid or Liquid	Required	Optional	Same as above
	215 and Fenced Area (asphalt)	24 in.	Solid or Liquid	Required	Required for liquids	Same as above
Area G	8, 33, 48, 49, 153, 224, 229, 231, 232, 283, 375, 412 Pads 1,3, 5, 6,7,8, 9, 10, 11	24 in.	Solid or Liquid	Required	Required for liquids	Containers greater than or equal to 30 gal of hazardous waste may be stacked to no more than three containers high. Stacked containers of this volume shall be palletized and each layer shall be bound together. Containers with free liquids in Dome 224 must be on a secondary containment pallet. Waste containers stored on Pad 9 will be stored in transportainers or modular buildings. Ignitable and/or reactive waste containers may be stacked no more than two high. Containers with free liquids must <u>not</u> be stored on the third row and must be on secondary containment systems.
	144, 145, 146, 177, 1027, 1028, 1030, 1041	24 in.	Solid or Liquid	Required	Optional	Same as above
	230	24 in.	Solid or Liquid	Required	Optional	Same as above
	Shafts 145, 146	N/A	Solids	N/A	N/A	N/A

<sup>1</sup> See maps in Appendices A and B for locations.<sup>2</sup> Optional—designates that the unit is designed to provide secondary containment (e.g., recessed floor, curbed area) and that additional means of secondary containment (secondary containment pallets) may be used but are not required.<sup>3</sup> For all outdoor storage areas permitted for storage of hazardous or mixed waste, containers will not be stored within 5 ft of the permitted unit boundary, within 5 ft of any structure, or within 5 ft of paved or unpaved roadway. Additionally, containers holding ignitable or reactive waste will not be stored within 50 ft of the TA boundary.<sup>4</sup> The Permittees may store mixed TRU wastes in sealed Nuclear Regulatory Commission (NRC) certified Type-B shipping containers at the TA-54 West Outdoor permitted unit without secondary containment and weather protection.

Reference

**5.4      RCRA Inspections (continued)****TABLE 3 – ACCEPTABLE WASTES FOR STORAGE UNITS  
IN CH-TRU-SUPPORTED FACILITIES**

	Unit	Hazardous Waste	MLLW	MTRU	TRU
<b>Area L Hazardous and MLLW</b>	Area L Units	YES	YES	<b>NO</b>	<b>NO</b>
<b>Area G MLLW and MTRU</b>	Area G Units	YES	YES	YES	YES

**Landfill and Shafts**

Landfill inspections for Area G include Pit 29 and Shaft 124. Area G storage shaft inspections include shafts 145 and 146. Landfill inspections for Area L include Impoundments B and D; Shafts 1, 13 through 17; and Shafts 19 through 34, which are located under the asphalt. Other N3B-supported facilities do not contain shafts or landfills.

Landfill inspections shall be conducted weekly and after storm events for evidence of erosion, subsidence, and water intrusion.

Items 24 and 26 through 28 on the IRF are currently not applicable to CH-TRU and therefore are marked N/A by the inspector.

**5.4 RCRA Inspections (continued)**

[32] **INSPECT** shafts and landfill covers for the following and **DOCUMENT** on Attachment 1, Item 25:

- Physical integrity of the collars and the shaft covers (e.g., no signs of displacement or significant degradation)
- Covers securely in place and completely cover the shaft
- Covers constructed of non-combustible material
- Surrounding area shows no signs of erosion
- Landfill covers show no signs of erosion, subsidence, or water intrusion

**NOTE** *Only one date and time are entered for Steps 5.4[33] and 5.4[34], whether a team or an individual performs the inspection.*

[33] **RECORD** date of inspection on Attachment 1, Item 29.

[34] **RECORD** time of inspection on Attachment 1, Item 30 is completed.

[35] **LEGIBLY RECORD** (i.e., print) the names of each Inspector involved in the inspection on Attachment 1, Item 31.

[36] **IF** no new issues were identified,  
**THEN RECORD** NO NEW ISSUES and the date of the inspection on Attachment 1, Item 32.

[37] **DOCUMENT** any immediate actions taken and any plans for future action to be taken on Attachment 1, Item 32, Part II.

[A] **ENSURE** previous ARs are closed out with completed actions described and closure date included.

[B] **IF** the AR has not been resolved,  
**THEN ENSURE** that it is carried over to the current inspection by entering information into the database and spreadsheet.

[C] **DESCRIBE** any actionable item(s) in accordance with the format outlined in Appendix D.

Reference

**5.5      Monthly CH-TRU Spill Kit Inventory**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

**RCRA Inspector**

- [1]    **OBTAIN** a clean copy of Attachment 2, CH-TRU Spill Kit Inventory Sheet or **USE** the existing form for subsequent inspections.
  
- [2]    **DOCUMENT** inventory of spill kit on Attachment 2.
  
- [3]    **IF** an actionable item(s) is identified for any item inspected,  
      **THEN:**
  - [A]    **DOCUMENT** the actionable item(s) as an AR on Attachment 2 and on Attachment 1, Item 12.
  
  - [B]    **CONTACT** the Environmental Professional and TA-54 Operations Center for guidance and direction for the replacement of missing items.



**5.6 Weekly Evacuation Route Posting and Contingency Plan Inspection**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

The applicable inspection form for the facility to be inspected should be used when performing this section:

- Attachment 3, Weekly Area G Evacuation Route and Contingency Plan Inspection Form
- Attachment 4, Weekly Area L Evacuation Route and Contingency Plan Inspection Form

**RCRA Inspector**

[1] **OBTAIN** the appropriate Evacuation Route and Contingency Plan inspection form for the facility to be inspected (Attachments 3 and/or 4).

[2] **RECORD** the date of inspection on the applicable attachment.

[3] **PERFORM** the following at each unit:

**NOTE** *Contingency Plan revisions can be verified by contacting the CH-TRU Environmental Professional and/or the Regulatory Compliance Group.*

[A] **VERIFY** that both evacuation route signs and Contingency Plans are in their designated locations using the applicable inspection form and that the Contingency Plans are the latest revisions.

[B] **IF** the item is present and in good condition in the prescribed location,  
**THEN CHECK** (✓) SAT (Satisfactory) in the appropriate box.

[C] **IF** the item is missing or damaged,  
**THEN CHECK** (✓) UNSAT (Unsatisfactory) in the appropriate box and  
**DESCRIBE** the actionable item(s) in the Comments section of the applicable attachment.

Reference

**5.6      Weekly Evacuation Route Posting and Contingency Plan Inspection (continued)**

- [4]    **IF** an actionable item(s) is identified for any item inspected,  
      **THEN PERFORM** the following:
  - [A]    **DOCUMENT** the actionable item(s) as an AR in the Comments section of the applicable attachment.
  - [B]    **RECORD** any actionable item as an AR on the IRF (Attachment 1, Part II, Item 32) for the appropriate location.
  - [C]    **INFORM** the Environmental Professional of any missing items, deficiencies, or unusual findings.
  - [D]    **NOTIFY** TA-54 Operations Center and the Responsible Line Manager of findings that may impact her/his area of responsibility.

**5.7      Weekly CH-TRU Assembly Area Inspection**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

**RCRA Inspector**

- [1]    **OBTAIN** a clean copy of Attachment 5, CH-TRU Assembly Area Inspection Form, or **USE** the existing form for subsequent inspections.
- [2]    **PERFORM** the following for each Assembly Area:
  - [A]    **DOCUMENT** the Facility and Assembly Area Number of the station being inspected.
  - [B]    **DOCUMENT** the date and time of inspection.
  - [C]    **IF** the item is present and functioning,  
         **THEN RECORD** "OK" or a checkmark (✓) in the appropriate box for the following:
    - 1 Two-way radio
    - 2 Vests
    - 1 Tamper Indicating Device (TID) on first aid kit
    - 1 Copy of the TA-54 East Building Emergency Plan (BEP)  
         (i.e., N3B-BEP-TRU-3001)
- [3]    **INVENTORY** the contents of the first aid kit and **RECORD** "OK" or a checkmark (✓) in the appropriate box if contents are complete.
- [4]    **IF** TID is not broken/missing,  
         **THEN** inventory of the first aid kit is not required.
- [5]    **IF** the TID is missing from the first aid kit,  
         **THEN:**
  - [A]    **REPLENISH** first aid kit as necessary and **APPLY** a new TID.
  - [B]    **DOCUMENT** this discrepancy in the Comments column on Attachment 5.

**5.7      Weekly CH-TRU Assembly Area Inspection (continued)**

- [6]    **IF** an actionable item(s) is identified for any item inspected under Step 5.7[2] [C] or 5.7[3],  
**THEN DOCUMENT** the actionable item(s) as an AR in the Comments column on Attachment 5.
- [7]    **CONDUCT** a radio test to ensure the radios are transmitting/receiving properly (e.g., Monday Wednesday, Friday).
- [A]    **TURN ON** the radio tuned to the appropriate channel (TA-54 Ops - Channel 1).
- [B]    **STATE** “This is Assembly Area # performing radio check” into the radio.
- [C]    **WAIT** for a response from the TA-54 Operations Center personnel.
- [8]    **IF** a response is received,  
**THEN:**
- [A]    **ACKNOWLEDGE** the response.
- [B]    **TURN OFF** the radio.
- [C]    **REPLACE** the radio to the proper location in the Assembly Area.
- [9]    **IF** a response is not received,  
**THEN:**
- [A]    **CALL** the TA-54 Operations Center to determine radio functionality.
- [B]    **RETRY** the radio after talking to the Operations Center on the phone.
- [C]    **IF** the Operations Center indicates the radio is working,  
**THEN REPEAT** Step 5.7[8].
- [D]    **IF** the TA-54 Operations Center indicates the radio is not functioning,  
**THEN DOCUMENT** the malfunction on Attachment 5 and on Attachment 1, Item 8, of Area G IRF, 1-4, and **INFORM** the TA-54 Operations Center of the problem.

Reference

**5.7      Weekly CH-TRU Assembly Area Inspection (continued)**

- [10] **INITIAL** and **RECORD** Z# for the appropriate week of inspection on Attachment 5 after verifying the presence/absence of the equipment listed in Step 5.7[2][C] and 5.7[3].
- [11] **RECORD** any actionable item(s) as an AR on Attachment 1, Item 32 of the Area G IRF.
- [12] **INFORM** the Environmental Professional of any missing items, deficiencies, or unusual findings.
- [13] **NOTIFY** the TA-54 Operations Center and the Responsible Line Manager of findings that may impact her/his area of responsibility.

Reference

**5.8 Quarterly Area G Fence Line Inspection**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

**NOTE** *This sub-section applies only to TA-54 Area G quarterly inspections. The condition of fence lines at Area G and other facilities is documented on Attachment 1, Item 10.*

**RCRA Inspector**

- [1] **OBTAIN** a clean copy of Attachment 6, Area G Fence Line Inspection Form.
- [2] **OBTAIN** a list of remaining issues from previous inspections.

**CAUTION**

**Vehicles shall not be driven over erosion control structures. Failure to comply with this caution could damage erosion control structures.**

- [3] **INSPECT** the fence line that makes up the boundaries of Area G (on foot or with an off-road vehicle).
- [4] **OBSERVE** fence condition and look for deficiencies, such as openings and signs of erosion or tampering.
- [5] **IF** deficiencies are found,  
**PERFORM** the following:
  - [A] **RECORD** any deficiencies noted on Attachment 6.
  - [B] **REPORT** these deficiencies and status of previous deficiencies, if applicable, to the TA-54 Area G Operations Center and Environmental Professional.
- [6] **SIGN** and **DATE** Attachment 6.

**5.9 Monthly Area L, Dome 215 Holding Tank Inspection**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

**RCRA Inspector**

- [1] **OBTAIN** a clean copy of Attachment 7, Monthly Area L, Dome 215 Holding Tank Inspection Form or **USE** the existing form for subsequent inspections.

**NOTE** *Any fluids detected in the holding tank require characterization and removal within 3 days.*

- [2] **INSPECT** the 10,000-gallon holding tank at Area L, Dome 215 for any detectable fluids each month.
- [3] **CHECK** (✓) YES (fluids detected) or NO (no fluids detected) for the appropriate month of inspection on Attachment 7.
- [4] **SIGN** and **DATE** for the appropriate month of inspection on Attachment 7.
- [5] **IF** any fluids are detected in the holding tank,  
**PERFORM** the following:
- [A] **DOCUMENT** in the Comments section of Attachment 7 and on Attachment 1, item 15 on Area L IRF.
- [B] **NOTIFY** the Waste Disposition Field Coordinator, Environmental Professional and the Shift Operations Manager (SOM) to ensure that a chemical analysis of the fluid is performed and the fluid is removed within 3 days.

**5.10      Annual Area G and Area L, Demarcation Line Inspection**

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

**RCRA Inspector**

- [1]    **OBTAIN** a clean copy of Attachment 8, Annual Area G and L Demarcation Line and Pad Inspection Form, or **USE** the existing form for subsequent inspections.

**NOTE**      *Demarcation Lines will be painted, taped, or established by other visible markings (e.g., Chain between signage to signage).*

- [2]    **INSPECT** the demarcation lines at each permitted unit (including asphalt pads 1, 3, 5, 6, 9, 10, and 11) at Area G and Area L for presence and visibility.
- [3]    **CHECK** (✓) SAT (present/visible) or UNSAT (not present/not visible/degraded) for the appropriate permitted unit for the annual inspection on Attachment 8.
- [4]    **SIGN** and **DATE** for the annual inspection on Attachment 8.
- [5]    **IF** the demarcation lines are not present, not visible, or degraded at any permitted unit, **PERFORM** the following:
- [A]    **DOCUMENT** in the Comments section of Attachment 8 and on Attachment 1, item 33.
- [B]    **CREATE** a Maintenance Work request to have the lines repainted, taped, or replaced by other permanent, visible marking on the floor or base material and **NOTIFY** the Environmental Professional and the SOM that the corrective action must be implemented within 90 days.



## 6. INSTRUCTIONS—EQUIPMENT MALFUNCTION AND NOTIFICATIONS

This section is a stand-alone section and may be performed independently of or in conjunction with other Instructions sections.

This section is performed in response to the discovery of RCRA related equipment malfunctions that are identified during routine operations (not performing RCRA inspection).

### Operations Center

- [1] **NOTIFY** the SOM and the Environmental Professional of the concerns or necessary actions.
- [2] **NOTIFY** support personnel [Industrial Hygiene and Safety (IHS), Radiation Protection (RP) Supervision, to assist the SOM, as needed.

### SOM or designee

- [3] **EVALUATE** whether a hazard due to the discovered deterioration or malfunction of equipment or structures is imminent or has already occurred.

**NOTE** *Any missing or nonfunctioning communication equipment, alarm system, fire protection component, spill control, or decontamination equipment is to be promptly repaired or substitute equipment provided. (Hazardous Waste Permit 2.10.2)*

- [4] **PROMPTLY**, within 24 hours, **DETERMINE** compensatory measures (e.g., substitute equipment or mitigation) and applicable training for personnel in area.
- [5] **ENSURE** that equipment or structures that have been determined to be malfunctioning are identified (e.g., Caution Tag) as out-of-service and that any substitute equipment is clearly identified.
- [6] **NOTIFY** all workers in the affected area via Public Address, 2-way radio, Enterprise Message Agreement (EMAG), and/or cell phone of the concern or necessary action and of the compensatory measures (e.g., substitute equipment), as applicable.
- [7] **DOCUMENT** concern or necessary action, actions taken, notifications, and training provided to personnel within the area, and final resolution in the Operations Center Logbook.

Reference

6. **INSTRUCTIONS—EQUIPMENT MALFUNCTION AND NOTIFICATIONS**  
**(continued)**

[8] **NOTIFY** Environmental Professional of actions taken.

**SOM/Environmental Professional/Supervisor**

[9] **IF** a concern or necessary action was found,  
**PROMPTLY**, within 24 hours, **INITIATE** actions to correct the concern or necessary action [e.g., N3B Work Request] and **DOCUMENT** the actions taken (e.g., N3B- Work Request Issue Number) in the Comments section of the applicable attachments.

[10] **ENSURE** that the responsible parties (e.g., SOM and Facility Operations Manager) have been notified of the following information:

- Date that the issue was discovered
- Status of each issue.
- Responsible party
- Unit number (i.e., dome, building, or pad number)
- Description of the concern or necessary action

[11] **WHEN** the concern or necessary action has been corrected,  
**THEN REQUEST** that TA-54 Operations Center **NOTIFY** all workers in the affected area via Public Address System, 2-way radio, EMAG, and/or cell phone to return to normal operations.

Reference

## 7. POST-PERFORMANCE ACTIVITY

### 7.1 Activity Closeout

#### RCRA Inspector

- [1] **ENSURE** that the applicable attachments (Attachment 1 through 8) have been signed and dated.
- [2] **IF** a concern or AR was found,  
**THEN:**
  - [A] **UPDATE** the applicable inspection in the AR database.
  - [B] **NOTIFY** the TA-54 Operations Center of the concerns or necessary actions.
- [3] **FORWARD** the applicable attachments to the appropriate reviewer.

**NOTE** *The CH-TRU Environmental Professional reviews of the IRF are performed weekly.*

#### RCRA Environmental Professional

- [4] **REVIEW** the applicable attachments for accuracy and completeness and determine if it is necessary to enter action item(s) into the Issues Management System.
- [5] **SIGN** and **DATE** the applicable attachments.

**NOTE** *Any missing or nonfunctioning communication equipment, alarm system, fire protection component, spill control, or decontamination equipment is to be promptly repaired or substitute equipment provided. (Hazardous Waste Permit Section 2.10.2)*

- [6] **IF** abnormal conditions were identified during the performance of this procedure, **INITIATE** actions to correct the deficiency/discrepancy, such as generating a Nonconformance Report or Issues Management system, and **DOCUMENT** actions taken in the Comments section of the applicable attachments.

Reference

**7.1      Activity Closeout (continued)**

- [7]    **PERFORM** a Post-Job Review in accordance with N3B-Form-6218, *Post-Job Review Checklist*.

**7.2      Notification**

**RCRA Inspector**

- [1]    **ISSUE** an email containing at a minimum of the following information to the responsible parties (e.g., SOM and Nuclear Facility Manager) noting the concerns or necessary actions opened, continued, and closed that day.
- TYPE (AR) and tracking number
  - DATE the issue was discovered
  - Status of each issue (new, repeat, or closed). Closed issues will only appear on the email one day. They will appear on the day that they were closed, **IF** they are closed, before the email issued for the day, or they will appear the day after they are closed **IF** they are closed after the email is issued.
  - Responsible party
  - IRF item number (Attachment 1)
  - Unit number (i.e., dome, building, or pad number)
  - Description of the concern or necessary action
- [2]    **WHEN** the concerns or necessary actions have been corrected,  
**THEN** note the closure on the IRF.

Reference

**7.3 Records Processing****Person in Charge**

- [1] **ENSURE** all records generated by the performance of this procedure are processed and protected accordingly:
- When the records are no longer needed for current business, transfer all records to N3B Records Management custody according to N3B-P1020-1, N3B Records Management.
  - Use N3B-PLAN-RM-0004, N3B Specific Records File Plan and Retention Schedule, to determine approved disposition schedules for Federal records created or received in performance of work for the Los Alamos Legacy Cleanup Contract (LLCC).

Record Identification	Record Type Determination	Protection/Storage Methods
Attachment 1, Hazardous Waste Facility Inspection Record Form  <b>Note:</b> Quality Assurance (QA) documents shall be considered valid records only if stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated. Corrections to documents shall be reviewed and approved by the responsible individual from the originating or authorized organization.	<b>QA Record</b> Lifetime  <b>Note:</b> Lifetime QA Records must be retained for the life of the item. Nonpermanent QA Records provide evidence that an activity was performed in accordance with applicable requirements, but do not meet the criteria for Lifetime Records. Nonpermanent Records must be maintained for their identified retention period.	Supervision shall ensure the records are managed, maintained and stored according to NQA-1 2008/2009a requirements: <ul style="list-style-type: none"> <li>▪ Limit access to the processing, storage, and retrieval of records to authorized personnel.</li> <li>▪ Provide for the temporary storage of QA records in a cabinet with 1-hour fire rating, unless dual storage requirements are met.</li> <li>▪ Provide for the long-term storage (single storage) of QA records in a cabinet with a minimum 2-hour fire rating unless dual storage requirements are met.</li> </ul>
Attachment 2, , CH-TRU Spill Kit Inventory Sheet	<b>QA Record</b> Lifetime	
Attachment 3, Weekly Area G Evacuation Route and Contingency Plan Inspection Form	<b>QA Record</b> Lifetime	
Attachment 4, Weekly Area L Evacuation Route and Contingency Plan Inspection Form	<b>QA Record</b> Lifetime	
Attachment 5, Assembly Area Inspection Form	<b>QA Record</b> Lifetime	
Attachment 6, Area G Fence Line Inspection Form	<b>QA Record</b> Lifetime	

Reference

**7.3     Records Processing (continued)**

<b>Record Identification</b>	<b>Record Type Determination</b>	<b>Protection/Storage Methods</b>
Attachment 7, Monthly Area L, Dome 215 Holding Tank Inspection Form	<b>QA Record</b> Lifetime	
Attachment 8, Annual Area G, and L, Demarcation Lines and Pad Inspection Form	<b>QA Record</b> Lifetime	

**8.       REFERENCES**

40 CFR 264, Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

Hazardous Waste Permit

N3B-AP-TRU-1001, General Site Hazards and Controls

N3B-AP-TRU-1101, Pre-Job Briefings

N3B-BEP-TRU-3001, TA-54 East Building Emergency Plan (BEP)

N3B-FORM-6218, Post-Job Review Checklist

N3B-PLAN-RM-0004, N3B Specific Records File Plan and Retention Schedule

N3B-P1020-1, N3B Records Management

N3B-P300-1, Integrated Work Control Process

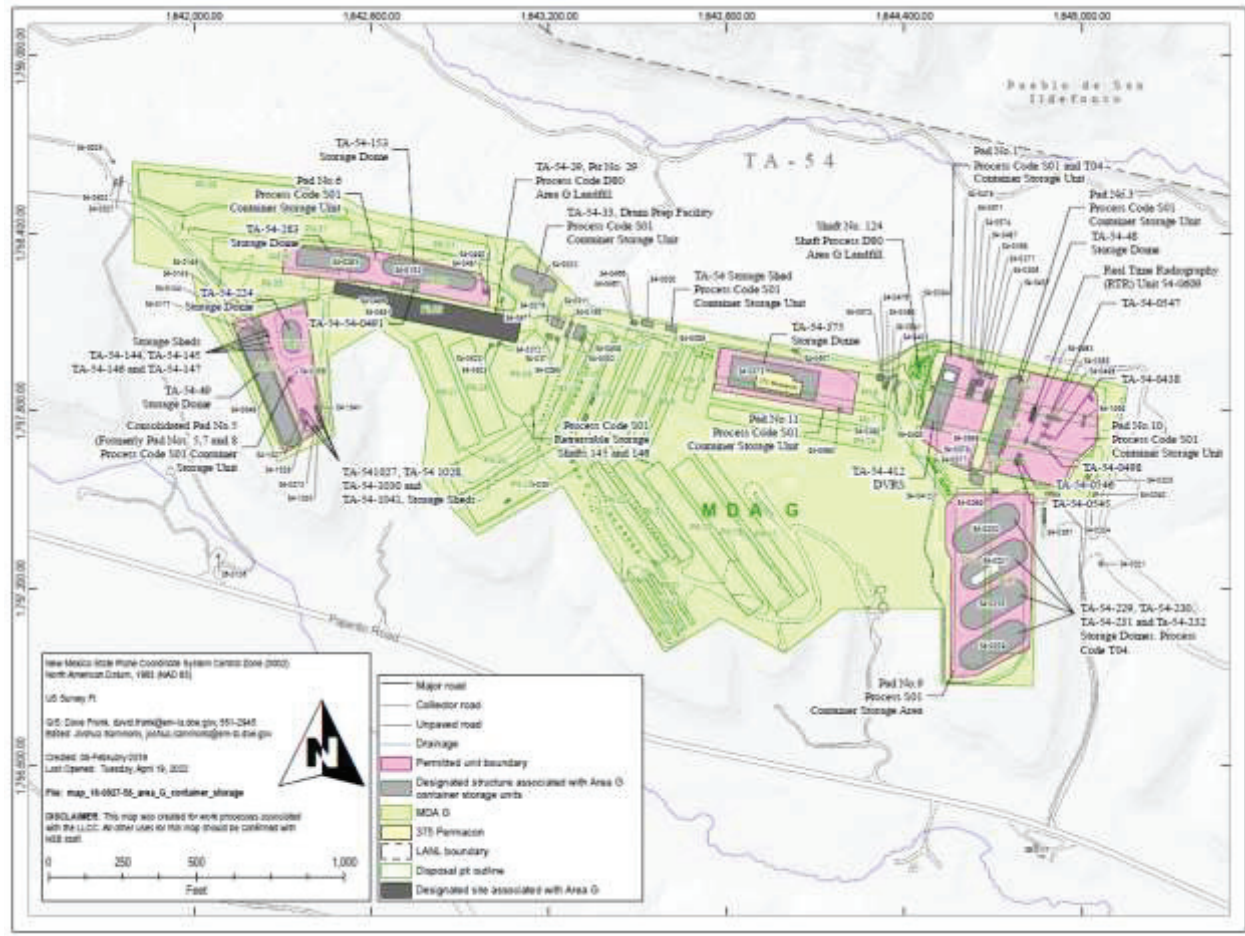
N3B-P322-4, Issues Management

N3B-P330-6, Nonconformance Reporting

## APPENDIX A

Page 1 of 1

## AREA G MAP

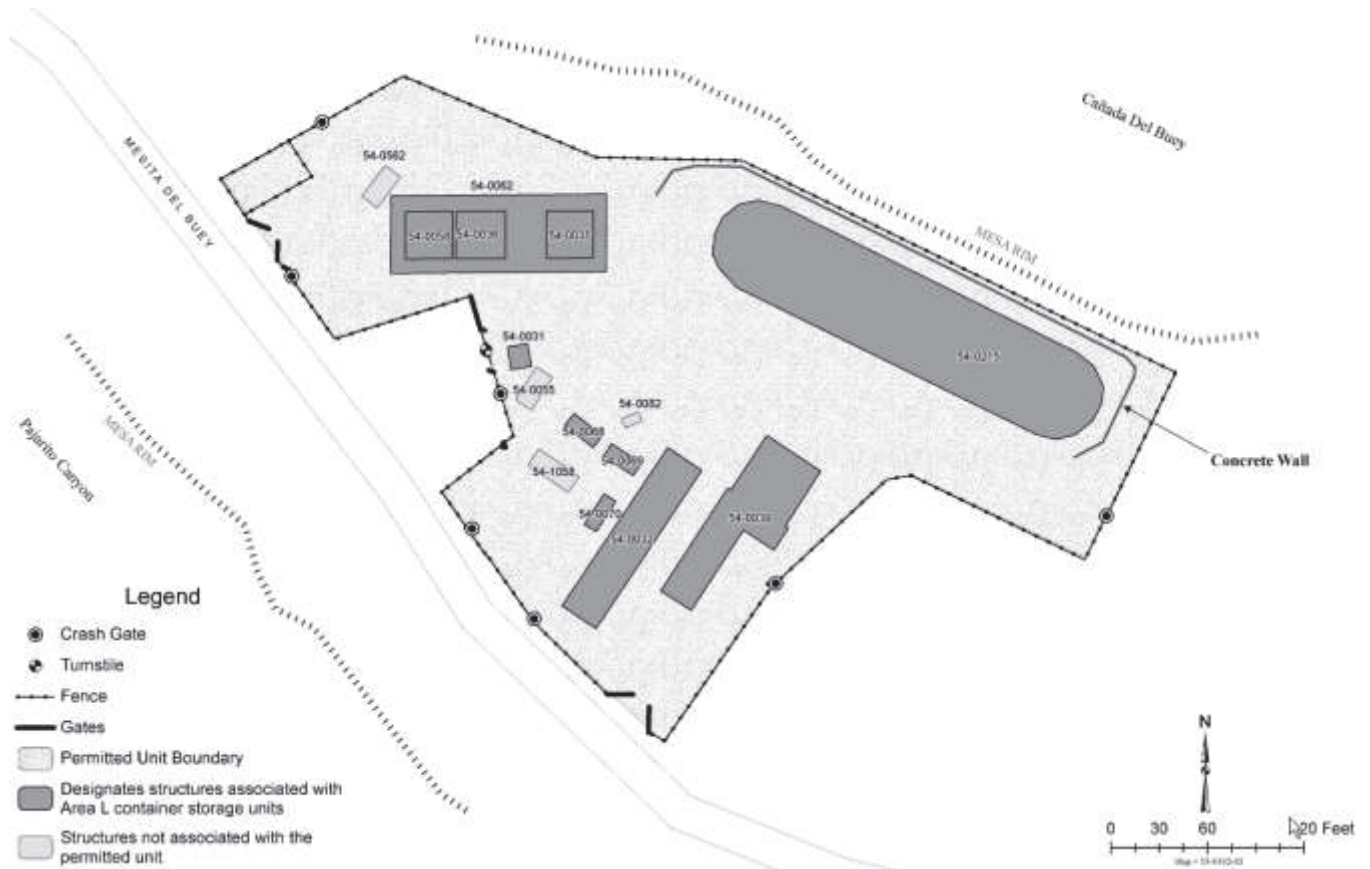




## APPENDIX B

Page 1 of 1

### AREA L MAP





**APPENDIX C**

Page 1 of 1

**DEFINITIONS**

**Accumulation Start Date** – The date that a container first receives any waste and, for a Treatment, Storage, and Disposal Facility, the date when a container is received from elsewhere.

**Action Required (AR)** – An actionable item(s) that is a violation of regulatory requirements or that poses an immediate danger to human health and the environment. ARs should be recorded on Part II of Attachment 1, Hazardous Waste Facility Inspection Record Form. Immediate attention is required.

**Inspector** – A qualified RCRA Inspector who conducts inspections identified in this procedure.

**Promptly** – Determined by CH-TRU Environmental Professional to be within 24 hours.

**Responsible Person** – Management personnel accountable for correcting identified deficiencies.

**Waste Handling Operations** – Activities involving any of the following:

- Opening or closing containers
- Moving or handling waste or waste containers
- Receiving waste or waste containers
- Placing waste into containers or waste containers into storage
- Treating waste
- Removing waste or waste containers from storage

**APPENDIX D**

Page 1 of 2

**CONTAINER INTEGRITY WRITE-UP GUIDANCE FOR RCRA INSPECTORS**

Deficiencies found during inspections shall be documented in the following format:

Type or write -Year- # [mm-dd-yyyy] (IRF item #) Site ID Location, Container number, Description

Item	Description
Type	AR
Year	Four-digit year that actionable item(s) was identified.
#	Sequential number of actionable item(s) for the calendar year (i.e., if this is the 1 <sup>st</sup> AR found in the year, insert a “1”; if it is the 15 <sup>th</sup> AR found in the calendar year, insert a “15”).
mm-dd-yyyy	Provide the date the actionable item(s) was found indicating the two-digit month and day and the four-digit year.
IRF item #	Indicate item on the IRF that is <u>not</u> compliant. For ARs with no associated item # on the IRF, write “No Item.”
Site ID	AREA G and AREA L
Location	Indicate the location of the deficiency. For domes in Area G with labeled columns, use the following format Col##L##R##. The column number may be 2 or 3 digits. Begin counting layers at the ground level with the bottom layer indicated as L01. Rows are counted from the exterior dome wall towards the center of the dome with R01 being the drums closest to the exterior dome wall. Each pallet typically contains 2 rows.
Container number	Indicate the container number. For leaking or compromised containers, also provide waste stream number and EPA hazardous waste codes numbers.
Description	Describe the actionable item(s) found.

**APPENDIX D**

Page 2 of 2

Examples of write-ups with further guidance is given below:

Example 1: Hazardous Waste containers with compromised integrity and external contamination (determined by the Industrial Hygienist (IH) and RCT):

AR-2003-22 [07-29-2003] (Item 21) Dome 230 C101L02R01 (may also provide directions if column #s are not available), Drum# S875495, TA-50-18, F001, F002, D007, has been breached in (provide location on drum) with (provide color) residue present. Operation Center, IH and RCT notified. Radiological results 1000 dpm/cm<sup>2</sup> (indicate fixed or removable contamination and radionuclide involved). Chemical results 50 ppm.

Example 2: Hazardous Waste containers with compromised integrity and no external contamination (determined by IH and RCT):

AR-2003-22 [07-29-2003] (Item 21) Dome 230 C101L02R01, Drum# S875495 or Container number, TA-50-18, F001, F002, D007, has been breached in (provide location on drum) with residue present. Operation Center, IH, and RCT notified. Radiological results NDA. Chemical results 0 ppm.

Example 3: Hazardous waste container needs new label.

AR-2003-62 [07-29-2003] (Item 19) Dome 230 C101L02R01, Drum# S875495, needs new Hazardous Waste Label; words "Hazardous Waste" are illegible.

**APPENDIX E**

Page 1 of 3

**TA-54 AREA G EMERGENCY EQUIPMENT<sup>1</sup>****FIRE CONTROL EQUIPMENT****Description of General Capabilities:**

Portable manually operated fire extinguishers are provided throughout Area G and may be used by any qualified employee in the event of a small (incipient stage) fire after first calling 911 and notifying the Operations Center. For larger fires, Emergency Management personnel and the Los Alamos Fire Department (LAFD) are alerted.

ABC and/or BC rated fire extinguishers are available at TA-54-0008, TA-54-0033, TA-54-0048, TA-54-0049, TA-54-0153, TA-54-0224, TA-54-0229, TA-54-0230, TA-54-0231, TA-54-0232, TA-54-0283, TA-54-0375, and TA-54-0412, and on Pads 1, 9 and 10.

**Description of General Capabilities:**

Fire alarms pull stations may be activated by any employee in the event of a fire to notify the LAFD and Emergency Management personnel. Similar notification is provided upon activation of flame, heat or smoke detectors or any automatic fire suppression system.

Flame or smoke detection equipment are located within structures at TA-54-0229, TA-54-0230, TA-54-0231 PermaCon, TA-54-0232 (above auxiliary power supply), TA-54 153 (partial flame detection), and TA-54-0375 PermaCon.

Dry-chemical fire suppression systems are available at TA-54-1027, TA-54-1028, TA-54-1030, and TA-54-1041.

A dry-pipe fire suppression system is available at TA-54033 and TA-54-0412.

A pre-action fire suppression system is available at TA-54-0230, TA-54-231 PermaCon, and TA-54-0375 PermaCon

Fire alarm pull stations are available at TA-54-0033, TA-54-0048, TA-54-0049, TA-54-0153, TA-54-0224, TA-54-0229, TA-54-0230, TA-54-0231, TA-54-0232, TA-54-0283, TA-54-0375, and TA-54-0412.

An appropriate number of fire hydrants are located in Area G. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

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<sup>1</sup> Source: Hazardous Waste Permit, Attachment D, TA-54 Contingency Plan, Table D-2 dated December 2013 or successor

**APPENDIX E**

Page 2 of 3

**SPILL CONTROL EQUIPMENT**

Spill control stations and/or portable spill kits are located at -54-0008 -54-0033, -54-0048, 54-0049, -54-0153, -54-0224, 54-0229, 54-0230, 54-0231, 54-0232, 54-0283, 54-0375, and 54-0412.

Each spill kit generally includes bags of absorbent

**COMMUNICATION EQUIPMENT****Description of General Capabilities:**

Employees can be notified of an emergency situation and appropriate response action through the use of a text message sent on the EMAG, cellular telephones, and by two-way radio. Unescorted personnel carry a radio (issued at the TA-54 Operations Center) or a cell phone capable of receiving TA-54 text messaging in the event the PA system cannot be heard.

Emergency paging system-loud speakers are located throughout the site.

Evacuation alarm buttons are located at or near -54-0033, 54-0048, 54-0049, 54-0153, 54-0224, 54-0229, 54-0230, 54-0231, 54-0232, 54-0283, 54-0375, 54-0412, Pads 1, 9 and 10 and at various Assembly Areas.

Additional equipment includes portable two-way radios and cellular telephones.

**DECONTAMINATION EQUIPMENT****Description of General Capabilities:**

Emergency shower and eyewash stations are used by personnel who receive a chemical splash to the skin or eyes. Specific Safety Data Sheets (SDSs) for the chemicals being managed should be obtained prior to working with hazardous or mixed waste to determine if the application of water is indicated for decontamination.

Portable eyewash stations are located at TA-54 container storage units (CSUs) during waste management operations involving free liquids.

**APPENDIX E**

Page 3 of 3

One permanent, hard-plumbed eyewash station and a safety shower is located in TA-54-0033. Safety Data Sheets (SDS) are available hard copy or via online database.

**PERSONAL PROTECTIVE EQUIPMENT**

Personnel at Area G are required to use appropriate personal protective equipment (PPE) to protect themselves from the hazards found in the workplace under normal conditions. This PPE may include gloves, safety-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation and can be found at various PPE locations throughout the site.

**OTHER**

Routine contamination and dose rate surveys are performed in the container storage units for detection of radioactive constituents.

Heavy equipment available on site includes:

- Back hoe
- Excavator
- Front-end loader
- Scraper/side by side

Vehicles available to evacuate personnel from Area G include:

- All-terrain vehicles
- Pickup truck
- Flat-bed truck
- Vans

**APPENDIX F**

Page 1 of 3

**TA-54 AREA L EMERGENCY EQUIPMENT<sup>2</sup>****FIRE CONTROL EQUIPMENT****Description of General Capabilities:**

- Fire extinguishers (portable) may be used by any qualified employee in the event of a small (incipient-stage) fire. (An incipient-stage fire is in an initial state and can be controlled or extinguished by a portable fire extinguisher.)
- The automatic dry-pipe sprinkler system is heat activated. Security personnel and the Los Alamos Fire Department (LAFD) are alerted when this system has been activated.

Class ABC and BC rated fire extinguishers are located at Area L. Class D rated fire extinguishers are available at Area L if combustible metals are being managed. A dry-pipe sprinkler system is located at TA-54-215.

Dry chemical fire-suppression systems are located in storage sheds TA-54-0068, TA-54-0069, and TA-54-0070.

Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and security personnel.

Fire alarm pull boxes are located inside TA-54-0037, TA-54-0039, TA-54-0051, TA-54-0060, TA-54-0117, TA-54-0210, TA-0215, and TA-54-0221.

Fire hydrants are located near the main site entrance to Area L and at the southeast corner of TA-54-0062 inside Area L. These fire hydrants supply water at an adequate volume and pressure to satisfy 40 CFR § 264.32(d).

**SPILL CONTROL EQUIPMENT**

Spill equipment at TA-54 Area L includes the following:

- Shovels
- Oversized drums
- Absorbent (various locations on site)
- Heavy equipment from Area G available for any emergencies at Area L.

Spill kits are located throughout Area L. Each kit includes bags of absorbent.

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<sup>2</sup> Source: Hazardous Waste Permit, Attachment D, TA-54 Contingency Plan, Table D-1 dated December 2013 or successor

**APPENDIX F**

Page 2 of 3

**COMMUNICATION EQUIPMENT****Description of General Capabilities:**

- External and internal Laboratory communications which may be used in emergency situations are listed.
- Fire alarms may be activated by any employee in the event of a fire to notify the LAFD and security personnel.
- Employees can be notified of an emergency situation and appropriate response actions through the use of a text message sent on the EMAG or cellular telephones with page/text capabilities.
- The evacuation alarm is a pulsating sound that can be heard throughout Area L. The fire alarm is a double slow-whoop sound.
- EMAG can be utilized to alert workers of an emergency situation as well as appropriate response actions. Also personnel will carry cellular telephones or two-way radios or will have immediate access to communication equipment through visual or voice contact with another employee.

EMAG or cellular telephones with page/text capabilities are given to employees working in the area. Fire alarm pull boxes are located at TA-54-0215.

Emergency paging system-loud speakers are located throughout the site. Evacuation alarms are located adjacent to the fence line crash gates at Area L, at the northeast end of TA-54-0032, the exterior west end of TA-54-0215, and at TA-54-0062.

Unescorted personnel carry a radio (issued at the TA-54 Operations Center) or a cell phone capable of receiving TA-54 text messaging in the event the PA system cannot be heard.

**DECONTAMINATION EQUIPMENT****Description of General Capabilities:**

Emergency shower and eyewash stations are used by personnel who receive a chemical exposure to the skin or eyes. Specific Safety Data Sheets (SDS) for the chemicals should be obtained prior to working with the chemical to determine if the application of water is indicated for decontamination.

Emergency shower and eyewash stations are located immediately east of TA-54-0031, at TA-54-0215, at TA-54-0035, and at TA-54-0039.

SDSs are available hard copy or via online database at the facility.



**APPENDIX F**

Page 3 of 3

**PERSONAL PROTECTIVE EQUIPMENT**

Personnel at Area L are required to use appropriate personal protective equipment (PPE) to protect themselves from the hazards found in the workplace under normal conditions. This PPE may include gloves, safety-toed shoes, and safety glasses. Additional PPE may be required during an unusual hazardous situation or during sampling activities.

**APPENDIX G**

Page 1 of 1

**ASPHALT PAD MANAGEMENT****Inspection**

Inspections conducted under N3B-DOP-TRU-1219 will identify and record the locations of all cracks or gaps larger than the width of a credit card/badge in floors or base materials (asphalt pads) utilized for hazardous waste management. Cracks and gaps may include areas where vegetation exists. Any growth of vegetation in cracks or gaps gives the appearance of root systems of the vegetation permeating the soil between the cracks or gaps. Thus, a potential for any liquids or solid waste spilled to enter the environment.

If the crack or gap is in the base of a unit utilized for secondary containment (Dome 230), the unit will be repaired within 24 hours or the liquid waste container(s) will be moved to a location with compliant secondary containment until repairs are made.

If the crack or gap is in a permitted unit surface where solid wastes are stored (not secondary containment), then the IRF may be used to track the actionable item to closure, repairs are to be made as soon as practicable and a repair schedule will be sent to the N3B Regulatory Compliance group. Waste containers are not to be stored in a permitted area that has any cracks or gaps in the floor until repairs, compensatory measures or corrective actions can be implemented. Solid waste containers are also not to be stored outside on permitted areas that have any cracks or gaps.

Any cracks/gaps in the surface (e.g., asphalt pad) of a permitted unit storing liquid wastes will be repaired within 24 hours. If cracks cannot be repaired within 24 hours, compensatory actions will be implemented within 24 hours. Compensatory measures prior to complete repair may include actions such as backfilling the crack/gap with a base course, cold patch or other material, caulking, sand bagging around the defective area, covering the area with plastic sheeting/tarps, and removing waste from the damaged area.

N3B Regulatory Compliance shall be notified the same day cracks/gaps are discovered and the path forward (i.e., performing repairs or compensatory measures). Liquid waste storage on a permitted area with cracks/gaps shall not be allowed. Outdoor storage of solid wastes on a permitted area with cracks/gaps shall not be allowed, as rain could transport any potential releases into the crack/gaps. The crack/gaps repair status shall be tracked until repairs are completed. The repair status shall also be communicated to waste operators, so wastes are stored appropriately.

Cracks/gaps in permitted units that create a loading/unloading hazard or other safety issues will be repaired within 24 hours or have compensatory actions implemented within 24 hours.

**ATTACHMENT 1**

Page 1 of 4

**HAZARDOUS WASTE FACILITY INSPECTION RECORD FORM**

<sup>1</sup> FACILITY:	<sup>2</sup> Site ID #:	TREATMENT, STORAGE, OR DISPOSAL UNIT (TSD)	<sup>3</sup> START DATE:	<sup>4</sup> END DATE:				
<sup>5</sup> <input type="checkbox"/> Containers <input type="checkbox"/> Landfill <input type="checkbox"/> Chemical Treatment <input type="checkbox"/> Tank <input type="checkbox"/> Miscellaneous Unit (OB/OD, Cementation)								
<b>PART I</b> - Enter condition of the item inspected (i.e., <b>OK</b> , <b>NA</b> [Not Applicable], or <b>AR</b> [Action Required]) in column for day inspected.								
<b>ITEM</b>	<b>INSPECTED FOR:</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>	<b>FRI</b>	<b>SAT</b>	<b>SUN</b>
<sup>6</sup> NO UNIT USE	No waste stored							
<sup>7</sup> NO WASTE HANDLING	No waste handled (see instructions)							
<b>All TSDs</b>								
<sup>8</sup> COMMUNICATIONS EQUIPMENT	Availability and proper operating condition							
<sup>9</sup> WARNING SIGNS	Posted, legible, and bilingual							
<sup>10</sup> SECURITY	Good condition of fences, gates, locks, and other access control equipment							
<sup>11</sup> WORK SURFACES/ FLOORS/ROADS	Absence of conditions that could lead to an accident or spill							
<sup>12</sup> SPILL/FIRE EQUIPMENT	Present, appropriate, and in proper operating condition							
<sup>13</sup> EYEWASHES/ SAFETY SHOWERS	Proper operating condition							
<sup>14</sup> WIND SOCK	Proper operating condition and functional							
<sup>15</sup> SECONDARY CONTAINMENT	Integrity- No standing water/waste, erosion, or signs of a spill							
<sup>16</sup> (UN)LOADING AREA	No spills or deterioration							
<sup>17</sup> RUN-ON/OFF CONTROL	Integrity- no ponding, erosion, or damage							
<b>Container Storage Units and/or Tanks (see instructions section 5.4[24])</b>								
<sup>18</sup> COVERS/LIDS OF CONTAINERS	Closed and secured properly							
<sup>19</sup> LABELS	Proper with start date, present & legible							
<sup>20</sup> COMPATIBILITY	Separated according to compatibility							

# RCRA Inspections and Notifications

Document No.: N3B-DOP-TRU-1219

Revision: 3

Effective Date: 03/22/2023

Page: 56 of 67

UET

## ATTACHMENT 1

Page 2 of 4

<sup>1</sup> FACILITY:		<sup>2</sup> Site ID #:		<sup>3</sup> START DATE:			<sup>4</sup> END DATE:	
<b>ITEM</b>	<b>INSPECTED FOR:</b>	<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>	<b>FRI</b>	<b>SAT</b>	<b>SUN</b>
<sup>21</sup> INTEGRITY	No leakage, corrosion, or damage							
<sup>22</sup> AISLE SPACE/STACKING	Appropriateness and adequacy							
<sup>23</sup> PALLETS AND RAISED CONTAINERS	Absence of conditions that could result in failure							
<sup>24</sup> TANK SYSTEMS	Discharge controls and fill level and no corrosion or leakage							
<b>Other TSDs</b>								
<sup>25</sup> SHAFTS/LANDFILL COVERS	Presence and condition of cover							
<sup>26</sup> OPEN BURNING UNITS	Condition of cover, and no erosion, leakage, or damage							
<sup>27</sup> OPEN DETONATION UNITS	Unit and vegetation condition and no erosion							
<sup>28</sup> CEMENTATION UNITS	Structural integrity and condition of equipment and systems							
		<b>MON</b>	<b>TUE</b>	<b>WED</b>	<b>THU</b>	<b>FRI</b>	<b>SAT</b>	<b>SUN</b>
<sup>29</sup> DATE								
<sup>30</sup> TIME								
<sup>31</sup> <u>INSPECTORS</u>								

UET

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**ATTACHMENT 1**

Page 3 of 4

**Part II** - For any AR (Action Required) in PART I, describe below: action required, action taken, status, date, and time of action. Attach additional sheets if necessary. If more than one action is required, number each AR.

32.

**Part III** - Comments

33.

**RCRA Inspections and Notifications**

Document No.: N3B-DOP-TRU-1219

Revision: 3

Effective Date: 03/22/2023

Page: 58 of 67

UET

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**ATTACHMENT 1**

Page 4 of 4

**NOTE:** The Environmental Professional review signatures on this page is NOT part of the Hazardous Waste Facility Inspection Record Form as depicted in the Hazardous Waste Permit. However, it is required to meet the requirements of a QA record as it applies to this document.

Reviewed By:

/	/	/
Environmental Professional (print)	Signature	Z#      Date

**RCRA Inspections and Notifications**

Document No.: N3B-DOP-TRU-1219  
Revision: 3  
Effective Date: 03/22/2023  
Page: 59 of 67

UET

**ATTACHMENT 2**

Page 1 of 1

**CH-TRU SPILL KIT INVENTORY SHEET**

Year: 20\_\_\_\_ Location: \_\_\_\_\_

Description of Items	No. of Items	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3" x 4' Sock													
3" x 10' Sock													
10" Square Pillows													
Gray Mat Pads													
Is the Spill Kit secured? If not, explain below.	N/A												
Date of inventory	N/A												
Initials of Inspector	N/A												
Z#	N/A												
Comments:													

Reviewed By: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
Environmental Professional (print) Signature Z# Date

**ATTACHMENT 3**

Page 1 of 2

**WEEKLY AREA G EVACUATION ROUTE AND CONTINGENCY PLAN  
INSPECTION FORM**

Date: \_\_\_\_\_

Evacuation Route Signs	SAT / UNSAT
Dome 0049, inside by clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0224, inside by roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 7, on the doors to: 54-0144, 54-0145, 54-0146, 54-0177, 54-1027, 54-1028, 54-1030, and 54-1041	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0283, outside by clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0153, outside by west clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0153, inside by east clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0033, inside by east clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Building 0008, outside on the door to the building	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0375, inside-near the west end roll-up doors	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Building 0412, north side by roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 10, on southwest corner and on east side of pad near HENC 2 storage area.	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0048, inside near clamshell door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0232, inside near the west roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0231, inside near the west roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0230, inside near the west roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0229, inside near the west roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Contingency Plan	SAT / UNSAT
Bldg. 54-0315, inside the TA-54 Operations Center	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 1, inside basket by north roll-up door under evacuation route sign in 54-0412	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 3, inside near clamshell door near evacuation route sign in Dome 0048	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 5, inside by clamshell door near evacuation route sign in Dome 0049	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 6, inside by clamshell door east under evacuation route sign in 54-0153	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 9, inside near west roll-up door under evacuation route sign in 54-0231	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 10, inside 54-0545	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 11, north of roll-up door on east end Dome 0375	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Storage Shed 0008 next to Personnel door entrance	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Dome 0033, inside by east clamshell door under evacuation route sign	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT



UET

**ATTACHMENT 3**

Page 2 of 2

**WEEKLY AREA G EVACUATION ROUTE AND CONTINGENCY PLAN  
INSPECTION FORM (continued)**

Date: \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Performed By:

_____/	_____/	_____/	
Inspector Name (print)	Signature	Z#	Date

Reviewed By:

_____/	_____/	_____/	
Environmental Professional (print)	Signature	Z#	Date

UET

**ATTACHMENT 4**

Page 1 of 1

**WEEKLY AREA L EVACUATION ROUTE AND CONTINGENCY PLAN  
INSPECTION FORM**

Date: \_\_\_\_\_

Evacuation Route Signs	SAT / UNSAT
Area L Lift Gate, on the poster board	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Bldg. 54-0068, on the door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Bldg. 54-0069, on the door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Bldg. 54-0070, on the door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Bldg. 54-0039, south end of awning	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Bldg. 54-0039, outside roll-up door	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT

Contingency Plan	SAT / UNSAT
Bldg. 54-0039, room 101	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT

Comments: \_\_\_\_\_

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\_\_\_\_\_

Performed By:

_____/	_____/	_____/
Inspector Name (print)	Signature	Z#
		Date

Reviewed By:

_____/	_____/	_____/
Environmental Professional (print)	Signature	Z#
		Date

## UET

Page: 63 of 67

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Date

**ATTACHMENT 6**


Page 1 of 2

**AREA G FENCE LINE INSPECTION FORM**

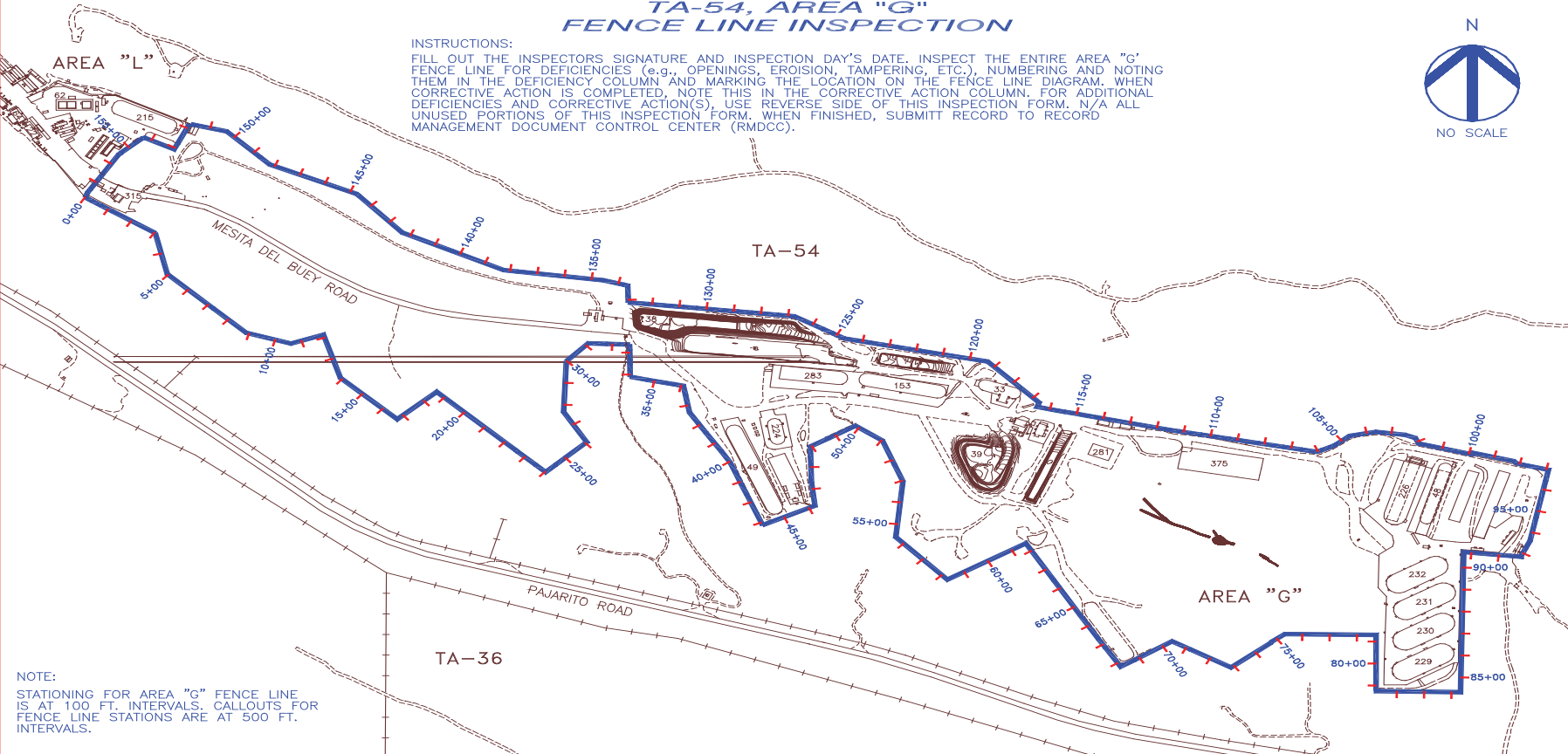
**TA-54, AREA "G"**  
**FENCE LINE INSPECTION**

**INSTRUCTIONS:**  
 FILL OUT THE INSPECTOR'S SIGNATURE AND INSPECTION DAY'S DATE. INSPECT THE ENTIRE AREA "G" FENCE LINE FOR DEFICIENCIES (e.g., OPENINGS, EROSION, TAMPERING, ETC.), NUMBERING AND NOTING THEM IN THE DEFICIENCY COLUMN AND MARKING THE LOCATION ON THE FENCE LINE DIAGRAM. WHEN CORRECTIVE ACTION IS COMPLETED, NOTE THIS IN THE CORRECTIVE ACTION COLUMN. FOR ADDITIONAL DEFICIENCIES AND CORRECTIVE ACTION(S), USE REVERSE SIDE OF THIS INSPECTION FORM. N/A ALL UNUSED PORTIONS OF THIS INSPECTION FORM. WHEN FINISHED, SUBMIT RECORD TO RECORD MANAGEMENT DOCUMENT CONTROL CENTER (RMDCC).

N



NO SCALE



**NOTE:**  
 STATIONING FOR AREA "G" FENCE LINE IS AT 100 FT. INTERVALS. CALLOUTS FOR FENCE LINE STATIONS ARE AT 500 FT. INTERVALS.

DEFICIENCIES:

CORRECTIVE ACTION(S):

**ATTACHMENT 6**

Page 2 of 2

Actionable Items:	Corrective Actions:
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.
9.	9.
10.	10.

Performed By:

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 Inspector Name (print)                      Signature                      Z#                      Date

Reviewed By:

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
 Environmental Professional (print)                      Signature                      Z#                      Date

UET

**ATTACHMENT 7**

Page 1 of 1

**MONTHLY AREA L, DOME 215 HOLDING TANK INSPECTION FORM**

Month	Fluids detected in Dome 0215 holding tank?	Printed Name of Inspector	Signature of Inspector	Date of Inspection
January	<input type="checkbox"/> YES <input type="checkbox"/> NO			
February	<input type="checkbox"/> YES <input type="checkbox"/> NO			
March	<input type="checkbox"/> YES <input type="checkbox"/> NO			
April	<input type="checkbox"/> YES <input type="checkbox"/> NO			
May	<input type="checkbox"/> YES <input type="checkbox"/> NO			
June	<input type="checkbox"/> YES <input type="checkbox"/> NO			
July	<input type="checkbox"/> YES <input type="checkbox"/> NO			
August	<input type="checkbox"/> YES <input type="checkbox"/> NO			
September	<input type="checkbox"/> YES <input type="checkbox"/> NO			
October	<input type="checkbox"/> YES <input type="checkbox"/> NO			
November	<input type="checkbox"/> YES <input type="checkbox"/> NO			
December	<input type="checkbox"/> YES <input type="checkbox"/> NO			

Comments:

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Reviewed By:

Environmental Professional (print)

Signature

Z#

Date

**ATTACHMENT 8**

Page 1 of 1

**ANNUAL AREA G AND L DEMARCATION LINE AND PAD INSPECTION FORM**

Area G – Demarcation Lines	<input type="checkbox"/> N/A
	SAT / UNSAT
Pad 5	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 6 (Dome 0283, and 0153)	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 11 (Dome 0375)	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 1 (Building 0412)	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 10	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 3 (Dome 0048)	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Pad 9 (Domes 0232, 0231, 0230, and 0229)	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Building 8	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT
Building 33	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT

Area L	<input type="checkbox"/> N/A
	SAT / UNSAT
Fenceline	<input type="checkbox"/> SAT <input type="checkbox"/> UNSAT

Comments: \_\_\_\_\_

\_\_\_\_\_

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Performed By:

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Inspector Name (print) Signature Z# Date

Reviewed By:

\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

Environmental Professional (print) Signature Z# Date



# Notification, Investigation and Learning from Events

## *Responsible Manager*

Scott Hobbs	Signature on File	6/27/2022
<i>Mission Assurance Director</i>	<i>Signature</i>	<i>Date</i>

## *Program Manager*

Tom Harrison	Signature on File	6/27/2022
<i>Quality Assurance &amp; Transformation Program Manager</i>	<i>Signature</i>	<i>Date</i>

**Document No.:** N3B-POL-QAT-0019  
**Revision:** 2  
**Effective Date:** 6/27/2022



## **1.0 PURPOSE**

This document defines the process for notification (of non-emergency response events) and the subsequent investigation, correction/prevention and reporting of events at Newport News Nuclear BWXT-Los Alamos, LLC (N3B).

The intent of the investigative and analysis process is to understand problems that contributed to the event so that deficiencies, including the causes, can be addressed, corrected and prevented from reoccurring. This procedure also facilitates the process for N3B to analyze, learn and improve from positive, successful events.

This procedure interfaces with N3B-P322-4, *Issues Management*, to ensure issues and corrective actions associated with events are managed effectively. N3B-P141, *DOE Enforcement & Reportability Process for Nuclear Safety, Worker Safety and Health, and Classified and Sensitive Information Security Procedure*, and N3B-P322-3, *DOE Occurrence Reporting and Processing of Operations Information (ORPS)*, implement related but parallel processes for categorization and reporting of incidents in accordance with DOE requirements.

## **2.0 AUTHORITY AND APPLICABILITY**

### **2.1 Authority**

This document is issued under the authority of the N3B Program Manager and President to direct the management and operation of N3B, as delegated to the Program Manager for Quality and Transformation (QA&T) as provided in the Los Alamos Legacy Cleanup Contract (LLCC).

- Issuing Authority (IA): N3B QA&T Program Manager (PM)
- Responsible Manager (RM): Mission Assurance Director

### **2.2 Applicability**

This document applies to all N3B employees, critical subcontractors and subcontractors.

This procedure does not take precedence in the event of operational emergency response to emergencies and security incidents.

Operational emergency events requiring emergency response (e.g., explosion, fire, hazardous material release, serious injury) and incidents of security concern are subject to categorization, notifications, and responses under:

- PD1200, *Emergency Management* (Triad controlled document)
- N3B-ERP-TRU-3002, *Emergency Response*
- SEO-DO-PLAN-100, *Hazardous Materials Program Emergency Plan* (Triad controlled document)
- SEO-PLAN-152, DOE O 151.1D *Comprehensive Emergency Management System Implementation Plan* (Triad controlled document)
- N3B-P102-2, *Occupational Injury and Illness Response, Reporting and Investigation*
- N3B-P201-3, *Reporting Known and Potential Incidents of Security Concern*

For the duration of emergency conditions, Los Alamos National Laboratory (LANL) Emergency Operations Center (EOC) Security and Emergency Operations (SEO) personnel and procedures take precedence.

### 3.0 PROCEDURE DESCRIPTION

This procedure is implemented for all events (including emergency response events once emergency conditions have ceased) utilizing a graded approach based on severity (High, Moderate, Low) described in N3B-P322-4, *Issues Management*.

#### 3.1 Event Notification

The N3B President has communicated supplemental expectations to the Management Team per Memo OoP-2020-0004 (Attachment 6), reinforcing the urgency associated with notification of an event. Depending on the event consequence, notification to the Office of the President should occur in the following timeframes:

- **Immediate concern**—within 20 minutes
- **Urgent concern**—within one hour
- **Prompt concern**—within same shift
- **Routine concern**—within 24 hours

When an event occurs, the CH-TRU Facility Operations Director (FOD) (or designee) or ER Operations Director (OD) (or designee) or any other N3B organization PM are required to immediately report events, per N3B-P322-3, *DOE Occurrence Reporting and Processing of Operations Information (ORPS)*. Event notification is communicated via [eventnotification@em-la.doe.gov](mailto:eventnotification@em-la.doe.gov) (see attachment 4). PMs also have the authority to report and initiate the event process as needed/required as delegate for the FOD or OD for this process. The ER OD is designated to coordinate any event notifications for the Program Support organizations within N3B.

Within 2 hours of discovery, the ORPS/Office of Enforcement CAS Specialist—in conjunction with FOD, OD, PM or designee—will make a preliminary ORPS level determination in accordance with N3B-P322-3, *DOE Occurrence Reporting and Processing of Operations Information (ORPS)*.

Every event must be entered into iCAS by the FOD, OD, PM or their delegate and identified as an Event in the appropriate field. The Issue Request number will be used as the identifier, following the process in N3B-P322-4, *Issues Management*. The Issue Request (IR) created for the event will be used to track the event issue to completion.

#### 3.2 Preparation for Event Meeting

An event meeting is conducted as soon as practicable, normally within 24 hours from the discovery of the event. It is imperative to immediately gather facts, testimonies, and ensure the people involved with the work, and their management team, attend.

The FOD, OD, or PM assembles the procedures, integrated work documents, photos, drawings, and measurements are gathered in advance to support the establishment of facts, as applicable. A preliminary timeline of the event is prepared prior to the meeting.

The FOD, OD, or PM is responsible for designating a QA&T approved facilitator from the line organization for the event meeting. To accomplish standardization and normalization across N3B, members outside of the program where the event occurred can be used as facilitators as long as they have been approved by QA&T. A scribe must also be assigned to support the facilitator.

Following event notification, a meeting invitation to attend the event meeting is sent out by the facilitator to the following:

- Involved worker(s)/managers
- FOD, OD, PM or delegate
- Line organization Event Meeting Facilitator
- ORPS/Office of Enforcement CAS Specialist and/or CAS Specialist as Issues Management lead
- Trained Causal Analyst (if required)
- Scribe
- Witnesses
- Key Responders
- Worker's immediate supervisor
- Key subject matter experts (SMEs)
- Disciplined Operations Group representative
- Senior Management
- Facility Representative/DOE Designated Representative
- Defense Nuclear Facilities Safety Board (DNFSB) Representative (for events at nuclear facilities)

To ensure a successful meeting, the facilitator should confirm the necessary individuals listed above are available and present.

### **3.3 Event Meeting Execution**

#### **3.3.1 Objective**

Event meetings demonstrate N3B's willingness to learn from events regardless of the severity. The objective is to have involved workers/managers discuss the various facts surrounding the event and any associated conditions, both positive and negative, with an overall objective to learn and improve. Using Human performance principles, a focus on the overall environmental conditions, organizational approaches to work, etc. should be examined to avoid "tunnel vision" only on the specific event.

The event meeting purpose is to establish the facts, understand what happened (using a timeline, statements and other relevant information), determine the severity of the event (including confirmation of ORPS/PAAA categorization), understand the problems and causes, and identify immediate or compensatory and short term corrective actions. Long term and follow-up actions will typically be added following the event meeting. The objective is to complete as much of the investigative process during the meeting as possible. For Low Severity events, the meeting results in agreement to the problems, causes and actions necessary to close the issue. For Moderate Severity events, the problems, apparent cause(s) are identified, and associated corrective actions agreed to by attendees. For High Severity events, a root cause is required, which necessitates a longer investigative process completed outside of the event meeting, using the information formulated during the event meeting.

**Issues that are revealed during the Event Meeting that may have HR, Personal Information (PI) or security implications should be placed on hold for management to address separately and should not be discussed further.**

### 3.3.2 Execution

The facilitator uses the Event Meeting checklist (Attachment 3) to help enable a culture of openness, honesty and willingness to learn and improve from the event. Facilitators are familiar with and demonstrate positive safety culture attributes. Facilitators have prior training, and/or experience demonstrating the ability to facilitate an effective event meeting and have been added to the list of QA&T approved facilitators. The scribe takes minutes to document discussions and conclusions and assist the facilitator in preparations, (draft timeline, etc.) and meeting conduct.

Event meetings determine the following:

- What happened?
- What should have happened?
- Problem Statement(s) and/or Identified problem(s)
- Likely cause(s) and apparent cause(s)
- Actions to address, mitigate, correct and prevent (based on severity)
  - Actions to close issue
  - Immediate actions, meaning actions taken to place the facility/system/situation in a safe and stable configuration
  - Compensatory actions to mitigate the issue until corrective actions are implemented
  - Corrective actions to correct and prevent recurrence

The meeting should be an open discussion forum that exhibits the attributes of a positive safety culture, including the following:

- Facilitator and management set and maintain the tone as an open, no-fault, candid, learning environment.
- Facilitator reviews the guidelines and expectations:
  - The dialogue is open, honest and professional. All in attendance are treated equally and respectfully.
  - Directly involved employees discuss their involvement with minimal interruptions.
  - Management and all attendees actively listen. Body language and actions suggest genuine interest in hearing and learning from involved workers and responders.
  - As a rule, there should be no cell phone use, including texting or email, or any other distracting behavior from the use of electronic devices, during an Event Meeting. Deviations from this rule should always be the exception.
  - Event Meeting attendees, especially management and oversight, do not shift the discussion towards a pre-conceived determination.
  - Individuals are clearly willing to speak up regarding the facts, including what they observed.
  - Participants demonstrate a questioning and learning attitude and engage others to understand all aspects of an event and underlying conditions.
  - The Event Meeting includes discussion of what went “right” in addition to what went “wrong.”
  - Individuals are recognized and commended for self-identification of errors and/or the demonstration of behaviors consistent with positive safety culture principles.

- The DOE and DNFSB representatives should be asked to provide their questions last to allow the N3B team the opportunity to conduct questioning. Any lingering questions not asked that are of interest to the DOE and DNFSB attendees should be asked as follow up when requested by the facilitator.
- Event meetings should be conducted with in person attendance.

### **3.3.2.1 Management Actions**

Management representatives at the Event Meeting also have action to:

- Confirm if compensatory actions are necessary to return to work. Agree how they are to be implemented and assign PM responsibility.
- Confirm ORPS/Office of Enforcement categorization and reporting requirements.
- Confirm N3B Issues Management severity rating (High, Moderate, and Low) for the event (as input to the IR Screening Meeting).
- Determine if supplemental event or apparent cause meeting is required to investigate further, and/or further develop corrective or preventative actions. Supplemental efforts are completed as expeditiously as possible.
  - If a separate or more in-depth Apparent Cause is required an Apparent Cause Evaluation (ACE) analyst is assigned and informed. From 24 hours post Event Meeting, the analyst has 15 calendar days to complete ACE.
- For High Severity events, assign and inform Root Cause Analysis (RCA) analyst. From 24 hours post Event Meeting, analyst has 30 calendar days to complete RCA.
- Determine if development and distribution of Lessons Learned is warranted. If yes, assign individual to the activity.

## **3.4 Event Follow Up and Reporting**

Within 24 hours post Event Meeting the FOD, OD, PM or their delegate communicates an updated event notification using [eventnotification@em-la.doe.gov](mailto:eventnotification@em-la.doe.gov) (Attachment 4) with what was learned. It is important to share any updates to the summary, problems, causes and the compensatory measures.

Within 48 hours post Event Meeting the Event Meeting report is approved and uploaded into iCAS. The FOD, OD PM has assigned the Issue Owner and Action owners and corrective action plans move to implementation, per N3B-P322-4, *Issues Management*.

If an ORPS report is required, the ORPS CAS Specialist writes and submits the ORPS report within the guidelines of N3B-P322-3, *DOE Occurrence Reporting and Processing of Operations Information (ORPS)*.

### **3.4.1 Moderate or High Significance Event Reports**

For Moderate and High Significance events (including ORPS reportable), the FOD, OD, PM or their delegate is responsible for the quality and completion of the (applicable sections of) Event Meeting Report Form (N3B-Form-6177, R1 or later, *Event Report*, see example in Attachment 5). The final report is:

- Uploaded into iCAS within 48 hours post Event Meeting.
- Distributed to N3B management, Event Meeting attendees, and is available in iCAS.
- Problems, causes and compensatory measures/corrective actions are documented.
- Includes completed Event Meeting Attendance Sheet (Attachment 2).

- Includes written witness statements.
- Includes Event timeline.
- Relevant documents submitted at the Event Meeting (Work Control Documents, drawings, data reports, etc.).

### **3.4.2 Low Significance Event Reports**

If, at the Event Meeting, the event is categorized as Low, and the problems, causes, and corrective actions have been captured, then the applicable sections of the Event Meeting Report—N3B-Form-6177, R1 or later, *Event Report* (see example in Attachment 5)—is completed and entered into iCAS with any other supplemental information.

If the event is determined to be very straightforward and the PM determines no new information will be gleaned from an Event meeting, the issue may be handled outside the Event Meeting process. Regardless, the applicable sections of N3B-Form-6177, R1 or later, *Event Report* (example in Attachment 5), must be filled out by the individual responsible for investigating. The report and any supplemental information is entered into iCAS.

## **4.0 RESPONSIBILITIES**

### **4.1 N3B Program Managers, Directors, Managers and Supervisors**

- Ensure that the appropriate immediate management notifications of events are made, compliant with facility and organizational expectations.
- Ensure that compensatory measures as defined by this procedure are in place prior to the resumption of work.
- Cooperate with Facilitator, FOD or OD, Operations personnel, and Contractor Assurance Specialists in all steps of the event reporting process (e.g., event meeting, event notification, investigation, causal analysis, and corrective action development).
- Ensure scene stabilization and evidence preservation when safe to do so.

### **4.2 Supervisors/First-Line Managers**

- Ensure personnel safety first, as part of any response to an event.
- Ensure timely notification of the FOD or OD and first available line manager (group level or above) for every event within their work area or span of supervision.
- Ensure scene stabilization and evidence preservation when safe to do so.
- Cooperate with the Facilitator, FOD or OD, Operations personnel, and Contractor Assurance Specialists in all steps of the event reporting process (e.g., event meeting, event notification, investigation, causal analysis, and corrective action development).

### **4.3 Workers**

- Report to supervisors or first-line managers any event or condition, whether within or beyond the bounds of the assigned work area.
- Participate candidly and openly when invited to event meetings, or when interviewed as part of the investigation.
- Provide written statement in advance of the Event Meeting to the facilitator describing the sequence of events and any other pertinent information that would be useful in understanding the facts surrounding the event or situation.
- Cooperate with the Facilitator, FOD or OD (and/or their support personnel), and Contractor Assurance Specialists in all steps of the event reporting process (e.g., Event



Meeting, event notification, investigation, causal analysis, and corrective action development).

#### **4.4 QA&T PM**

- Supports performance of all event notification, event investigation and reporting.
- Assess the quality and content of all related activities.
- Approves Event Meeting facilitators.

#### **4.5 CH-TRU FOD or ER OD or Program Support Area PMs**

- Responsible for the implementation of the events reporting process in accordance with N3B and DOE requirements.
- Categorize each event within 2 hours of discovery, or as soon thereafter as reasonably possible.
- Conduct Event Meeting in a timely manner to ensure reporting requirements are met.
- As soon as possible after categorization, transmit an Event/Incident Notification.
- Ensure that required notifications to N3B Management are made within required timelines.
- Ensure that compensatory measures for significant conditions adverse to quality are in place prior to the resumption of work.
- Engage SMEs to assist with the event reporting process as warranted.
- Manage the event process for the facility, including immediate communications, Event Meeting, investigation, causal analysis and corrective action development.
- Approve every related written report from notification to Event Meeting report and is responsible and accountable to the content and quality of the approved report.
- Designate Event Meeting Facilitator for each event.

#### **4.6 Contractor Assurance Specialists**

- Support N3B in all aspects of the Event Investigation process.
- Perform the ORPS and Office of Enforcement reporting process (with assistance from SMEs as required).

#### **4.7 Facilitator**

- Lead the Event Meeting process, including verifying that all appropriate personnel are in attendance.
- Assist with the Event Meeting reports.
- Ensure that all the required parties are present for the Event Meeting.
- Ensure every aspect of the Event Meeting are clearly addressed and articulated.

#### **4.8 Scribe**

- Thoroughly document Event Meeting and support Facilitator.

### **5.0 IMPLEMENTATION**

The requirements in this document are effective on the issue date.

## 6.0 TRAINING

Event Meeting Facilitator training and experience is required to implement this document. It is recommended that all personnel implementing this document by facilitating, scribing or being a Responsible Manager for Event Meetings attend the QA&T requisite training session, *Notification, Investigation and Learning from Events*, CW-2021-0186.

## 7.0 EXCEPTION OR VARIANCE

None.

## 8.0 DOCUMENTS AND RECORDS

CH-TRU Facility Operations Director (FOD) (or designee) or ER Operations Director (OD) (or designee) or other N3B organization PM

Ensure all records generated by the performance of this procedure are processed and protected accordingly:

- When the records are no longer needed for current business, transfer all records to N3B Records Management custody according to N3B-P1020-1, *N3B Records Management*.
- Use N3B-PLN-RM-0004, *N3B Specific Records File Plan and Retention Schedule*, to determine approved disposition schedules for Federal records created or received in performance of work for the Los Alamos Legacy Cleanup Contract (LLCC).

Record Identification	Record Type Determination	Protection/Storage Methods
<p>Event Reports</p> <p><b>Note:</b> Quality Assurance (QA) documents shall be considered valid records only if stamped, initialed, or signed and dated by authorized personnel or otherwise authenticated. Corrections to documents shall be reviewed and approved by the responsible individual from the originating or authorized organization.</p>	<p><b>Quality Assurance (QA) Record</b></p> <p>Nonpermanent</p> <p><b>Note:</b> Lifetime QA Records must be retained for the life of the item.</p> <p>Nonpermanent QA Records provide evidence that an activity was performed in accordance with applicable requirements, but do not meet the criteria for Lifetime Records.</p> <p>Nonpermanent Records must be maintained for their identified retention period.</p>	<p>Supervision <b>shall</b> ensure the records are managed, maintained and stored according to NQA-1 2008/2009a requirements:</p> <ul style="list-style-type: none"> <li>▪ Limit access to the processing, storage, and retrieval of records to authorized personnel.</li> <li>▪ Provide for the temporary storage of QA records in a cabinet with 1-hour fire rating, unless dual storage requirements are met.</li> <li>▪ Provide for the long-term storage (single storage) of QA records in a cabinet with a minimum 2-hour fire rating unless dual storage requirements are met.</li> </ul>

- iCAS in association with the generated Issue # will serve as the repository of any documentation that is generated by the process. Upon closure of the Issue the document package will be exported to N3B DCRM.



## 9.0 DEFINITIONS AND ACRONYMS

### 9.1 Definitions

**Event**—Something significant and real-time that happens (e.g., pipe break, valve failure, loss of power, environmental spill, earthquake, tornado, flood, injury).

**Actionee**—Person tasked with the responsibility of executing all or portions of a corrective action.

**Causal Analysis**—The application of a systematic and disciplined set of process steps, the purpose of which is to identify conditions, actions, or inactions that explain why the identified issue exists.

#### **Condition and/or Issue**

- Any as-found state, whether or not resulting from an event, that may have adverse safety, health, quality assurance, operational, or environmental implications. A condition is usually programmatic in nature; for example, errors in analysis or calculation, anomalies associated with design or performance, or items indicating a weakness in the management process are all conditions.
- A failure to meet a documented requirement.

**Compensatory (or immediate) Action**—An immediate, though temporary, action taken to provide adequate protection of personnel, facility, and/or the environment prior to full implementation of short term or long-term corrective actions.

**Contributing Factors**—Actions, conditions or decisions that contributed to, or exacerbated, the problem but did not cause the problem.

**Corrective Action**—Action(s) intended to correct the cause of an issue.

**Corrective Action Plan (CAP)**—Formal set of corrective actions that address underlying causes and contributing factors of high significance levels.

**Event Meeting**—The gathering of information to ascertain facts, followed by identifying the problems, causes and (at a minimum) short term corrective actions.

**Initial Notification**—Timely reporting of the occurrence to the Facility Representative or Designated DOE Representative as required by the Report Level and the reporting criteria of the occurrence.

**Integrated Contractor Assurance System (iCAS)**—Data management system for contractor assurance system functions.

**Lessons Learned**—A “good work practice” or innovative approach that is identified and shared, or an adverse work practice or experience that is captured and shared to prevent recurrence.

**Occurrences**—Events, conditions or issues that adversely affect, or may adversely affect, DOE or contractor personnel, the public, property, the environment, or the DOE mission.

**Occurrence Report**—A documented evaluation of a reportable occurrence that is prepared in sufficient detail to enable the reader to assess its significance, consequences, or implications and to evaluate the actions being proposed or employed to correct the condition or to avoid recurrence.

**Short Term Corrective Action**—A simple/easy to implement corrective Action that can be put in place immediately, or within a short period of time.

**Long Term Corrective Action**—A corrective action that involves more complex planning and implementation, e.g. a more complex revision to a process, procedure or program.

## 9.2 Acronyms

See N3B [Master Acronym List](#).

To request an informational copy or make additions to the Master Acronym List, send requests to [RegDocs@em-la.doe.gov](mailto:RegDocs@em-la.doe.gov).

## 10.0 HISTORY

Revision History		
09/19/19	N3B-POL-QAT-0019, Rev. 0	Initial Issue. Supersedes Blue Sheeted ADMASER-17-261.
09/28/2021	N3B-POL-QAT-0019, Rev. 1	Complete re-write following improvement and streamlining to the Event investigation process; including the evaluation and learning from positive events.
6/27/2022	N3B-POL-QAT-0019, Rev. 2	Major revision and clarifications to Rev. 1, following implementation for six months. Combined N3B-Form-6177, N3B-Form-6178 and N3B-Form-6359 into one for efficiency.

## 11.0 REFERENCES

Los Alamos Legacy Cleanup Contract

### 11.1 Other References

- N3B-P322-4, *Issues Management*
- N3B-P141, *DOE Enforcement & Reportability Process for Nuclear Safety, Worker Safety and Health, and Classified and Sensitive Information Security*
- N3B-P322-3, *DOE Occurrence Reporting and Processing of Operations Information (ORPS)*
- N3B-P323-1, *Operating Experience and Lessons Learned Process*

## 12.0 FORMS

- N3B-Form-6177, *Event Report*

## 13.0 ATTACHMENTS

Attachment 1. *Event Reporting Process Timeline*

Attachment 2. *Event Meeting Roster Template*

Attachment 3. *Event Meeting Checklist*

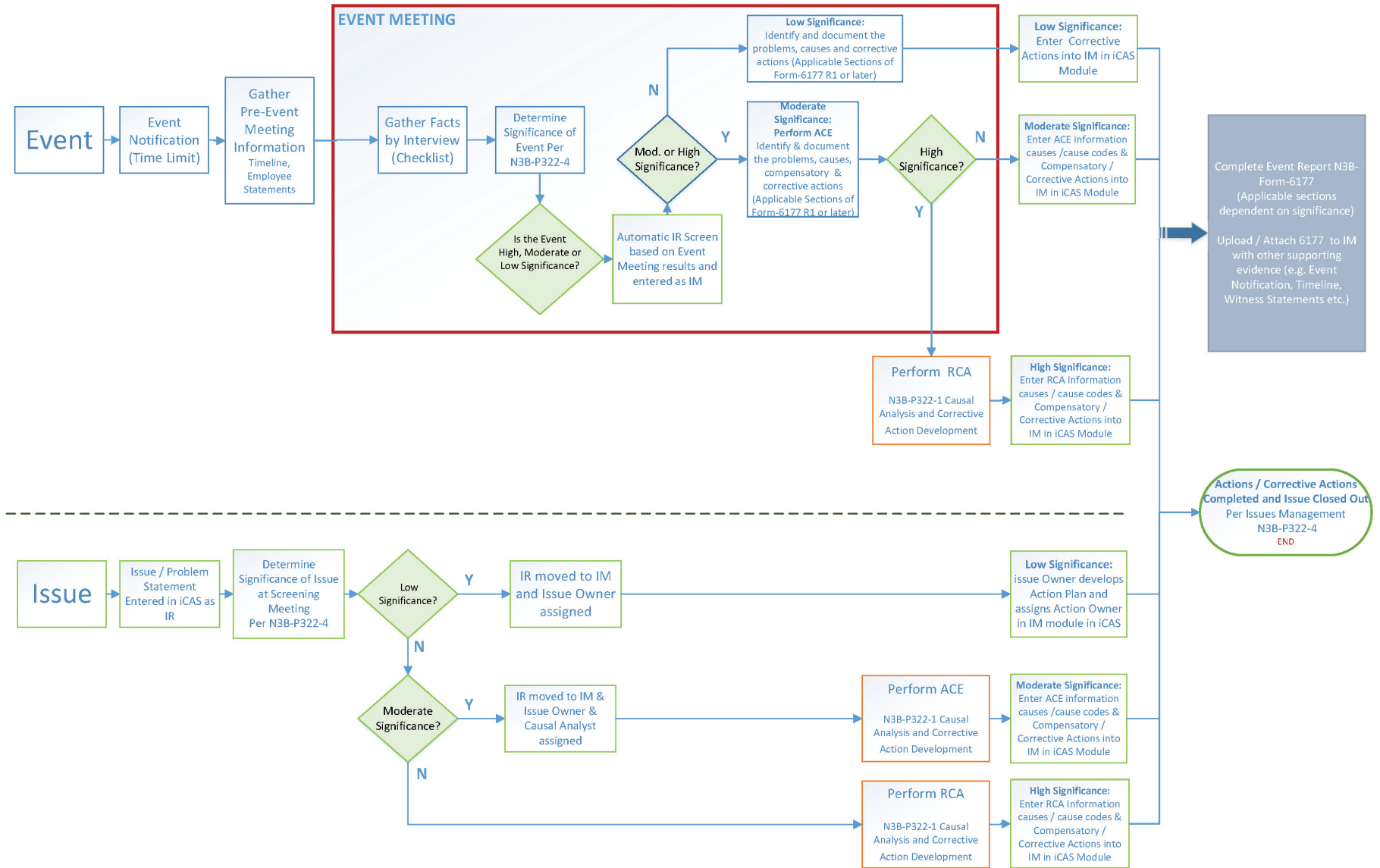
Attachment 4. *Investigation of Events: Event Notification*

Attachment 5. *Event Report Form (Example of N3B-Form-6177)*

Attachment 6. *Memo from the Office of the President*

## Attachment 1. Event Reporting Process (Page 1 of 1)

### N3B Notification, Investigation and Learning From Events AND Issues Management Processes



Attachment 2. Event Meeting Roster Template (Page 1 of 1)

Title of Event:

Date:

Facilitator:

Scribe:

PRINT NAME	ORGANIZATION	ROLE RELATED TO EVENT	E-MAIL	PHONE

### Attachment 3. Event Meeting Checklist (Page 1 of 2)

Event Meeting Preparation	
<input type="checkbox"/>	Photos: If not already done, take photos of the relevant physical evidence to include the scene.
<input type="checkbox"/>	Secure event scene: Secure any involved items, or the entire event scene, for further investigation.
<input type="checkbox"/>	Obtain witness statements: Consider obtaining written witness statements as soon as possible from key workers, as that information is perishable.
<input type="checkbox"/>	Secure records: Secure relevant records or logbooks from the work area.
Event Meeting	
<input type="checkbox"/>	Ensure the necessary invitees are present: If invitees cannot attend, consider rescheduling the Event Meeting or consider witness statements depending on the significance of the event.
<input type="checkbox"/>	Have the attendees introduce themselves: State their role in the event and sign an attendance roster.
<input type="checkbox"/>	State the purpose of the Event Meeting: <i>The purpose of this Event Meeting is to discuss the various facts through development of a timeline of activities and any associated conditions surrounding the event, with an overall objective to understand, learn, and improve. It is not to assign blame. This Event Meeting is an open discussion forum, with an emphasis on learning from the involved management, workers and responders, and all factual input from attendees regarding the event and associated conditions is valued. We will be reviewing any immediate or compensatory actions to mitigate the event based on the Facts, Problems and Causes identified. Based on the complexity and severity of the event, a follow up meeting may be required to finalize the causal analysis and/or conduct a Root Cause Analysis.</i>
<input type="checkbox"/>	Continually maintain positive safety culture: The Facilitator, management, oversight, and the attendees actively and continually exhibit and reinforce positive safety culture attributes.
<input type="checkbox"/>	Reconstruct the timeline using the draft timeline generated prior to the meeting: During this phase, continually encourage a questioning attitude regarding all aspects of the event. Actively engage workers and responders and allow them to “tell the story.” Keep the discussion on track, minimize interruptions and do not steer the discussion toward a presumed cause or outcome. <b>Avoid “solving the case.”</b>
<input type="checkbox"/>	Determine conditions before the event: Set the stage by understanding work planning, pre-job briefings, equipment checks, etc. (Have all vital information ready for presentation, including: the event notification, schematic of the operations, real time pictures of the scene immediately after the incident occurred and specifications for equipment, integrated work document [IWD]s, etc. This information being readily available allows for a better understanding of the incident and can reduce the amount of questions needed to paint a picture for personnel that were not present during the incident.)
<input type="checkbox"/>	Establish event sequence and immediate response: What actually happened? How was the event controlled?
<input type="checkbox"/>	Review follow-up actions after the event: Determine initial impacts on involved workers, the environment, facility, equipment, or program. Confirm adequacy of immediate actions and identify if additional responses or immediate actions are required, and by whom.
<input type="checkbox"/>	Complete the event causal (N3B-Form-6177) as appropriate based on the event severity.
<input type="checkbox"/>	Recap the Event Meeting: Confirm known facts, and determine if any additional immediate event information is required.

### Attachment 3. Event Meeting Checklist (Page 2 of 2)

<input type="checkbox"/>	Specifically recognize and commend individuals: Acknowledge involved workers and responders for self-identification of events and issues, for exhibiting a questioning attitude, for their willingness to openly discuss the event, and for any instances where things were done “right.”
<input type="checkbox"/>	Conclude the Worker/Responder segment of the Event Meeting: Ask “What can we do to help you?” <i>Thank all of the participants for their active attentiveness and input, and for helping to conduct a high-quality Event Meeting.</i>
Management Actions	
<input type="checkbox"/>	Ensure Clearly defined facts, problem causes and corrective actions for the event. Managers clearly state what they learned during the Event Meeting.
<input type="checkbox"/>	Review compensatory actions or immediate actions and short term corrective actions.
<input type="checkbox"/>	Consider additional investigation follow-up actions:
<input type="checkbox"/>	Sampling or evaluation: If necessary, request additional analytical sampling of the scene (radiological, chemical, etc.) or medical evaluations.
<input type="checkbox"/>	Define the initial extent of condition consideration.
<input type="checkbox"/>	Confirm Categorization: Based on the facts presented during the Event Meeting, confirm categorization and determine responsibility for any follow-up investigation—the CAS ORPS Occurrence Investigator and FOD OR OD for ORPS-reportable events or the IRM for Sub-ORPS events. If the event was re-categorized, ensure that any additional notifications to DOE are completed as necessary and promptly.

## Attachment 4. Investigation of Events Event Notification (Page 1 of 1)

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**Title:** *Insert title describing the event*

**New or Update:** New notification or update to previous notification

**Reported By:**

**Issue Number:** (from iCAS)

**Date and Time of Discovery:**

**Date and Time of Categorization:**

**Location (TA/Building and/or Area):**

**N3B FOD or Program Manager:**

**Description:** A clear and concise summary of the timeline and facts. What happened, where, when, how and personnel involved (role – no names).

**Immediate Actions Taken:** The immediate actions taken to ensure safety and security of employees, the site and protection to the environment. Actions put in place so work could resume pending Event meeting and development of Corrective Actions.

**Categorization (ORPS/Sub -ORPS):** Confirm or Update as determined at the Event Meeting.

**ORPS Report Levels:** Confirm or Update

**ORPS Reporting Criteria (Group/Subgroup/Sequence Criteria):** Confirm or Update

**Was the Los Alamos Fire Department (LAFD) engaged? (YES/NO):**

**Will a Event Meeting be held to support learning? (YES/NO):**

**Please fill out and send to direct manager and N3B Notification** [eventnotification@em-la.doe.gov](mailto:eventnotification@em-la.doe.gov)

## Attachment 5. Event Report Form (Example of N3B-Form-6177)

(Note: Available as a fillable .pdf on the Policies & Procedures Portal)



N3B-Form-6177

### Event Report

\*All Events Boxes 1-16 | \*L/M Significance Events Complete 1-17 | \*H Events 1-16 & Root Cause Analysis

1. Title of Event:		
2. Date of Discovery:		3. Time of Discovery:
4. Location of Event:	5. Responsible N3B Organization: Responsible Manager/FOD/PM:	
6. Event Notification Attached (Y/N):	7. IR#	8. Significance Level (H/M/L):
9. ORPS Reportable? (Y/N)	10. ORPS Categorization:	
11. PAAA Reportable? (Y/N)		
12. Brief Summary of Event: (What Happened?)		
13. What Should Have Happened?		
14. Relevant Facts and Timeline:		
15. Event Meeting Conducted (Y/N):		Event Meeting Date and Time:
16. FOD/PM Designated Responsible Manager		
Name:	Title:	Date:

N3B-Form-6177, Rev. 1  
Effective Date: 5/11/2022  
Implementing Procedure: N3B-POL-QAT-0019

Page 1 of 3



## Attachment 5. Event Report Form (Example of N3B-Form-6177)



N3B-Form-6177

### Event Report

17. Facts	Problems	Causes (Includes Cause Code)	Safe Stable Immediate Actions	Extent of Condition	Short Term Corrective Action	Long Term Corrective Action	Follow Up for Effectiveness

N3B-Form-6177, Rev. 1  
Effective Date: 5/11/2022  
Implementing Procedure: N3B-POL-QAT-0019

Page 2 of 3

## Attachment 5. Event Report Form (Example of N3B-Form-6177)



N3B-Form-6177

### Event Report

17. Facts	Problems	Causes (Includes Cause Code)	Safe Stable Immediate Actions	Extent of Condition	Short Term Corrective Action	Long Term Corrective Action	Follow Up for Effectiveness

N3B-Form-6177, Rev. 1  
Effective Date: 5/11/2022  
Implementing Procedure: N3B-POL-QAT-0019

Page 3 of 3

## Attachment 6. Memo from the Office of the President

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To: Senior Management Team  
From: Glenn Morgan, President *G. J. Morgan*  
Date: August 14, 2020  
Memo No.: OoP-2020-0004

### *Office of the President*

**Subject: Expectations for Notification of Events by N3B Program Managers**

This memorandum establishes expectations for notification of events by N3B Program Managers. This process pertains to all N3B environmental activities.

These event notifications do not replace any required Department of Energy (DOE) notifications, including Occurrence Reporting and Processing System (ORPS) or Computerized Accident/Incident Reporting System.

There are three types of event notifications:

- IMMEDIATE (20 minutes)
- URGENT (one hour)
- PROMPT(same shift)
- ROUTINE (24 hours)

Contact only one of the people identified in the appropriate contact list below within the timeframe commensurate with the significance of the event, and then follow up with an email. ROUTINE notifications only require an email to all names on list.

**IMMEDIATE NOTIFICATION - Call Office of the President within 20-minutes of occurrence of any:**

- Work related fatality;
- Activation of an Emergency Operations Center at ALERT level or higher;
- Security incident comprising actions, inactions, or events that pose the most serious threats to national security interests and/or critical DOE assets, create serious security situations, or could result in deaths in the workforce or general public;
- Offsite transportation incident or accident that results in, or has the potential to result in, harm to the environment or the public;
- Event that the Office of the President believes will result in significant media or stakeholder interest, including DOE Watch Office Notifications.

**Follow up: Send an email to:** [N3BSeniorManagement@em-la.doe.gov](mailto:N3BSeniorManagement@em-la.doe.gov)

**Note:** The attachment provides additional detail regarding the Immediate Event Notification process.

1200 Trinity Drive, Suite 150, Los Alamos, NM 87544

(505) 661-5918

## Attachment 6. Memo from the Office of the President

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OoP-2020-0004  
August 14, 2020

**URGENT EVENT NOTIFICATION - Call within 1 hour of occurrence of any:**

- Serious injury or illness requiring emergency offsite medical treatment (including heat stress, stroke, or heart attack);
- Fire having the potential to affect N3B operations or facilities;
- Loss of control or any compromise of nuclear material or personal identification information;
- Categorization of any Significance Category (H) ORPS event;
- Work stand-down initiated by DOE or site contractor; follow-up email for work stand-down shall include:
  - The reason for the stand-down;
  - Immediate actions to safely secure the facility;
  - The expected duration of the stand-down; and
  - The number of contractor employees who may be affected, and if they are being paid during the stand-down.

Note: The N3B point of contact notified will brief N3B Senior Management, as deemed necessary. N3B Senior Management will brief senior EM-LA leadership.

Note: Items that may result in N3B Senior Management notifications should be considered under Immediate Notification, as the Office of the President deems appropriate.

**PROMPT EVENT NOTIFICATION - Send an email to the points-of-contact listed within the same shift of the occurrence of any:**

- *Identification of a Potential Inadequacy in the Safety Analysis (PISA) (PISA-if subsequent Unreviewed Safety Question Determination is positive, report in a separate 24-hour notification);*
- Near miss;
- Violation of hazardous energy controls;
- Personnel exposure to ionizing radiation above administrative control levels without prior authorization;
- Incident which might result in a confirmed radiological skin or internal contamination of a worker;
- Release to the environment above legal limits; and
- Violation or non-compliance with a Technical Safety Requirement, Justification for Continued Operations compensatory measure, *Operational Restriction initiated for a PISA*, or Criticality Safety Evaluation control.

**ROUTINE Notifications- Send an email within 24 hours to the points of contact listed**

- Abnormal event requiring a critique
- Negative feedback from DOE EM-LA that may result in escalation (CO letter, audit report, etc.)
- Employee or work area issues that will likely escalate

## Attachment 6. Memo from the Office of the President



OoP-2020-0004  
August 14, 2020

### N3B Senior Management

Name	Position	Email	Phone
Morgan, Glenn	President	<a href="mailto:glenn.morgan@em-la.doe.gov">glenn.morgan@em-la.doe.gov</a>	757-810-7624 Cell
Legare, Joe	Vice President / Executive Officer	<a href="mailto:joseph.legare@em-la.doe.gov">joseph.legare@em-la.doe.gov</a>	303-386-5660 Cell
Holgerson, Debby	Executive Manager	<a href="mailto:debby.holgerson@em-la.doe.gov">debby.holgerson@em-la.doe.gov</a>	720-838-4881 Cell
Erwin, Mary	Business Services	<a href="mailto:mary.erwin@em-la.doe.gov">mary.erwin@em-la.doe.gov</a>	505-412-9717 Co. cell
Harrison, Tom	QA and Transformation	<a href="mailto:thomas.harrison@em-le.doe.gov">thomas.harrison@em-le.doe.gov</a>	505-257-8206 Co. cell
Holland, Jeff	Regulatory & Stakeholder Interface	<a href="mailto:jeff.holland@em-la.doe.gov">jeff.holland@em-la.doe.gov</a>	505-257-8057 Co. cell
Lebak, Kim	Environmental Remediation	<a href="mailto:kim.lebak@em-la.doe.gov">kim.lebak@em-la.doe.gov</a>	505-695-3149 Co. Cell
Lindsay, Dana	General Counsel	<a href="mailto:dana.lindsay@em-la.doe.gov">dana.lindsay@em-la.doe.gov</a>	505-309-1274 Co. cell
Moore, Jason	Information Technology	<a href="mailto:jason.moore@em-la.doe.gov">jason.moore@em-la.doe.gov</a>	505-257-8424 Co. cell
Murdock, Joe	Environment, Safety & Health	<a href="mailto:joseph.murdock@em-la.doe.gov">joseph.murdock@em-la.doe.gov</a>	757-870-3678 Cell
Noll, Joseph	Engineering & Nuclear Safety	<a href="mailto:joseph.noll@em-la.doe.gov">joseph.noll@em-la.doe.gov</a>	505-309-1376 Co. Cell
O'Leary, Gerald (Jerry)	CH-TRU	<a href="mailto:Gerald.O'Leary@em-la.doe.gov">Gerald.O'Leary@em-la.doe.gov</a>	505-709-7766 Co. Cell
Vigil, Tashia	Human Resources Director	<a href="mailto:tashia.vigil@em-la.doe.gov">tashia.vigil@em-la.doe.gov</a>	505-257-8373 Co. Cell

Distribution:

Mary Erwin  
Tom Harrison  
Debby Holgerson  
Jeff Holland  
Kim Lebak  
Joe Legare  
Dana Lindsay  
Jason Moore  
Joe Murdock  
Joe Noll  
Jerry O'Leary  
Tashia Vigil  
N3B Document Control, [n3bdocctrl@em-la.doe.gov](mailto:n3bdocctrl@em-la.doe.gov)  
N3B Records Management, [n3brecords@em-la.doe.gov](mailto:n3brecords@em-la.doe.gov)

## Attachment 6. Memo from the Office of the President

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OoP-2020-0004  
August 14, 2020

### ATTACHMENT

#### IMMEDIATE Event Notification Process

1. Background:

The Immediate Notification should be made by calling the Office of the President (3 Phone Numbers provided). In addition, the e-Mail Process provides a mechanism for N3B Program Managers to send priority messages to the leadership simultaneously, and then to provide notification updates to the Office of the President. This process enables the N3B Senior Management Team to provide real-time information ahead of social media or EM-LA reaction to events originating from our sites. This process enables Program Managers to make “early” notifications before all information associated with an event is known and/or verified to be complete.

2. E-mail Address:

[N3BSeniorManagement@em-la.doe.gov](mailto:N3BSeniorManagement@em-la.doe.gov)

3. E-mail Format:

The Immediate Event Notification e-mail will contain the following:

- Subject Line: Immediate Event Notification – *Insert Site Name*
- Brief, simple description of the event: (i.e., a short paragraph written for a layperson)
- Level of confidence of information: (i.e., high, medium or low)

4. Notification Updates:

After the initial notification e-mail to [N3BSeniorManagement@em-la.doe.gov](mailto:N3BSeniorManagement@em-la.doe.gov), the Program Manager (or their senior-level designate), will provide regular written updates. As deemed necessary, the Office of the President will distribute the updates to senior EM-LA leadership.

5. Communications Coordination

After the initial notification e-mail to [N3BSeniorManagement@em-la.doe.gov](mailto:N3BSeniorManagement@em-la.doe.gov), the Program Manager (or their senior-level designate), will coordinate with the N3B Communications, RS&I, to develop a communication plan that will be used to notify and provide updates to the media, external stakeholders, and congressional staff as necessary. The N3B Communications Team will coordinate the communications plan with the appropriate program managers for timely approval of the plan.

6. E-mail Distribution List Maintenance:

The Executive Manager for the Office of the President will provide the distribution list associated with [N3BSeniorManagement@em-la.doe.gov](mailto:N3BSeniorManagement@em-la.doe.gov) to ensure accuracy of the most current distribution list.

## **Enclosure 2**

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*Engineering Evaluation of Dome 230*





## Derek Selvage

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**From:** Patrick R. Sisneros  
**Sent:** Wednesday, October 4, 2023 7:47 AM  
**To:** Derek Selvage  
**Cc:** Christian T. Maupin; Jared P. Taylor  
**Subject:** RE: Eng drawings of dome 230  
**Attachments:** dome 230.pdf

Derek/Christian,

I took a walk down of the exterior of dome 230 last Wednesday; as I did not have support to enter the dome. Regardless, my walk down did not reveal any areas of concern with respect to the concern of settlement. Nor is there any evidence to suggest that the slope of the dome has changed from its original design/ installation. Attached is the drawings from '09 Jared sent previously that shows the as-found slopes. Let us know if you need anything more than this email to use as OE; or if you need anything more at all. Thanks

**Patrick Sisneros**  
**Facility Engineering**  
**505-695-6651**  
Newport News Nuclear BWXT Los Alamos (N3B)



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**From:** Derek Selvage <Derek.Selvage@EM-LA.DOE.GOV>  
**Sent:** Wednesday, September 27, 2023 3:52 PM  
**To:** Patrick R. Sisneros <Patrick.Sisneros@EM-LA.DOE.GOV>  
**Cc:** Christian T. Maupin <Christian.Maupin@em-la.doe.gov>  
**Subject:** Eng drawings of dome 230

Hello,

NMED is requesting documentation on dome 230 design and structure. The requested documents for 230 will be any engineering design or drawings for the structure of Dome 230 in Area G especially the sloped asphalt floor and any specifics on the sump located on the East end of the dome. Please let me know if there are any questions or if additional information is needed.

Thank you,  
Derek Selvage

**Derek Selvage**  
**Environmental Professional**  
1200 Trinity Dr Suite 150  
Los Alamos NM 87544  
[Derek.Selvage@em-la.doe.gov](mailto:Derek.Selvage@em-la.doe.gov)



Newport News Nuclear BWXT Los Alamos (N3B)



Date: 10/18/2023

**Subject:** Dome 230 Engineering Evaluation Requests

Dear: Rob Edwards  
ESH&Q Program Manager (Acting)

The engineering department has examined the exterior and interior of dome 230 to evaluate the concerns of integrity with respect to asphalt pad, slope, settling, and condition of the sump. As you know Dome 230 was constructed over two waste burial pits. The dome sits at an approximate 30 degree angle to the pits with the majority of the dome over the east pit. The domes foundation straddles the native rock wall that separates the two pits and the domes east end also is on top of the native rock.

During our visual investigation of the exterior of the dome there were no visible signs of degradation to the foundation. Nor did we find evidence to suggest that the dome was settling or that the slope of the dome has changed from its original design/ installation. These findings were consistent when we investigated the interior of the dome. From the field survey, using a laser level and 100' tape, we conducted on the interior of the dome the slope of the pad is from north to south at ~1% and west to east at ~1%. The slope of the pad directed runoff towards the longitudinal centerline of the dome and into the sump within the dome.

During our visual investigation of the interior of the dome we took care to evaluate the condition of the asphalt, the HDPE liner connection at the foundation wall and in the sump. It was noted that there are cracks within the asphalt that have been sealed with a liquid asphalt patch compound. The cracks were found within a 10' buffer of the center line of the dome. Engineering has determined that the cracks are a result of normal wear and tear over the life of the asphalt; for the past 20+ years. Despite these few minor blemishes the asphalt is in good condition and would not have a negative impact on the HDPE underlayment. In fact the HDPE liner and connections around the internal perimeter of the foundation did not have any signs of wear or tear. Our visual inspection of the sump did not reveal signs of stress and the HDPE liner for the sump appeared to be in good operable condition. The seams and connections at the tops of the sump walls all appeared to be in good condition and properly sealed.

It is the conclusion of engineering that the dome is functioning as designed. The asphalt is sloped appropriately to drain to the sump and is in good repair. The foundation of the dome and the asphalt do not show signs of settlement. Finally the sump does not have any areas of concern. Attached are several pictures we took from our investigation and a couple of drawings showing the location of the dome and the '09 as-found partial floor plan. Let me know if you have any questions or concerns with this investigation and our engineering evaluation.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Patrick Sisneros'.

Patrick Sisneros, PE #26515  
Facility Engineering Manager

Attachments: Pictures from investigation, Map, As-Found Drawings.



Pictures of exterior stoops to show alignment of asphalt, stoop, and awning pinning.



Pictures around dome perimeter showing HDPE connection.





Pictures around dome perimeter showing HDPE connection. (cont)



Pictures of sump and drainage to sump.