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LA-UR: 15-20472
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Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

Subject: Transmittal of Los Alamos National Laboratory Nitrate Salt-Bearing Waste Container Isolation Plan, Revision 3 for Review

The purpose of this letter is to transmit a Los Alamos National Laboratory (LANL) document for review and approval by the New Mexico Environment Department (NMED). The *LANL Nitrate Salt-Bearing Waste Container Isolation Plan, Revision 3* (Isolation Plan) is being submitted as discussed on April 3, 2015 by NMED personnel and personnel from the Los Alamos National Security, LLC (LANS) and the U.S. Department of Energy (DOE), collectively the Permittees. The original draft of the Isolation Plan was required by the May 19, 2014, *Administrative Order*, which was modified on July 10, 2014 by a letter from NMED, *Modification to May 19, 2014, Administrative Order*.

The enclosures to this letter represent changes to the LANL Isolation Plan that are necessary to update the plan, incorporate new containers into isolation, and create flexibility in the management of some nitrate salt-bearing waste containers located at LANL. There are two major modifications proposed by this revision. The first proposed modification incorporates newly identified suspect nitrate salt-bearing waste containers into isolation with the originally identified remediated nitrate salt-bearing waste containers. The four newly identified containers are Pipe Overpack Containers (POCs) and are referenced as such throughout the proposed revision. The second major proposed modification allows for the 29 unremediated nitrate salt-bearing waste containers currently stored within isolation to be placed into other compliant permitted storage at the facility.

SCANNED



Other updates to the plan include:

- Removal of specific descriptions of fire protection equipment and emergency operations planning for unremediated nitrate salt waste containers because they are no longer applicable.
- Revisions to the description of temperature monitoring data because the data was only included with the Isolation Plan, Revision 2.
- Revisions to text that was indirectly affected by the major modifications proposed to the document.
- Correction of typographical errors.
- Correction of inconsistencies within the document.

Enclosure 1 contains a copy of the plan that contains editing marks. Enclosure 2 includes a clean copy of the *LANL Nitrate Salt-Bearing Waste Container Isolation Plan, Revision 3* that includes all attachments to the plan. If you have comments or questions regarding this submittal, please contact Mark P. Haagenstad at (505) 665-2014 or David Nickless at (505) 665-6448.

Sincerely,



Alison M. Dorries
Division Leader
Environmental Protection Division
Los Alamos National Security LLC

Sincerely,



Christine M. Gelles
Acting Manager
Environmental Management
Los Alamos Field Office
U.S. Department of Energy

AMD:CMG:MPH:LVH/lm

Enclosures: (1) Revision Isolation Plan, Revision 3 with Editing Marks
(2) LANL Nitrate Salt-Bearing Waste Container Isolation Plan, Revision 3

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Kathryn Roberts, NMED, Santa Fe, NM, (E-File)
Steve Pullen, NMED/HWB, Santa Fe, NM, (E-File)
Timothy Hall, NMED/HWB, Santa Fe, NM, (E-File)
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ENCLOSURE 1

Revision Isolation Plan, Revision 3 with Editing Marks

ENV-DO-15-0099

LA-UR-15-20472

Date: APR 21 2015

LANL Nitrate Salt-Bearing Waste Container Isolation Plan
Revision 23

~~September 19, 2014~~April 2015

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I. Introduction

On May 19, 2014, the Department of Energy (DOE) and the Los Alamos National Security, LLC (LANS) (“Permittees”) received Administrative Order No. 5-19001 (“Order”) issued by the New Mexico Environment Department (NMED). The Order, at paragraph 18, required the Permittees to submit a *LANL Nitrate Salt-Bearing Waste Container Isolation Plan* (“Isolation Plan”). The Isolation Plan was submitted by 2:00 PM on May 21, 2014.

On May 23, 2014, NMED approved the Isolation Plan contingent on the submittal of a revised Isolation Plan that incorporated additional requirements (“Revised Isolation Plan”). NMED required the Permittees to address all of the items enumerated in their May 23, 2014 letter, incorporate those changes and resubmit the Revised Isolation Plan by May 29, 2014. The Revised Isolation Plan was submitted on May 29, 2014.

On August 29, 2014, NMED approved the Revised Isolation Plan with modifications. NMED required the Permittees to address all of the items enumerated in their August 29, 2014 letter, incorporate changes and resubmit the Plan (“Isolation Plan, Revision 2”) to NMED no later than September 19, 2014 for final review and approval.

~~As described below, this~~ The -Isolation Plan, Revision 2 incorporated ds the modifications enumerated by NMED and was submitted to the NMED on September 19, 2014. It included description of ~~describes~~ how the Permittees will isolated, and secured and/or treat all nitrate salt-bearing waste containers currently stored at Los Alamos National Laboratory (LANL) and information on characterization assessments conducted by the Permittees.

This revision of the Isolation Plan, Isolation Plan, Revision 3, describes the activities and assessments that have been conducted to date associated with all nitrate salt-bearing waste containers and includes the addition of 4 suspect remediated nitrate salt-bearing waste containers into isolation in the Permacon within Technical Area 54, Dome 375 (TA-54-375). It describes how the Permittees continue to secure and isolate remediated and newly suspect nitrate salt-bearing waste containers, so that a potential release from any nitrate salt-bearing container them at LANL does not pose a threat to human health or the environment. -This plan also includes information on remediation planning and a schedule of immediate actions undertaken to implement isolating, securing and/or treating nitrate salt-bearing waste containers currently stored at LANL.

Additional measures above those described in this Isolation Plan, Revision 23 may also be taken and will be identified to NMED during the technical calls established in Section IX below.

II. Background and General Implementation Updates

- 1) On May 1, 2014, the Waste Isolation Pilot Plant (WIPP) declared a potentially inadequate safety analysis (PISA) on the possibility of unremediated nitrate salt-bearing waste contained in waste packages at WIPP. On May 2, 2014, LANS convened a critique to perform an extent of condition on the PISA issued by WIPP. As a result of the critique, the Permittees implemented several corrective and precautionary actions immediately to ensure protection of human health and the environment. The Permittees identified the current storage locations of all remediated and unremediated nitrate salt-bearing waste containers. The Permittees moved all remediated nitrate salt-bearing waste containers into TA-54, Area G, Dome 230 (because Dome 230 has an active fire suppression system) and daily temperature measurements of each container commenced. Additionally, continuous radiological air monitoring was initiated in Dome 230. Finally, any further processing of nitrated salt waste streams was suspended and all transuranic (TRU) waste shipments from LANL were paused.
- 2) On May 15, 2014, WIPP released photographs showing a LANL drum containing remediated nitrate salt-bearing waste that appeared to be breached in Panel 7, Room 7. The initiator of this breach and other potentially impacted drums is currently unknown, but is being actively investigated by multiple parties.
- 3) On May 16, 2014, the Permittees convened a critique to review the new information. A PISA was declared (ORPS NA-LASO-LANL-WASTEMGT-2014-0004) on the possibility of inadequate safety basis controls specified for the remediated nitrate salt-bearing waste. As a result of the critique, the Permittees implemented several corrective and precautionary actions immediately to ensure protection of human health and the environment.
- 4) On May 18, 2014, the Permittees completed the overpacking of all originally identified remediated nitrate salt-bearing waste containers at LANL into Standard Waste Boxes (SWBs). There are 57 remediated nitrate salt-bearing waste containers at LANL, and these were overpacked into 55 SWBs. (As part of the original packing configuration, 2 SWBs each have 2 remediated nitrate salt-bearing waste containers.)
- 5) On May 20, 2014, the Permittees held the initial meeting of their Remediation Team. (See Section VI below for additional information.)
- 6) On June 3, 2014, the Permittees completed the move of all unremediated nitrate salt-bearing waste containers to the Permacon in Dome 231 located at TA-54, Area G, and all

remediated nitrate salt-bearing waste containers were moved to the Permacon in Dome 375 located at TA-54, Area G.

- 7) On June 5, 2014, the Permittees conservatively applied Environmental Protection Agency (EPA) Hazardous Waste Number D002 to 26 unremediated nitrate salt-bearing waste containers. The following describes the Permittees' regulatory basis, reasoning and analysis for assigning this EPA Hazardous Waste Number. (See also, Permittees' letter to NMED dated September 5, 2014, ADESH-14-088.)

During a review of operating records associated with the remediation of nitrate salt-bearing TRU wastes, the Permittees determined that a few of the parent containers were noted as having liquids with a pH of 2 or less. (*see* ES Nitrate Salt Waste Containers at WCS, WIPP Panel 7, and LANL Data Summary, May 17, 2014, <http://www.nmenv.state.nm.us/NMED/Issues/documents/ESNSWasteContatWCS-WIPP-LANL5.17.14.pdf>). Based on this information, LANL evaluated the remaining unremediated nitrate salt-bearing waste containers to identify those with free liquids using real-time radiography (RTR) and high-energy RTR (HERTR) analysis. The testing identified that 26 of the 29 containers contained free liquids. As a conservative measure, based on this information, LANL applied the D002 EPA Hazardous Waste Number to these remaining unremediated nitrate salt-bearing waste containers identified with free liquids.

Videos of 27 RTR fast scans were provided to NMED on September 5, 2014. (ADESH-14-088). As explained in the Permittees' September 5, 2014 letter, RTR video recordings are not available for 2 of the 29 unremediated nitrate salt-bearing waste containers as historically RTR video recordings were not created.

- 8) On June 18, 2014, the Permittees began headspace gas (HSG) sampling on additional SWBs containing remediated nitrate salt-bearing waste containers. The Permittees' intent was to conduct HSG sampling on each of the 55 SWBs. This HSG monitoring was an additional measure above those described in the original May 19, 2014 Isolation Plan and the May 29, 2014 Revised Isolation Plan. When all 55 SWBs were sampled the Permittees transitioned to sampling a subset of the 55 SWBs on a regular basis.
- 9) On July 25, 2014, the Permittees conservatively applied EPA Hazardous Waste Number D001 to the remediated and unremediated nitrate-salt bearing wastes stored at LANL. The following describes the Permittees' regulatory basis, reasoning and analysis for assigning this EPA Hazardous Waste Number. (See also, Permittees' letter to NMED dated September 5, 2014, ADESH-14-088.)

Unremediated Nitrate-Salt Bearing Waste. On May 22, 2014, LANL received analytical results from two samples taken from an unremediated nitrate salt-bearing waste drum stored at Area G, Dome 231. (These results were provided as Attachment A to the Permittees' letter to NMED dated September 5, 2014, ADESH-14-088). The results showed the presence of nitrate compounds listed on the US Department of Transportation (DOT) Division 5.1 Oxidizers table under the DOT rules at 49 CFR §173.127. EPA/NMED require hazardous wastes that qualify as a 5.1 DOT oxidizer to be managed as a RCRA waste (D001) under 40 CFR §261.21(a)(4). Although the analytical results apply to one (1) unremediated drum, the Permittees determined to conservatively label the remaining drums with the D001 Hazardous Waste Number.

Remediated Nitrate-Salt Bearing Waste. As described in CCP's *Acceptable Knowledge Summary Report for Los Alamos National Laboratory TA-55 Mixed Transuranic Waste* (CCP-AK-LANL-006, Rev. 13, which includes waste stream LAMIN02-V-001), on page 142, LANL previously determined that these nitrate salts did not meet the definition of a DOT oxidizer. However, to further support managing these specific nitrate salt wastes as non-ignitable, LANL determined to remediate and repackage this waste with an inert material (e.g., zeolite/kitty litter) with a minimum absorbent material to nitrate salts mixture ratio of 1.5 to 1. This ratio was based on results of oxidizing solids testing performed by the Energetic Materials Research and Testing Center (EMRTC) and a white paper authored by the LANL-Carlsbad Office Difficult Waste Team (DWT), *Amount of Zeolite Required to Meet the Constraints Established by the EMRTC Report RF 10-13: Application to LANL Evaporator Nitrate Salts* (See, Attachment B to Permittees' letter to NMED dated September 5, 2014, ADESH-14-088). The EMRTC testing established the concentration at which the most reactive mixture of sodium and potassium nitrate becomes a non-oxidizer when mixed with either zeolite or grout. Based on the EMRTC testing, the LANL DWT concluded that the results can apply to LANL's non-cemented nitrate salts.

As previously reported, LANL remediated and repackaged certain nitrate-salt bearing waste containers using an organic kitty litter, and not a zeolite-based kitty litter (see Letter from Permittees to NMED Secretary Flynn dated July 1, 2014, *Addendum to the Los Alamos National Laboratory Hazardous Waste Facility Permit Reporting on Instances of Noncompliance and Releases for Fiscal Years 2012 and 2013*). This type of absorbent did not comport with the EMRTC testing or the LANL DWT recommendation.

To date, the Permittees have not sampled a remediated nitrate salt-bearing waste drum. Between July 22 and 29, 2014, LANL had surrogate samples of the waste tested by Southwest Research Institute of San Antonio, Texas. The surrogates were formulated using materials to approximate the remediated nitrate salt waste including *Swheat*TM kitty litter and a mixture of nitrate salts in both wet and dry samples. The samples were

analyzed using US Environmental Protection Agency's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) Method 1040 (which is based on a test method adapted from the United Nations regulations and classification procedures for the international transportation of dangerous goods) to determine whether the D001 designation code could apply.

On July 25, 2014, the Permittees received preliminary, un-validated results from this testing that indicated that the surrogates sampled could be classified as oxidizers. Based on these results, LANL determined that it could not exclude the application of D001 to the remediated nitrate salt-bearing wastes. Based on this information and consultation with the Carlsbad Field Office, LANL determined to conservatively apply D001 to the remaining remediated nitrate salt-waste containers stored at LANL.

The final analytical reports for this test and all of the other testing that has been conducted is included as Attachment 1.

10) On September 3-5, 2014, the Permittees had additional surrogate samples representative of the remediated waste tested by Southwest Research Institute of San Antonio, Texas to determine if the surrogate samples meet the DOT oxidizer criteria when tested in accordance with the UN Manual of Tests and Criteria under DOT rules at 49 CFR §173.127 (a) in addition to SW-846, Method 1040. The surrogates for the remediated nitrate salt waste were comprised of a mixture of *Swheat*TM kitty litter and sodium nitrate in a ratio of 3:1. This mixture represents the main components of interest in the remediated waste, i.e., the organic kitty litter and the principal nitrate salt as indicated by the May 22, 2014 analysis. The additional testing determined that the surrogate mixture was a DOT Oxidizer, Packing Group II by the DOT test and a Category II oxidizer by Method 1040. Additional analytical tests for ignitability have also been conducted on various surrogates related the investigation of nitrate-salt bearing wastes.

11) Attachment 2 contains correspondence between the Permittees, Waste Control Specialists (WCS), the Waste Isolation Pilot Plant (WIPP), and any other agencies related to the assignment of EPA Hazardous Waste Number D001 that were shipped to WCS and/or WIPP. The Permittees have not yet received copies of corrected manifests. However, upon receipt of the corrected manifests, the Permittees will provide them to NMED within 15 business days. Additionally, the Permittees are working to resolve manifest discrepancies with WIPP and WCS. The Permittees will provide NMED with any of the Permittees' additional correspondence on this issue.

12) In late February 2015, the Permittees identified an additional 3 parent containers designated as within waste stream LA-MIN04 to be suspect nitrate salt-bearing waste

containers. The 3 parent containers produced 10 daughter waste containers: 3 daughters are designated as LA-MDH01 (i.e., debris) and 7 daughters are designated as LA-MIN04. The 10 daughter waste containers are located at Waste Control Specialists (WCS) (2 containers), WIPP (4 containers), and LANL (4 containers). All 4 containers located at LANL are Pipe Overpack Containers (POCs). As a result of this reevaluation, the Permittees determined that the 10 daughter waste containers are suspected to hold nitrate salt-bearing waste.

- On March 12, 2015, the Permittees identified an additional 2 parent waste containers designated as LA-MDH01 (i.e., debris) to be suspect nitrate salt-bearing waste containers. The parent waste containers produced 3 daughter waste containers also designated as LA-MDH01. The Permittees and CCP reviewed generator AK documentation, RTR videos, and conducted interviews with SMEs to determine if these 3 daughter waste containers held any nitrate-salt bearing wastes. As a result of this reevaluation, the Permittees determined that the 3 daughter waste containers, located at WIPP, were suspected to hold nitrate salt-bearing waste

11)13) All 4 containers located at LANL are Pipe Overpack Containers (POCs).

III. Waste Container Categories

The current inventory of nitrate salt-bearing waste containers stored at LANL can be divided into two categories: 1) remediated nitrate salt-bearing wastes; and 2) unremediated nitrate salt-bearing wastes. Additionally, there is a third category of containers that are cemented legacy and newly generated wastes that originated from the nitrate evaporator and cementation operations within TA-55.

To identify all of the nitrate salts-bearing waste containers generated, a focused review of the generator records was conducted. Unconsolidated nitrate salts were only generated at TA-55 in a specific room and glove box from 1979 through 1991. It is important to note that after 1991, all nitrate wastes were cemented.

Following review of generator records, it was determined that all of the nitrate salt parents exist as subsets in both a debris (LA-MHD01.001) and cemented (LA-CIN01.001-Cans) waste stream. The LA-MHD01.001 waste stream includes over a thousand containers, but only 164 original parent drums contained nitrate salts. LA-CIN01.001-Cans waste stream also includes over a thousand containers, but only 103 original parent drums contained nitrate salts.

In total, there were 267 original nitrate salt parent containers identified. A large portion of these 267 parent containers have been remediated into nitrate salt daughter containers. As a result, there are currently 707 nitrate salt-bearing waste containers. After remediation, all of the remediated nitrate daughters were assigned to two homogeneous absorption waste streams; LA-MIN02-V.001 and LA-MIN04-S.001. However, after RTR, daughter containers may have been re-assigned to a final waste stream based on the volume percentages of the final waste content.

Of the 707 identified nitrate salt-bearing containers, a total of 86 remain at LANL, 57 are remediated daughter containers and 29 are unremediated parent containers.

The above-referenced waste streams, LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001 and LA-MIN04-S.001 are not solely dedicated to nitrate salts. All other containers in waste streams LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001 and LA-MIN04-S.001 do not contain nitrate salts and do not require isolation or management as nitrate salts.

The Permittees' approach to the focused reviewed discussed above was conservative. The original list of 707 includes containers that contain nitrate salt-bearing waste or are suspected of containing nitrate salt-bearing waste.

Additional information on the Permittees' evaluation and identification of LANL nitrate salt drums is provided in the *Summary of Evaluation and Identification of LANL Nitrate Salt Containers*. (Attachment 3)

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Ongoing internal reviews have produced new information as described in II.12 and II.13. If any additional nitrate salt-bearing waste containers are identified based on new information, these will be managed in the same manner as the currently identified nitrate salt-bearing waste containers. The Permittees will notify NMED during the technical calls established in Section IX below.

This plan addresses isolation, securing and/or treatment of the remediated ~~and unremediated,~~ nitrate salt-bearing wastes. In this plan, “remediated” containers are defined as LANL unconsolidated nitrate salts that were remediated with kitty litter absorbent and were repackaged into new drums. “Unremediated” containers are defined as LANL unconsolidated nitrate salts drums to which absorbent material has not been added. Isolation Plan, Revision 3, removes unremediated nitrate salt-bearing waste containers from secured isolation and allows for the storage of these waste containers in other compliant permitted storage at Technical Area (TA)-54, Area G.

The third category, cemented legacy and newly generated cemented wastes from the nitrate processing line at TA-55, is not addressed in this Isolation Plan, Revision ~~32~~ because, as discussed in Section VII, per the definitions of ignitable and reactive in 40 CFR §264.21 and §264.23, legacy cemented nitrate waste generated since 1991, as well as newly generated cemented nitrate waste generated at ~~Technical Area (TA)-55~~, is not ignitable or reactive.

IV. Immediate Actions for Remediated Nitrate Salt-Bearing Waste Containers

There are currently ~~5761~~ remediated ~~and suspect~~ nitrate salt-bearing waste containers at LANL. The Permittees validated this number through review of data from the Waste Characterization and Action Tracking System (WCATS) database and a field walk-down verification. Below is a description of the activities the Permittees have already taken ~~and/or are currently underway~~ to address isolating, securing, and/or treating the remediated nitrate salt-bearing waste containers.

- 1) On May 16, 2014, LANS applied five LANL tamper indicating devices (TIDs) to drum number 68685 as shown in the attached photo (Attachment 4, photo 1). This TRU waste drum is the sister drum related to the suspect drum at WIPP (drum 68660 was confirmed as the damaged drum during the May 22, 2014 WIPP entry, and drum 68685 is its sibling). Additionally, a member of the DOE Los Alamos Field Office observed the application of the TIDs.

On May 16, 2014, drum number 68685 was placed inside an SWB along with three empty dunnage drums (Attachment 4, photo 2) and was sealed. LANS applied two additional TIDs to either end of the SWB as shown in the attached photo (Attachment 4, photo 3).

On May 16, 2014, the empty parent containers for the two drums of initial interest (68660 and 68533) in the WIPP underground repository were identified onsite at LANL. As a result, LANS applied TIDs to both empty parent containers (69120 and 68359) during the early afternoon of May 16, 2014. This evolution was observed by DOE Los Alamos Field Office. Since that time S855793 was determined to be the parent container of drums 68685 and 68660.

These TIDs, and all subsequent TIDs, were installed in accordance with the LANL TID User Manual, NMCA-TID-FWI-002 R.1 (Attachment 5) by trained and qualified LANL TID users.

No additional TIDs have been applied to date, nor do the Permittees intend to install any additional TIDs at this time. However, additional TIDs will be applied as necessary to ensure that valuable information is not lost or as otherwise needed.

If directed to open the containers, the TIDs must be removed by qualified TID personnel in accordance with the TID User Manual (Section 3.21). In this instance, a two-person rule must be followed to verify chain of custody has been maintained and to verify that the TID has been properly destroyed once removed. Additionally, to ensure the TIDs are not removed without approval from the Facility Operations Director (FOD), they also have postings that clearly address that the TIDs cannot be removed without FOD approval.

- 2) On May 18, 2014, the Permittees completed overpacking the 57 remediated nitrate salt-bearing waste containers at LANL into SWBs. These containers were first placed into isolated storage in Dome 230 at TA-54, Area G, which has an active fire protection system. This dry-pipe fire protection system is not included within the LANL Hazardous Waste Facility Permit ("Permit"), Attachment D ("Contingency Plan") as it was inoperable during the re-application process for the Permit. This system became operable in November 2011, and currently the Permittees have chosen not to credit this system as fire control equipment in the Contingency Plan.

Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

- 3) The Permittees moved all remediated nitrate salt-bearing waste SWBs originally identified at LANL to the Permacon in Dome 375 located at TA-54, Area G. This move was completed on June 3, 2014. In the future, for operational efficiency, the Permittees may also utilize the Permacon in Dome 231 for storage of these containers.

4) The 4 newly identified suspect remediated nitrate salt-bearing waste containers located at LANL were moved from Domes 232 and 153 into the Permacon in Dome 375 on March 27, 2015.

4)5) As described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Domes 231 and 375. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

The Los Alamos Fire Department (LAFD) is manned and available 24-hours a day. They are able to utilize fire hydrants in the event of a fire or reaction. Additionally, the LANL emergency management organization is also on call 24-hours a day, and will respond promptly.

The Permacon in Dome 375 and the Permacon in Dome 231, as part of permitted units, are authorized under the LANL Permit for storage of mixed TRU wastes. The dry-pipe fire protection systems within the Permacons in the Domes are not included within the Permit Contingency Plan as the Permacons have been generally used for processing waste containers, a process that requires added safety / emergency controls more prescriptive than those of normal waste storage. Therefore, currently the Permittees have chosen not to credit these systems as fire control equipment in the Contingency Plan.

Pre-action fire suppression systems (FSSs) were installed in the Permacon within Dome 231 in November 2012, and in the Permacon within Dome 375 in February 2013. The FSSs are designed as an ordinary group 2 pre-action sprinkler system to protect the moderate hazard operations in the Permacon. Drawings of these FSSs are found in *TA-54 Area G Nitrate Salt Waste Container Response Instructions*, [EWMO-AREAG-PLAN-1248, R.1](#) ~~[EP-AREAG-PLAN-1248, R.0](#)~~ (Attachment 6). This system uses water for fire suppression, which is compatible with the nitrate salt waste. Should the fire suppression system activate, Pad 9 has a fire water collection system that would contain water from the 231 Permacon FSS. Dome 375 has curbing that provides approximately 49,000 gallons of retention capacity.

The sprinkler system pre-action valve is automatically activated by a combination of any 2 of 3 types of electronic initiating devices located in the Dome or the Permacon: smoke detection, heat detection, or fire alarm pull stations. During an event, fire alarm pull stations can be accessed and manually activated by staff. Pull stations are located in accordance with National Fire Protection Association (NFPA) standards, and are in both Domes and both Permacons. Also, access is facilitated by maintaining emergency egress aisles with a minimum aisle space of two feet in the Domes and the Permacons. Further,

in compliance with Permit Section 3.5.1(1), the Permittees will maintain adequate aisle space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and 375 Domes and Permacons. Finally, in the event of an abnormal condition, staff will evacuate quickly and will promptly report to 911, the operations center or the shift manager. Should an abnormal condition be observed, the Permittees will implement their emergency response plan and provide notice to NMED within 24 hours.

The Permacons are constructed of stainless steel frame and sheeting. They are contamination-control structures that are temperature-controlled and equipped with a High Efficiency Particulate Air (HEPA) filtration and fire suppression systems. The Permacons are also maintained at negative pressure. Additionally, the remediated drums ~~were have been~~ overpacked into new SWBs and suspect nitrate salt-bearing waste are packaged in POCs. Since SWBs and POCs are considered robust enough to prevent lid loss due to deflagration or fire ~~based on information in, according to~~ DOE-STD-5506-2007, they would act as a barrier to provide a significant measure of worker protection. While the energy of the WIPP event in Panel 7, Room 7 has not been determined at this time, should an event occur, the 231 and 375 Permacons are designed to contain a radiological release.

~~5)6)~~ The Permittees are monitoring, on a daily basis, the temperature of the SWBs and POCs that contain remediated or suspect nitrate salt-bearing waste drums. As discussed above, all remediated nitrate salt-bearing containers are overpacked in SWBs or are within POCs. Daily temperature measurements are taken of the external surface of the SWB using a calibrated infrared thermometer. The target temperature at which the nitrate salt-bearing waste containers are maintained in both the 375 and 231 Permacons is less than 90°F.

The Permittees will maintain records of all such temperature monitoring. These activities will be performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EPWMO-AREAG-FO-DOP-1246, R.64 (Attachment 7). These records will be updated on a daily basis. The temperature data (both daily, and if conducted as an additional measure under Section I, hourly) that the Permittees have collected since the Isolation Plan was implemented was included with the Isolation Plan, Revision 2 as two attachments. The attachments were discs containing documentation of daily and hourly temperature measurements obtained by the Permittees up to the time the is attached to this Isolation Plan, Revision 2 at Attachment 8 (daily) and Attachment 9 (hourly). ~~The Permittees began including will also include this~~ temperature data in the daily written submissions provided to NMED, as established in Section IX below.

Between the data included with the Isolation Plan, Revision 2 in Attachments 8 and 9 of that document and the data that the Permittees ~~have already begun to~~ provide in the daily

submissions, the Permittees have provided a current set of information to NMED. Additionally, these records and all temperature data (both daily, and if conducted as an additional measure under Section I, hourly) will be available to NMED for inspection.

The Permittees are also performing visual inspections of these containers on an hourly basis, 24 hours per day, to identify abnormal conditions (e.g., signs of smoking and fire, evidence of deterioration, bulging). These activities will be performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, ~~EPWMO~~-AREAG-FO-DOP-1246, R.64. The Permittees will maintain records of all such visual monitoring. (See, Attachment 7) These records will be updated on a daily basis and be available to NMED for inspection.

Additionally, the Permittees are using continuous air monitors (CAMs) with alarm capability, and will continue their use until further notice. There are CAMs in place in the 375 Permacon, two of which have remote alarm notification capability. These two remotely monitored CAMs provide remote notification if there is a significant airborne release (the 375 Permacon currently contains the LANL remediated nitrate salt-bearing waste). Additionally, there are CAMs in place in the 231 Permacon. Lastly, the Emergency Response/Hazardous Materials organization has been briefed on the storage configuration.

Action levels have been established and response instructions prepared. These are contained in LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, ~~EPWMO~~-AREAG-FO-DOP-1246, R.64 (Attachment 7). Should an abnormal condition be observed, the Permittees will implement their emergency response plan and provide notice to NMED within 24 hours. Area G's building emergency plan is found at Attachment ~~840~~, and associated procedures are found at Attachments ~~944~~, ~~1210~~ and ~~1311~~.

~~67)~~ Remediated and suspect nitrate salt-bearing ~~SWBs-waste containers~~ are spaced an adequate distance apart to limit any potential interactions between SWBs and POCs. This distance has been determined to be a minimum of 2 feet between containers. This distance is based on the Permittees' review of evidence from the event at WIPP, a calculation on the heat transfer from an SWB or POC undergoing a similar reaction, and a review of fire protection and Permit requirements.

The Permittees have reviewed photographs of the impacted drum in WIPP Room 7, Panel 7 and the adjacent containers. From the photographs, the adjacent drum and the adjacent SWB appear to have minimal damage and no release. The adjacent drums are in contact with the impacted drum and the adjacent SWBs are within inches of the impacted drum.

The Permittees have performed a preliminary calculation on the minimum separation distance between SWBs and POCs to ensure that an incident in one SWB-container will not impact an adjacent SWB-container. Assuming the offending SWB-container reaches a maximum temperature of approximately 1100°F and that the adjacent SWB-container does not to exceed 200°F, the heat generated from the offending SWB-container drops off to below 200°F within 1 inch. The 2 foot spacing in use provides additional assurance that the adjacent SWBscontainers will not be impacted by the heat generated during an exothermic event in a single SWB-container. Drawings that include the locations of the containers are included in TA-54 Area G Nitrate Salt Waste Container Response Instructions, EWMO-AREAG-PLAN-1248, R.1 EP-AREAG-PLAN-1248, R.0 (Attachment 6). The use of fire curtains in between SWBscontainers will not provide a measurable reduction in the thermal conductivity across the 24 inches but does provide protection from flame impingement.

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SWBs and POCs arewill be placed in rows that allow for emergency egress and that have Permit compliant spacing between each row. When-If used, the fire curtains will be placed within a row (that is, between the adjacent SWBs-containers in that row) to mitigate the potential for interaction between adjacent SWBscontainers. While the temperatures of the event in Panel 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent temperatures of 2500°F.

The NFPA consensus standards were also reviewed and NFPA 211 provided the most similar type of control. NFPA 211 covers the installation of chimney pipes and stoves and the distance recommended between the pipe and unprotected combustibles is 18 inches. There are no unprotected combustibles in the Permacons in Domes 231 and 375.

This 2 foot distance also meets the requirements in Permit Section 3.5.1(1). This section requires the Permittees to maintain adequate aisle space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and 375 Domes and Permacons.

The Permittees may also use fire resistant curtains in lieu of spacing. SWBs-Containers will be placed in rows that allow for safe egress and that have Permit compliant spacing between each row. When-If used, the curtains will be placed within a row (that is, between the adjacent SWBs-containers in that row) to mitigate the potential for interaction between adjacent SWBscontainers. While the temperatures of the event in Panel 7, Room 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent

temperatures of 2500°F. Prior to using fire resistant curtains, the Permittees will discuss the details of their use with NMED during the technical calls established in Section IX below.

The Permittees will protect workers by restricting access to the remediated nitrate salt-bearing waste containers. Only those personnel performing the ongoing container monitoring activities (e.g., daily temperature monitoring), other sampling-/data collection work (e.g., periodic head space gas sampling), and other required inspections (e.g., Permit required inspections) will be allowed into the storage areas. –This is documented in Standing Order EP-AREAG-SO-1247, R.2.4(Attachment 1412). Also, there will be warning signs posted at the entrance to the Permacons in Domes 231 and 375 that will inform personnel of access restrictions.

Additionally, all originally identified remediated nitrate salt-bearing waste ~~has been recently were~~ packed in new drums and overpacked into new SWBs, and suspect nitrate salt-bearing waste is located in POCs. Since SWBs and POCs are considered robust enough to prevent lid loss due to deflagration or fire, ~~according to~~ based on information in DOE-STD-5506-2007, they would act as a barrier to provide a significant measure of worker protection. No other protective shields or barriers are deemed necessary for the protection of workers at this time.

Furthermore, the ongoing data collection activities provide continuing information on the physical condition of the waste so that appropriate additional worker safety measures can be taken, if required.

~~7)8)~~ Prior to moving nitrate salt-bearing containers, the Permittees will notify the LANL Emergency Operations Center (EOC). The EOC will notify the Los Alamos Fire Department and other responders, if needed. The Permittees will notify the EOC at the completion of the move. The Permittees do not anticipate that responders will be present during the movement of these containers, or that responders will be present / alerted during other actions.

~~8)9)~~ The Permittees have updated all procedures and safety basis documents to convert the processing facilities into storage facilities.

~~9)10)~~ SWBs will display the required labels for all inner containers or will be reclassified as a new container in WCATS. The ~~5761~~ subject containers (including the sister drum to the suspect drum in WIPP) have been clearly labeled with the appropriate warning labels and any other required labeling. –Specifically, the containers have the hazardous waste labels required by Permit Section 3.6(1). Additionally, the remediated nitrate salt-bearing waste containers are also marked as “Radioactive”, as required by Permit Section 3.6(1). In addition, the 4 POCs have been labeled as containing “Free

Liquids” and have been placed on adequate secondary containment within the Permacon in Dome 375

~~10~~11) The Permittees have conducted headspace gas (HSG) sampling on all 55 SWBs that contain nitrate salt-bearing waste containers. Each SWB has been sampled for at least 7 days.

Gas chromatography with thermal conductivity detection is used for the analysis of He₂, H₂, O₂, N₂, CH₄, CO, CO₂, and NO₄ in HSG samples. The HSG sample data (H₂, CO₂, CO, and N₂O) that the Permittees have collected from the time since the Isolation Plan was implemented through September 11, 2014 is attached to this Isolation Plan, Revision ~~23~~ at Attachment ~~1513~~. Between the data in Attachment ~~1513~~ and the data that the Permittees have already begun to provide in the daily submissions, the Permittees have provided a current set of information to NMED. Attachment ~~1513~~ also graphically presents the H₂, CO₂, CO, and N₂O data collected for each SWB, and the range of H₂ and CO₂ concentrations from the HSG for each.

Additionally, He₂ and CH₄ have not been detected in these samples, and O₂ and N₂ are observed at atmospheric concentrations. More detailed information on these compounds is available to the NMED at their request. If there is any change to this status, the Permittees will inform the NMED during the technical calls established in Section IX below.

The Permittees began this HSG sampling on May 19, 2014, when they began daily HSG sampling of SWB 68685. This SWB contains TRU waste drum 68685 which is the sister drum related to the suspect drum at WIPP.

On June 18, 2014, the Permittees began HSG sampling on the additional SWBs containing nitrate salt-bearing waste containers, in order to better be able to compare and evaluate results against SWB 68685. On July 24, 2014, the Permittees began daily HSG sampling of SWB SB50522. On August 13, 2014, LANL had conducted HSG sampling of all 55 SWBs that contain remediated nitrate salt-bearing waste. The Permittees transitioned to sampling a subset of the 55 SWBs on a regular basis (this subset may change over time). All of this headspace gas monitoring was an additional measure above those described in the original May 19, 2014 Isolation Plan and the May 29, 2014 Revised Isolation Plan.

On September 3, 2014, upon receipt (email) of the NMED’s letter dated August 29, 2014, the Permittees immediately resumed daily HSG sampling of SWBs 68685 and SB50522. (The Permittees had been sampling both of these containers on a daily basis until August 28, 2014, when they shifted sampling to twice per week. The Permittees had also conducted HSG sampling of both SWBs on September 2, 2014.)

The Permittees will continue to conduct HSG sampling. This HSG sampling will measure concentrations of H₂, CO₂, CO and N₂O. The Permittees will:

1. Conduct daily HSG sampling of SWB SB50522 and the SWB that contains 68685.
2. Periodically sample HSG of all other SWBs that contain nitrate salt-bearing waste containers. This HSG sampling ~~will be occurs~~ on a schedule that ~~provides ensures~~ that each of these SWBs ~~and POCs will be are~~ sampled for HSG at least once per calendar month. The Permittees ~~will begin began~~ implementation of this monthly HSG sampling in ~~OctoberSeptember~~, 2014 ~~upon NMED approval of this plan~~. ~~Theis~~ monthly schedule is supported by the graphical presentations of the H₂, CO₂, CO and N₂O data in Attachment ~~4513~~ which indicate stability in the analyzed gas constituents. ~~This monthly schedule and~~ is protective of human health and the environment.

HSG sampling was conducted for at least 7 days on the 4 newly identified POCs. After the 7 day sampling was completed, the POCs were added to the monthly schedule described above. The Permittees will include this HSG data (H₂, CO₂, CO and N₂O) in the daily written submissions provided to NMED, as established in Section IX below.

Additionally, as part of initial investigations, the Permittees have performed solid phase micro-extraction (SPME) analyses. This work is being performed as part of the Permittees additional measures under Section I. SPME monitors for trace levels of organic compounds (< 1ppm). The detection limits for organic compounds without SPME is sufficient to establish that concentrations of organic vapors do not approach flammability limits. SPME was performed for the purpose of detecting organic molecules which could be an ignition initiator at very low concentrations. No noteworthy detections of compounds have been observed. A summary of this data is available as Attachment ~~1416~~.

~~11)12)~~ The Permittees ~~have~~ evaluated the HSG data (H₂, CO₂, CO, and N₂O) collected from SWB SB50522 collected from July 24, 2014 through September 11, 2014. SB50522 contains 4 drums, with the following container identification numbers and waste stream identification numbers:

- Container 69490 (LA-MIN02-V.001)
- Container 69271 (LA-MIN03-NC.001)
- Container 68799 (LA-MIN03-NC.001)
- Container 57653 (LA-CIN01.001)

The range (high to low) of H₂ levels the Permittees ~~have~~ observed ~~during-in~~ HSG ~~sampling data during that time frame was is~~ 28,020 parts per million (ppm) to 6,986 ppm. On July 30, 2014, the Permittees installed additional filters in the SWB to decrease concentrations. This approach was successful and concentrations of H₂ ~~have since been maintained-are present~~ at a lower level. – ~~Since Form~~ August 18, 2014 ~~through September 11, 2014,~~ H₂ levels ~~have~~ remained below 10,000 ppm. The range (high to low) of CO₂ levels the Permittees ~~have~~ observed ~~during-in~~ HSG ~~sampling is data was~~ 76,858 ppm to 39,338 ppm ~~during that time frame~~.

The range of temperature measurements the Permittees ~~have~~ observed during hourly temperature measurements ~~through September 11, 2014 is-were as follows:~~

| SB50522 Temperature | Degrees Fahrenheit |
|---------------------|--------------------|
| High | 83.7 |
| Low | 55.5 |

For comparison the ambient temperature range in Dome 375 Cell 1 where SB50522 is located during the same time period is:

| Dome 375 Cell 1 Temperature | Degrees Fahrenheit |
|-----------------------------|--------------------|
| High | 85.1 |
| Low | 54.9 |

Prior to packaging the four containers into SB50522, the Permittees conducted flammable gas analysis on three of the containers (57653, 69271 and 69490) ~~prior to packaging them into the SWB~~. (Note: although flammable gas analysis is not required for the LA-MIN03-NC.001 waste stream it was conducted for 69271.) The Quantitation Reports for flammable gas analysis for these three containers are provided at Attachment ~~1547~~.

The HSG data for SB50522 is presented in Attachment ~~1345~~. This Attachment also graphically presents the H₂, CO₂, CO and N₂O data collected.

~~12)13)~~ The Permittees ~~have~~ also evaluated the HSG data (H₂, CO₂, CO, and N₂O) collected from all of the SWBs with remediated nitrate salt-bearing waste.

As background information, radiolytic processes produce simple gas molecules from the interaction of radiation with organic and inorganic material in TRU waste. Hydrogen is

typically the principal gas produced from the interaction of radiation with organic [material](#). During headspace analysis for hydrogen, levels of other gases including CO, CO₂, and N₂O are also measured. Gaseous CO₂ can also be formed from radiolysis, and its concentration depends on the specific composition of the waste. From studying the radiolysis of selected simulated TRU waste, the relative amount of CO₂ and H₂ that is produced has been established under a range of conditions. From these investigations, the ratio of the amount of CO₂ to H₂ produced was greatest for poly vinyl chloride, with a maximum ratio for this material to be 6.5 CO₂/H₂. Other waste types did not produce as much CO₂ and therefore this ratio would be less than 6.5.

The conducted HSG analysis initially selected revealed that some drums had CO₂ to H₂ ratios of >100. This suggests that gas generation in some cases cannot be attributed solely to radiolysis of the waste. This supposition is reinforced by the observation of nitrous oxide > 1,000 ppm, which would likely be indicative of nitrate salt chemistry. Atmospheric concentrations for these gases are approximately 450 ppm and 350 parts per billion (ppb) respectively.

LANL began characterizing the headspace gas of 55 SWBs containing remediated nitrate salt-bearing waste for Volatile Organic Compounds (VOCs) by Gas Chromatography/Mass Spectrometry (GC-MS) and for permanent gases using GC with a Thermal Conductivity Detector (GC-TCD). Permanent gases are those that remain gaseous at standard temperature and pressure. Daily monitoring of a subset of these 55 SWBs was initiated on May 19, 2014. All 55 SWBs have now been characterized. Elevated concentrations of HSG compounds have been observed at concentrations well above normal atmospheric concentrations in some of these 55 SWBs (Attachment [1345](#)). These concentrations cannot be explained based on radiolysis of waste drum content and suggest that the gases are being produced from other processes. Specifically, N₂O is believed to result from the oxidation of material contained within the nitrate salt containing waste. The N₂O concentrations observed, ranging from (100 – 9000 ppm), are above the normal atmospheric concentration of ~ 350 ppb. The Permittees have ongoing work that may provide insight into this chemistry.

While high CO₂ concentrations (and potentially the ratio of CO₂ and H₂) are expected to be proportional to the magnitude of potential changes taking place in any given drum, they are not, on their own an indicator of significant changes to the waste within the container. To date, LANL has collected over 700 HSG samples. The graphical representation of this HSG data indicates stability in the analyzed gas constituents and supports the monthly sampling schedule set out in Section IV.10 above.

The Permittees initially suspected the CO₂- to H₂ ratio might be an indicator of radiolytic decomposition, and tracked that ratio. However, analysis of the HSG data (H₂, CO₂, CO,

and N₂O) gathered to date indicates there are potentially other gas generating mechanisms occurring within some containers. The concentrations of oxidation products (e.g.: CO₂ and N₂O) is ancillary to the H₂ concentration measurement. While it provides additional insight into the nitrate salt-bearing waste, the Permittees no longer consider tracking the CO₂- to H₂ ratio to be a useful indicator. The Permittees have focused ongoing analyses on the monitoring of H₂ concentrations and temperature measurements rather than ratio of CO₂ and H₂ because: the lower flammability limit (LFL) for H₂ is established; both H₂ gas concentrations and temperature are readily measured; and actionable levels can be established. The H₂ and temperature measurements are a more direct way to monitor potential changes in the waste.

~~13)~~14) The Permittees conclude that the concentration of H₂ is an appropriate indicator to track and to use as a basis for action levels to trigger specific actions.

If the Permittees observe an H₂ concentration at or above 20,000 ppm (~50% of the lower explosive limit [LEL]), they will conduct daily HSG (H₂, CO₂, CO, and N₂O) for that SWB.

If the Permittees observe an H₂ concentration at or above 30,000 ppm (~75% of the LEL), they will install additional filters in the SWB, if the SWB is configured to accept additional filters. (This approach was successfully implemented by the Permittees with SB50522. Concentrations of H₂ were reduced after the installation of additional filters in that SWB, and have since been maintained at a lower level.)

If additional filters cannot be added to the SWB or if concentrations are not reduced to below 30,000 ppm at the next daily HSG sample, then the Permittees will apply a 15 foot stand-off exclusion zone. (The stand-off exclusion zone is a 15 foot area that is used at LANL to surround a container that is or has become unvented, thereby unable to vent contents adequately. This area is segregated from normal operations except those operations specific to disposition or inspection of the container of concern. Surrounding containers may exist in the exclusion zone. Entry into the exclusion zone is controlled by the FOD who will determine what actions can be taken – including entry for sampling, temperature measurements or visual monitoring.) This approach is consistent with the hazard analysis that has been performed for an unvented drum discovery. The Permittees will notify LANL Emergency Management to assume responsibility for the container if the container poses a threat, e.g. bulging.

The Permittees will include this HSG data (H₂, CO₂, CO, and N₂O) in the daily written submissions provided to NMED, as established in Section IX below.

—The isolation configuration described in this Section IV continues to be protective of human health and the environment in light of the observed concentrations of H₂ and CO₂

in SWBs, and in light of the conservative assignment of EPA Hazardous Waste Number D001. The facility being used for isolation is compliant with the LANL Hazardous Waste Facility Permit. The fire suppression systems, climate control and filtration systems, and other mechanisms described above are designed to protect human health and the environment in the event of a reaction within a container, a release, a fire, or an explosion. The Permittees continue to evaluate the effectiveness of the isolation configuration and will make changes to this configuration as appropriate.

~~14)15)~~

V. **-Immediate Actions for Unremediated Nitrate Salt-Bearing Waste Containers**

There are currently 29 unremediated nitrate salt-bearing waste containers at LANL. The Permittees validated this number through review of data from the WCATS database and a field walk-down verification. Below is a description of the activities DOE/LANS ~~have implemented and intend to implement to address~~ isolating, securing, and ~~then removing from isolation /or treating~~ the unremediated nitrate salt-bearing waste containers.

- 1) The 29 unremediated containers were first placed into isolated storage in Dome 230 at TA-54, Area G, which has an active fire protection system. -This dry-pipe fire protection system is not included within the Permit Contingency Plan as it was inoperable during the re-application process for the Permit. -This system became operable in November 2011, and currently the Permittees have chosen not to credit this system as fire control equipment in the Contingency Plan.

Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

- ~~2)-~~The Permittees moved all unremediated nitrate salt-bearing waste SWBs at LANL to the Permacon in Dome 231 located at TA-54, Area G. This move was completed on June 3, 2014. ~~-In the future, for operational efficiency, the Permittees may also utilize the Permacon in Dome 375 for storage of these containers.~~

~~—The Permit provides additional precautions for the storage of waste with the EPA Hazardous Waste Number D001. These precautions are found at Part 2.8.1 of the Permit.~~

~~—As described in Permit Attachment A.4.5 and Attachment D, TA 54 Area G, Table D 2, fire control equipment is located throughout Area G, including Domes 231 and 375. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants.~~

~~These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).~~

- ~~—The LAFD is manned and available 24 hours a day. They are able to utilize fire hydrants in the event of a fire or reaction. Additionally, the LANL emergency management organization is also on call 24 hours a day, and will respond promptly.~~
- ~~—The Permacon in Dome 375 and the Permacon in Dome 231, as part of permitted units, are authorized under the LANL Permit for storage of mixed TRU wastes. These dry pipe fire protection systems are not included within the Permit Contingency Plan as the Permacons have been generally used of processing waste containers. A process that requires added safety / emergency controls above and beyond those of normal waste storage. Therefore, currently the Permittees have chosen not to credit these systems as fire control equipment in the Contingency Plan.~~
- ~~—Pre action FSSs were installed in the Permacon within Dome 231 in November 2012, and in the Permacon within Dome 375 in February 2013. The FSSs are designed as an ordinary group 2 pre-action sprinkler system to protect the moderate hazard operations in the Permacon. Drawings of these FSSs are found in *TA 54 Area G Nitrate Salt Waste Container Response Instructions*, EP AREAG PLAN 1248, R.0 (Attachment 6). This system uses water for fire suppression, which is compatible with the nitrate salt waste. Should the fire suppression system activate, Pad 9 has a fire water collection system that would contain water from the 231 Permacon FSS. Dome 375 has curbing that provides approximately 49,000 gallons of retention capacity.~~
- ~~—The sprinkler system pre-action valve is automatically activated by a combination of any 2 of 3 types of electronic initiating devices located in the Dome or the Permacon: smoke detection, heat detection, or fire alarm pull stations. During an event, fire alarm pull stations can be accessed and manually activated by staff. Pull stations are located in accordance with National Fire Protection Association standards, and are in both Domes and both Permacons. Also, access is facilitated by maintaining emergency egress aisles with a minimum aisle space of two feet in the Domes and the Permacons. Further, in compliance with Permit Section 3.5.1(1), the Permittees maintain adequate aisle space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and Domes and Permacons. Finally, in the event of an abnormal condition, staff will evacuate quickly and will promptly report to 911, the operations center or the shift manager. Should an abnormal condition be observed, the Permittees will implement their emergency response plan and provide notice to NMED within 24 hours.~~

- 2) ~~The Permacons are constructed of stainless steel frame and sheeting. They are contamination control structures that are temperature controlled and equipped with a HEPA filtration and fire suppression systems. The Permacons are also maintained at negative pressure. Additionally, the unremediated drums have been overpacked into 85-gallon drums of good integrity. While the energy of the WIPP event in Panel 7, Room 7 has not been determined at this time, should an event occur, the 231 and 375 Permacons are designed to contain a radiological release.~~
- 3) The Permittees ~~are monitoring, on a daily basis,~~ the temperature daily of the 85-gallon overpacks that contain unremediated nitrate salt-bearing waste drums from the time the Isolation Plan was implemented until the approval of the Isolation Plan, Revision 3. Daily temperature measurements ~~are were~~ taken of the external surface of the 85-gallon overpack using a calibrated infrared thermometer. The target temperature at which the nitrate salt-bearing waste containers ~~are were~~ maintained while in isolation in both the 375 and 231 Permacons is was less than 90°F.

The Permittees will maintain records of all such temperature monitoring. These activities ~~will be were~~ performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EPWMO-AREAG-FO-DOP-1246, R.64 (Attachment 7). These records will be updated on a daily basis. The temperature data (both daily, and if conducted as an additional measure under Section I, hourly) that the Permittees ~~have~~ collected since the Isolation Plan was implemented was included with the Isolation Plan, Revision 2 as two attachments. The attachments were discs containing documentation of daily and hourly temperature measurements obtained by the Permittees up to the time the is attached to this Isolation Plan, Revision 2 at Attachment 8 (daily) and Attachment 9 (hourly). ~~The Permittees began including will also include this~~ temperature data to NMED in the daily written submissions provided to NMED, as established in Section IX below. Between the data included with the Isolation Plan, Revision 2 in Attachments 8 and 9 of that plan and the data that the Permittees have ~~already begun to provided~~ in the daily submissions, the Permittees have provided a current set of information to NMED. Additionally, these records and all temperature data (both daily, and if conducted as an additional measure under Section I, hourly) will be available to NMED for inspection.

The Permittees ~~are~~ also performing visual inspections of these containers on an hourly basis, 24 hours per day, to identify abnormal conditions (e.g., signs of smoking and fire, evidence of deterioration, bulging) from the time the Isolation Plan was implemented until the approval of the Isolation Plan, Revision 3. These activities ~~will be were~~ performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMOP-AREAG-FO-DOP-1246, R.64. The Permittees will maintain records of all such visual monitoring— (see Attachment 7). These records will be updated on a daily basis and be available to NMED for inspection.

Additionally, the Permittees ~~are using~~ used continuous air monitors (CAMs) with alarm capability, ~~and will continue their use until further notice.~~ ~~There are CAMs in place in the 375 Permacon, two of which have remote alarm notification capability.~~ ~~These two remotely monitored CAMs provide remote notification if there is a significant airborne release (the 375 Permacon currently contains the LANL remediated nitrate salt-bearing waste).~~ ~~Additionally, t~~ There are were CAMs in place in the 231 Permacon for the entire time unremediated nitrate salt-bearing waste containers were stored within the Permacon. Lastly, the Emergency Response/Hazardous Materials organization ~~has been~~ were briefed on the storage configuration while the containers were isolated.

~~Action levels have been established and response instructions prepared. These are contained in LANL's Procedure on Nitrate Salt-bearing TRU Waste Container Monitoring, EWMOP AREAG FO DOP 1246, R.4 (Attachment 7). Should an abnormal condition be observed, the Permittees will implement its emergency response plan and provide notice to NMED within 24 hours. Area G's building emergency plan is found at Attachment 10, and associated procedures are found at Attachments 11, 12 and 13.~~

4) ~~During isolation,~~ Unremediated nitrate salt-bearing containers ~~will be~~ were spaced an adequate distance apart to limit any potential interactions with other containers. This distance has been determined to be 2 feet between containers. This distance ~~was~~ is based on the Permittees' review of evidence from the event at WIPP, a calculation on the heat transfer from an SWB undergoing a similar reaction, and a review of fire protection and Permit requirements:

~~The Permittees have reviewed photographs of the impacted drum in WIPP Room 7, Panel 7 and the adjacent containers. From the photographs, the adjacent drum and the adjacent SWB appear to have minimal damage and no release. The adjacent drums are in contact with the impacted drum and the adjacent SWBs are within inches of the impacted drum.~~

~~The Permittees have performed a preliminary calculation on the minimum separation distance between SWBs to ensure that an incident in one SWB will not impact an adjacent SWB. Assuming the offending SWB reaches a maximum temperature of approximately 1100°F and that the adjacent SWB does not to exceed 200°F, the heat generated from the offending SWB drops off to below 200°F within 1 inch. The 2 foot spacing in use provides additional assurance that the adjacent SWBs will not be impacted by the heat generated during an exothermic event in a single SWB. Drawings that include the locations of the containers are included in TA 54 Area G Nitrate Salt Waste Container Response Instructions, EP AREAG PLAN 1248, R.0 (Attachment 6). The use of fire curtains in between SWBs will not provide a measurable reduction in the thermal conductivity across the 24 inches but does provide protection from flame impingement.~~

- ~~—SWBs will be placed in rows that allow for emergency egress and that have Permit compliant spacing between each row. When used, the fire curtains will be placed within a row (that is, between the adjacent SWBs in that row) to mitigate the potential for interaction between adjacent SWBs. While the temperatures of the event in Panel 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent temperatures of 2500°F.~~
- ~~—The NFPA consensus standards were also reviewed and NFPA 211 provided the most similar type of control. NFPA 211 covers the installation of chimney pipes and stoves and the distance recommended between the pipe and unprotected combustibles is 18 inches. There are no unprotected combustibles in the Permacons in Domes 231 and 375.~~
- ~~—This 2 foot distance also meets the requirements in Permit Section 3.5.1(1). This section requires the Permittees to maintain adequate aisle space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and 375 Domes and Permacons.~~
- 4) ~~The Permittees may also use fire resistant curtains may be used in lieu of spacing. Containers will be placed in rows that allow for safe egress and that have Permit compliant spacing between each row. When used, the curtains will be placed within a row (that is, between the adjacent containers in that row) to mitigate the potential for interaction between adjacent containers. While the temperatures of the event in Panel 7, Room 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent temperatures of 2500°F. Prior to using fire resistant curtains, the Permittees will discuss the details of their use with NMED during the technical calls established in Section IX below.~~
- 5) During isolation, ~~t~~The Permittees ~~will protect~~ protected workers by restricting access to the unremediated nitrate salt-bearing waste containers. ~~-~~Only those personnel performing the ongoing container monitoring activities (e.g., daily temperature monitoring), other sampling ~~-/~~ data collection work (e.g., periodic head space gas sampling), and other required inspections (e.g., Permit required inspections) ~~will be~~ were allowed into the storage areas. ~~-~~This is documented in Standing Order EP-AREAG-SO-1247, R.12 (Attachment 1214). Also, there ~~will be~~ were warning signs posted at the entrance to the Permacons in Domes 231 informing ~~and 375 that will inform~~ personnel of access restrictions.

Additionally, all unremediated nitrate salt-bearing waste is in 55-gallon drums that have been overpacked into 85-gallon containers of good integrity.

~~—This waste has been stored above-ground for many years and the Permittees. No other protective shields or barriers are deemed necessary for the protection of workers at this time.~~

~~6) Furthermore, the ongoing continued data collection activities to provide continuing information on the physical condition of the waste so that appropriate additional worker safety measures could~~ean~~ be taken, if required.~~

~~7) Further evaluation of unremediated nitrate salt waste has led to the conclusion that the 29 unremediated nitrate salt-bearing waste containers do not require specific isolation from other waste containers stored at permitted units at TA-54 Area G. Unremediated salts are determined to not present the potential hazard of spontaneous combustion or enhanced combustion in their current configuration; therefore, they can be stored in any area in which combustible material is minimized and separated from the nitrate salt waste containers, without fear of a release. Attachment 16 for this Isolation Plan details the assessment conducted to reach this conclusion.~~

~~6) As a result of this evaluation, the Permittees will remove the 29 unremediated nitrate salt-bearing waste containers located within the Dome 231 Permacon from isolation and into a compliant permitted storage unit at TA-54, Area G, Pad 9 within Dome 230. Storage of the waste containers within Dome 230 will Prior to moving nitrate salt-bearing waste containers, the Permittees will notify the LANL EOC. The EOC will notify the LAFD and other responders, if needed. The Permittees will notify the EOC at the completion of the move. The Permittees do not anticipate that responders will be present during the movement of these containers, or that responders will be present / alerted during other actions.~~

~~7) The Permittees have updated all procedures and safety basis documents to convert the processing facilities into storage facilities.~~

~~—The isolation configuration described in this Section V continues to be protective of human health and the environment. In light of the conservative assignment of EPA Hazardous Waste Number D001 and D002 (D002 conservatively assigned to some containers as described above), storage of the containers will meet all applicable conditions in Permit Section 2.8 and all other applicable sections of . The facility being used for isolation is compliant with the LANL Hazardous Waste Facility Permit. The fire suppression systems, climate control and filtration systems, and other mechanisms described above are designed to protect human health and the environment in the event of a reaction within a container, a release, a fire, or an explosion. The Permittees continue to~~

~~evaluate the effectiveness of the isolation configuration and will make changes to this configuration as appropriate.~~

8)

Dome 230 at TA-54, Area G, is equipped with an active dry-pipe fire protection system. Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

Additional precautions that will be maintained for these containers of ignitable waste include:

- Waste will be stored with adequate aisle space (at least 2 feet) and separate from other wastes within the permitted unit.
- The waste will be protected from sources of ignition by facility procedure.
- Sources of open flames will not be allowed in, on, or around the containers and smoking is not permitted within the boundaries of TA-54, Area G.
- Dome 230 has appropriate lightning protection for storage of ignitable waste.
- Non-sparking tools will be used when managing ignitable waste containers (e.g. opening waste container or sampling waste).
- Movement of the containers will be achieved using a drum grapppler or a forklift with the container strapped to the mast.
- Although Dome 230 is designed for secondary containment, the 26 unremediated nitrate salt-bearing waste containers that have free liquids will be stored on secondary containment pallets. The remaining 3 containers will be stored elevated.
- Waste containers will not be stacked.

VI. ~~VI.~~ Remediation Planning

1) The Permittees have established a “Remediation Team” to identify a path forward for remediation of these containers as necessary and appropriate. The Remediation Team has met regularly. The Permittees have met with NMED on ~~two~~ multiple occasions to discuss the Team’s progress, and will continue these communications.

~~2)~~ As discussed in Paragraphs IV.2 and IV.3 above, the Permittees have overpacked the 57 remediated nitrate salt-bearing waste containers at LANL into 55 SWBs. These 55

SWBs are currently located in the Permacon in Dome 375. As discussed in IV.4 above, an additional 4 POCs are also located in the Permacon in Dome 375.

~~In order to take the first steps toward remediation and to further isolate the remediated nitrate salt-bearing waste containers, the Permittees will meet with NMED to have detailed discussions on the progress of remediation plans and schedules, including but not limited to, the processes, location and regulatory pathways to treat and stabilize the nitrate salt-bearing waste and remove the characteristics of ignitability (D001) and/or corrosivity (D002). The initial meeting is anticipated to discuss the potentially 'de-nesting' the 55 SWBs containing remediated nitrate salt-bearing waste containers. By the term de-nesting, the Permittees mean physically segregating (1) the non-nitrate salt-bearing waste containers out of these SWBs, and (2) move co-located nitrate salt-bearing waste containers into separate SWBs. The result would be that the 57 remediated nitrate salt-bearing containers will be separately overpacked in 57 SWBs.~~

~~The Permittees would also like to discuss the collection of additional data during any de-nesting activities, including potentially opening all the SWBs to perform a visual inspection of the internal remediated nitrate salt-bearing waste drum(s), attaching thermocouples to the outside of each remediated nitrate salt-bearing waste container, measuring the gas evolution (flow rate) from each drum and collecting head space gas samples from the waste containing drums, including the remediated nitrate salt-bearing waste drums.~~

NMED and the Permittees have had initial discussions on these potential remediation actions and. ~~T~~the Permittees will continue their contact with NMED to set meeting(s) to discuss these potential actions in more detail. The Permittees will use these meetings to help develop a proposal for submission to NMED.

~~3)2)~~ Any treatment plans or proposals that are developed by the Remediation Team shall be discussed with NMED. These plans or proposals shall include, but not be limited to, the neutralization steps, the reagents used, the location of the process for treating wastes, and any other key specific information related to all potential treatment and neutralization options. Any treatment plans that are developed shall detail which characteristic (toxicity, reactivity, ignitability, corrosivity) mixed TRU wastes the Permacons (or other locations) are authorized to treat – including, as appropriate, the removal of the characteristics of ignitability (D001) and/or corrosivity (D002). Permittees shall discuss with NMED any permit modifications or authorizations that may be necessary for treatment of the nitrate salt-bearing wastes.

~~4)~~ The key events, actions and activities to be documented as specified in the treatment plan. The Permittees will maintain records of all key events, actions and activities

related to the disposition of the unremediated nitrate salt-bearing waste as documented in the treatment plan (e.g. safe storage configuration, the neutralization steps, the reagents used, the location of the process for treating drums). These records will be updated on a daily basis and be available to NMED for inspection.

3)

VII. ~~VII.~~ Cemented Legacy and Newly Generated Cemented Nitrate Salt-Bearing Waste

Since 1991, the nitrate salt waste stream generated from the evaporator process at TA-55 has been sent to cement fixation immediately upon generation. Remediated and unremediated nitrate salt-bearing waste containers generated at TA-55 prior to 1991 are discussed above. Additional information about the review that the Permittees conducted to identify containers with nitrate salt-bearing waste is included in Enclosure ~~3-2~~ of the Permittees' letter to NMED dated September 19, 2014 (DIR-14-149). This enclosure also includes a discussion on how the evaluation was conducted for a specific subset of waste containers (all of which were pre-1991 containers).

There are approximately 378 containers of post-1991 cemented nitrate salt containers within the LANL Area G inventory.

The cementation process removes characteristics of ignitability and reactivity from the nitrate salt waste stream. Nitrate salt waste containers generated at TA-55 after 1991 have been cemented and are therefore not ignitable per the definition in 40 CFR §264.21 (Characteristic of Ignitability) or reactive per the definition in §264.23 (Characteristic of Reactivity).

The waste characterization by Acceptable Knowledge used at TA-55 to demonstrate that the cement from the stabilization process meets the waste acceptance criteria at WIPP was centered around two primary elements (1) no free liquids were present in the cemented waste and 2) the Portland cement created an inert solid monolith. These elements support the determination that the waste does not exhibit the characteristics of ignitability and reactivity.

The ignitability characteristic is not a concern for the following reasons: (1) the cement from the stabilization process is a solid and does not meet the definition of a liquid per 40 CFR 261.21(a)(1); (2) the cement has never exhibited the characteristic of an ignitable solid that is capable "under standard temperature and pressure of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard" per 40 CFR 261.21(a)(2); and (3) the cement has never exhibited oxidizing behavior per 40 CFR 261.21(a)(4).

The reactivity characteristic has never been observed regarding cement. The cement has never exhibited the following properties per 40 CFR 261.23: (1) it is normally unstable and readily undergoes violent change without detonating; (2) it reacts violently with water; (3) it forms potentially explosive mixtures with water; (4) when mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment; (5) it is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement; and (6) it is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

The basis for this determination has been established by direct personnel observations, the facility operating record, and the chemical nature of the Portland cement used in the LANL stabilization process. LANL staff has never observed any ignitable or reactive behavior associated with the cemented waste from the stabilization process. Facility records also confirm that no ignitable or reactive behavior was ever observed from the cemented waste. Lastly, Portland cement by its chemical nature will not react with oxidizers and has no available hydrogen, oxygen, and carbon molecules to help sustain a reaction. In addition, the stabilization process produces a solid monolith, which is an absorber of heat, further reducing any potential for reactive behavior within the cement matrix.

Characterization and stabilization (cementation) treatment of newly generated evaporator bottom waste at TA-55 is conducted in accordance with the Permit as approved. The waste treated at the TA-55 Mixed Waste Stabilization Unit is characterized using the procedure outlined in Permit Attachment C (Waste Analysis Plan), Section C.3.2.4.

Based on the above facts, the Permittees recommend that no further controls be implemented for the cemented legacy and newly generated cemented nitrate salt-bearing waste generated since 1991.

VIII. Immediate Action Implementation Schedule

| <u>Activity</u> | <u>Due Date</u> |
|---|---|
| Remediated Nitrate Salt-Bearing Waste Containers | |
| Overpacking (into SWBs) of all nitrate salt-bearing wastes at LANL | Completed 5/18/14 |
| Movement of SWBs to designated areas (e.g., Domes 230, 231 and 375) – (Remediated nitrate salt-bearing drums were in Dome 230, but have – been moved to the 375 Permacon) | Move to Dome 230 completed on 5/1/14. All remaining moves completed on 6/3/14 |

| <u>Activity</u> | <u>Due Date</u> |
|--|---|
| Daily/Hourly monitoring of containers | Daily monitoring began on 5/1/14. Hourly monitoring began on 5/17/14 |
| Appropriate spacing of SWBs | Completed in Dome 230 on 5/1/14. Completed in Dome 375 & 231 Permacons on 6/3/14 |
| Updating procedures/safety basis documents as appropriate | Completed on 5/30/14 |
| Labels for SWBs (display inner container label) | Completed 5/18/14 |
| Remediation Team kick off | Completed 5/20/14 |
| Unremediated Nitrate Salt-Bearing Containers | |
| Movement of 85-gallon drums to designated areas (e.g., Domes 230, 231 and 375) | Began in Dome 230 on 5/1/14. All remaining moves completed on 6/3/14 |
| Daily/Hourly monitoring of containers | Daily/Hourly; began on 5/20/14 |
| Appropriate spacing of containers | Completed in Dome 230 on 5/1/14. Completed in Domes 375 and 231 Permacons on 6/3/14 |
| Updating procedures/safety basis documents as appropriate | 5/30/14 |
| Remediation Team kick off | Completed 5/20/14 |

IX. Updates/Submissions

The Permittees shall provide updates to NMED during the twice weekly pre-scheduled technical calls. The Permittees shall also provide updates to NMED in the form of daily written submissions that will be sent to NMED via electronic mail (email) by close of business (COB) on a daily basis until NMED indicates otherwise. For purposes of this Plan, daily refers to business days, and excludes state and federal holidays.

All submissions related to this Order shall be placed in both the electronic and hard-copy Information Repositories within five (5) working days of submission to NMED.

All procedures and plans attached to this Revised Isolation Plan may be revised by the Permittees as required. Revisions will be submitted to NMED and placed in Information Repositories as required in this Section IX.

All submissions required by NMED's Order will be sent to the following addresses:

Bureau Chief
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87508-6303

Division Director
Environmental Health Division
Harold Runnels Building
1190 Saint Francis Drive, PO Box 5469
Santa Fe, New Mexico 87502-5469

ENCLOSURE 2

**LANL Nitrate Salt-Bearing Waste Container Isolation Plan
Revision 3**

ENV-DO-15-0099

LA-UR-15-20472

Date: APR 21 2015

**LANL Nitrate Salt-Bearing Waste Container Isolation Plan
Revision 3**

April 2015

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LIST OF ATTACHMENTS

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| Attachment 8 | EP-DIV-BEP-20048, R.1, EWMO Division Building Emergency Plan (BEP) |
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| Attachment 16 | Memorandum: Hazards Associated with Legacy Nitrate Salt Waste Drums Managed under the Container Isolation Plan |

I. Introduction

On May 19, 2014, the Department of Energy (DOE) and the Los Alamos National Security, LLC (LANS) (“Permittees”) received Administrative Order No. 5-19001 (“Order”) issued by the New Mexico Environment Department (NMED). The Order, at paragraph 18, required the Permittees to submit a *LANL Nitrate Salt-Bearing Waste Container Isolation Plan* (“Isolation Plan”). The Isolation Plan was submitted by 2:00 PM on May 21, 2014.

On May 23, 2014, NMED approved the Isolation Plan contingent on the submittal of a revised Isolation Plan that incorporated additional requirements (“Revised Isolation Plan”). NMED required the Permittees to address all of the items enumerated in their May 23, 2014 letter, incorporate those changes and resubmit the Revised Isolation Plan by May 29, 2014. The Revised Isolation Plan was submitted on May 29, 2014.

On August 29, 2014, NMED approved the Revised Isolation Plan with modifications. NMED required the Permittees to address all of the items enumerated in their August 29, 2014 letter, incorporate changes and resubmit the Plan (“Isolation Plan, Revision 2”) to NMED no later than September 19, 2014 for final review and approval.

The Isolation Plan, Revision 2 incorporated the modifications enumerated by NMED and was submitted to the NMED on September 19, 2014. It included description of how the Permittees isolated and secured all nitrate salt-bearing waste containers currently stored at Los Alamos National Laboratory (LANL) and information on characterization assessments conducted by the Permittees.

This revision of the Isolation Plan, Isolation Plan, Revision 3, describes the activities and assessments that have been conducted to date associated with all nitrate salt-bearing waste containers and includes the addition of 4 suspect remediated nitrate salt-bearing waste containers into isolation in the Permacon within Technical Area 54, Dome 375 (TA-54-375). It describes how the Permittees continue to secure and isolate remediated and newly suspect nitrate salt-bearing waste containers, so that a potential release from them at LANL does not pose a threat to human health or the environment. This plan also includes information on remediation planning and a schedule of immediate actions undertaken to implement isolating, securing and/or treating nitrate salt-bearing waste containers currently stored at LANL.

Additional measures above those described in this Isolation Plan, Revision 3 may also be taken and will be identified to NMED during the technical calls established in Section IX below.

II. Background and General Implementation Updates

- 1) On May 1, 2014, the Waste Isolation Pilot Plant (WIPP) declared a potentially inadequate safety analysis (PISA) on the possibility of unremediated nitrate salt-bearing waste contained in waste packages at WIPP. On May 2, 2014, LANS convened a critique to perform an extent of condition on the PISA issued by WIPP. As a result of the critique, the Permittees implemented several corrective and precautionary actions immediately to ensure protection of human health and the environment. The Permittees identified the current storage locations of all remediated and unremediated nitrate salt-bearing waste containers. The Permittees moved all remediated nitrate salt-bearing waste containers into TA-54, Area G, Dome 230 (because Dome 230 has an active fire suppression system) and daily temperature measurements of each container commenced. Additionally, continuous radiological air monitoring was initiated in Dome 230. Finally, any further processing of nitrated salt waste streams was suspended and all transuranic (TRU) waste shipments from LANL were paused.
- 2) On May 15, 2014, WIPP released photographs showing a LANL drum containing remediated nitrate salt-bearing waste that appeared to be breached in Panel 7, Room 7. The initiator of this breach and other potentially impacted drums is currently unknown, but is being actively investigated by multiple parties.
- 3) On May 16, 2014, the Permittees convened a critique to review the new information. A PISA was declared (ORPS NA-LASO-LANL-WASTEMGT-2014-0004) on the possibility of inadequate safety basis controls specified for the remediated nitrate salt-bearing waste. As a result of the critique, the Permittees implemented several corrective and precautionary actions immediately to ensure protection of human health and the environment.
- 4) On May 18, 2014, the Permittees completed the overpacking of all originally identified remediated nitrate salt-bearing waste containers at LANL into Standard Waste Boxes (SWBs). There are 57 remediated nitrate salt-bearing waste containers at LANL, and these were overpacked into 55 SWBs. (As part of the original packing configuration, 2 SWBs each have 2 remediated nitrate salt-bearing waste containers.)
- 5) On May 20, 2014, the Permittees held the initial meeting of their Remediation Team. (See Section VI below for additional information.)
- 6) On June 3, 2014, the Permittees completed the move of all unremediated nitrate salt-bearing waste containers to the Permacon in Dome 231 located at TA-54, Area G, and all

remediated nitrate salt-bearing waste containers were moved to the Permacon in Dome 375 located at TA-54, Area G.

- 7) On June 5, 2014, the Permittees conservatively applied Environmental Protection Agency (EPA) Hazardous Waste Number D002 to 26 unremediated nitrate salt-bearing waste containers. The following describes the Permittees' regulatory basis, reasoning and analysis for assigning this EPA Hazardous Waste Number. (See also, Permittees' letter to NMED dated September 5, 2014, ADESH-14-088.)

During a review of operating records associated with the remediation of nitrate salt-bearing TRU wastes, the Permittees determined that a few of the parent containers were noted as having liquids with a pH of 2 or less. (*see* ES Nitrate Salt Waste Containers at WCS, WIPP Panel 7, and LANL Data Summary, May 17, 2014, <http://www.nmenv.state.nm.us/NMED/Issues/documents/ESNSWasteContatWCS-WIPP-LANL5.17.14.pdf>). Based on this information, LANL evaluated the remaining unremediated nitrate salt-bearing waste containers to identify those with free liquids using real-time radiography (RTR) and high-energy RTR (HERTR) analysis. The testing identified that 26 of the 29 containers contained free liquids. As a conservative measure, based on this information, LANL applied the D002 EPA Hazardous Waste Number to these remaining unremediated nitrate salt-bearing waste containers identified with free liquids.

Videos of 27 RTR fast scans were provided to NMED on September 5, 2014. (ADESH-14-088). As explained in the Permittees' September 5, 2014 letter, RTR video recordings are not available for 2 of the 29 unremediated nitrate salt-bearing waste containers as historically RTR video recordings were not created.

- 8) On June 18, 2014, the Permittees began headspace gas (HSG) sampling on additional SWBs containing remediated nitrate salt-bearing waste containers. The Permittees' intent was to conduct HSG sampling on each of the 55 SWBs. This HSG monitoring was an additional measure above those described in the original May 19, 2014 Isolation Plan and the May 29, 2014 Revised Isolation Plan. When all 55 SWBs were sampled the Permittees transitioned to sampling a subset of the 55 SWBs on a regular basis.
- 9) On July 25, 2014, the Permittees conservatively applied EPA Hazardous Waste Number D001 to the remediated and unremediated nitrate-salt bearing wastes stored at LANL. The following describes the Permittees' regulatory basis, reasoning and analysis for assigning this EPA Hazardous Waste Number. (See also, Permittees' letter to NMED dated September 5, 2014, ADESH-14-088.)

Unremediated Nitrate-Salt Bearing Waste. On May 22, 2014, LANL received analytical results from two samples taken from an unremediated nitrate salt-bearing waste drum stored at Area G, Dome 231. (These results were provided as Attachment A to the Permittees' letter to NMED dated September 5, 2014, ADESH-14-088). The results showed the presence of nitrate compounds listed on the US Department of Transportation (DOT) Division 5.1 Oxidizers table under the DOT rules at 49 CFR §173.127. EPA/NMED require hazardous wastes that qualify as a 5.1 DOT oxidizer to be managed as a RCRA waste (D001) under 40 CFR §261.21(a)(4). Although the analytical results apply to one (1) unremediated drum, the Permittees determined to conservatively label the remaining drums with the D001 Hazardous Waste Number.

Remediated Nitrate-Salt Bearing Waste. As described in CCP's *Acceptable Knowledge Summary Report for Los Alamos National Laboratory TA-55 Mixed Transuranic Waste* (CCP-AK-LANL-006, Rev. 13, which includes waste stream LA-MIN02-V-001), on page 142, LANL previously determined that these nitrate salts did not meet the definition of a DOT oxidizer. However, to further support managing these specific nitrate salt wastes as non-ignitable, LANL determined to remediate and repackage this waste with an inert material (e.g., zeolite/kitty litter) with a minimum absorbent material to nitrate salts mixture ratio of 1.5 to 1. This ratio was based on results of oxidizing solids testing performed by the Energetic Materials Research and Testing Center (EMRTC) and a white paper authored by the LANL-Carlsbad Office Difficult Waste Team (DWT), *Amount of Zeolite Required to Meet the Constraints Established by the EMRTC Report RF 10-13: Application to LANL Evaporator Nitrate Salts* (See, Attachment B to Permittees' letter to NMED dated September 5, 2014, ADESH-14-088). The EMRTC testing established the concentration at which the most reactive mixture of sodium and potassium nitrate becomes a non-oxidizer when mixed with either zeolite or grout. Based on the EMRTC testing, the LANL DWT concluded that the results can apply to LANL's non-cemented nitrate salts.

As previously reported, LANL remediated and repackaged certain nitrate-salt bearing waste containers using an organic kitty litter, and not a zeolite-based kitty litter (see Letter from Permittees to NMED Secretary Flynn dated July 1, 2014, *Addendum to the Los Alamos National Laboratory Hazardous Waste Facility Permit Reporting on Instances of Noncompliance and Releases for Fiscal Years 2012 and 2013*). This type of absorbent did not comport with the EMRTC testing or the LANL DWT recommendation.

To date, the Permittees have not sampled a remediated nitrate salt-bearing waste drum. Between July 22 and 29, 2014, LANL had surrogate samples of the waste tested by Southwest Research Institute of San Antonio, Texas. The surrogates were formulated using materials to approximate the remediated nitrate salt waste including *Swheat*TM kitty litter and a mixture of nitrate salts in both wet and dry samples. The samples were

analyzed using US Environmental Protection Agency's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846) Method 1040 (which is based on a test method adapted from the United Nations regulations and classification procedures for the international transportation of dangerous goods) to determine whether the D001 designation code could apply.

On July 25, 2014, the Permittees received preliminary, un-validated results from this testing that indicated that the surrogates sampled could be classified as oxidizers. Based on these results, LANL determined that it could not exclude the application of D001 to the remediated nitrate salt-bearing wastes. Based on this information and consultation with the Carlsbad Field Office, LANL determined to conservatively apply D001 to the remaining remediated nitrate salt-waste containers stored at LANL.

The final analytical reports for this test and all of the other testing that has been conducted is included as Attachment 1.

- 10) On September 3-5, 2014, the Permittees had additional surrogate samples representative of the remediated waste tested by Southwest Research Institute of San Antonio, Texas to determine if the surrogate samples meet the DOT oxidizer criteria when tested in accordance with the UN Manual of Tests and Criteria under DOT rules at 49 CFR §173.127 (a) in addition to SW-846, Method 1040. The surrogates for the remediated nitrate salt waste were comprised of a mixture of *Swheat*TM kitty litter and sodium nitrate in a ratio of 3:1. This mixture represents the main components of interest in the remediated waste, i.e., the organic kitty litter and the principal nitrate salt as indicated by the May 22, 2014 analysis. The additional testing determined that the surrogate mixture was a DOT Oxidizer, Packing Group II by the DOT test and a Category II oxidizer by Method 1040. Additional analytical tests for ignitability have also been conducted on various surrogates related the investigation of nitrate-salt bearing wastes.
- 11) Attachment 2 contains correspondence between the Permittees, Waste Control Specialists (WCS), the Waste Isolation Pilot Plant (WIPP), and any other agencies related to the assignment of EPA Hazardous Waste Number D001 that were shipped to WCS and/or WIPP. The Permittees have not yet received copies of corrected manifests. However, upon receipt of the corrected manifests, the Permittees will provide them to NMED within 15 business days. Additionally, the Permittees are working to resolve manifest discrepancies with WIPP and WCS. The Permittees will provide NMED with any of the Permittees' additional correspondence on this issue.
- 12) In late February 2015, the Permittees identified an additional 3 parent containers designated as within waste stream LA-MIN04 to be suspect nitrate salt-bearing waste containers. The 3 parent containers produced 10 daughter waste containers: 3 daughters

are designated as LA-MDH01 (i.e., debris) and 7 daughters are designated as LA-MIN04. The 10 daughter waste containers are located at Waste Control Specialists (WCS) (2 containers), WIPP (4 containers), and LANL (4 containers). All 4 containers located at LANL are Pipe Overpack Containers (POCs). As a result of this reevaluation, the Permittees determined that the 10 daughter waste containers are suspected to hold nitrate salt-bearing waste.

- 13) On March 12, 2015, the Permittees identified an additional 2 parent waste containers designated as LA-MDH01 (i.e., debris) to be suspect nitrate salt-bearing waste containers. The parent waste containers produced 3 daughter waste containers also designated as LA-MDH01. The Permittees and CCP reviewed generator AK documentation, RTR videos, and conducted interviews with SMEs to determine if these 3 daughter waste containers held any nitrate-salt bearing wastes. As a result of this reevaluation, the Permittees determined that the 3 daughter waste containers, located at WIPP, were suspected to hold nitrate salt-bearing waste.

III. Waste Container Categories

The current inventory of nitrate salt-bearing waste containers stored at LANL can be divided into two categories: 1) remediated nitrate salt-bearing wastes; and 2) unremediated nitrate salt-bearing wastes. Additionally, there is a third category of containers that are cemented legacy and newly generated wastes that originated from the nitrate evaporator and cementation operations within TA-55.

To identify all of the nitrate salts-bearing waste containers generated, a focused review of the generator records was conducted. Unconsolidated nitrate salts were only generated at TA-55 in a specific room and glove box from 1979 through 1991. It is important to note that after 1991, all nitrate wastes were cemented.

Following review of generator records, it was determined that all of the nitrate salt parents exist as subsets in both a debris (LA-MHD01.001) and cemented (LA-CIN01.001-Cans) waste stream. The LA-MHD01.001 waste stream includes over a thousand containers, but only 164 original parent drums contained nitrate salts. LA-CIN01.001-Cans waste stream also includes over a thousand containers, but only 103 original parent drums contained nitrate salts.

In total, there were 267 original nitrate salt parent containers identified. A large portion of these 267 parent containers have been remediated into nitrate salt daughter containers. As a result, there are currently 707 nitrate salt-bearing waste containers. After remediation, all of the remediated nitrate daughters were assigned to two homogeneous absorption waste streams; LA-MIN02-V.001 and LA-MIN04-S.001. However, after RTR, daughter containers may have been re-assigned to a final waste stream based on the volume percentages of the final waste content.

Of the 707 identified nitrate salt-bearing containers, a total of 86 remain at LANL, 57 are remediated daughter containers and 29 are unremediated parent containers.

The above-referenced waste streams, LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001 and LA-MIN04-S.001 are not solely dedicated to nitrate salts. All other containers in waste streams LA-MHD01.001, LA-CIN01.001, LA-MIN02-V.001 and LA-MIN04-S.001 do not contain nitrate salts and do not require isolation or management as nitrate salts.

The Permittees' approach to the focused reviewed discussed above was conservative. The original list of 707 includes containers that contain nitrate salt-bearing waste or are suspected of containing nitrate salt-bearing waste.

Additional information on the Permittees' evaluation and identification of LANL nitrate salt drums is provided in the *Summary of Evaluation and Identification of LANL Nitrate Salt Containers*. (Attachment 3)

Ongoing internal reviews have produced new information as described in II.12 and II.13. If any additional nitrate salt-bearing waste containers are identified based on new information, these will be managed in the same manner as the currently identified nitrate salt-bearing waste containers. The Permittees will notify NMED during the technical calls established in Section IX below.

This plan addresses isolation, securing and/or treatment of the remediated nitrate salt-bearing wastes. In this plan, “remediated” containers are defined as LANL unconsolidated nitrate salts that were remediated with kitty litter absorbent and were repackaged into new drums. “Unremediated” containers are defined as LANL unconsolidated nitrate salts drums to which absorbent material has not been added. Isolation Plan, Revision 3, removes unremediated nitrate salt-bearing waste containers from secured isolation and allows for the storage of these waste containers in other compliant permitted storage at Technical Area (TA)-54, Area G.

The third category, cemented legacy and newly generated cemented wastes from the nitrate processing line at TA-55, is not addressed in this Isolation Plan, Revision 3 because, as discussed in Section VII, per the definitions of ignitable and reactive in 40 CFR §264.21 and §264.23, legacy cemented nitrate waste generated since 1991, as well as newly generated cemented nitrate waste generated at TA-55, is not ignitable or reactive.

IV. Immediate Actions for Remediated Nitrate Salt-Bearing Waste Containers

There are currently 61 remediated and suspect nitrate salt-bearing waste containers at LANL. The Permittees validated this number through review of data from the Waste Characterization and Action Tracking System (WCATS) database and a field walk-down verification. Below is a description of the activities the Permittees have already taken to address isolating, securing, and/or treating the remediated nitrate salt-bearing waste containers.

- 1) On May 16, 2014, LANS applied five LANL tamper indicating devices (TIDs) to drum number 68685 as shown in the attached photo (Attachment 4, photo 1). This TRU waste drum is the sister drum related to the suspect drum at WIPP (drum 68660 was confirmed as the damaged drum during the May 22, 2014 WIPP entry, and drum 68685 is its sibling). Additionally, a member of the DOE Los Alamos Field Office observed the application of the TIDs.

On May 16, 2014, drum number 68685 was placed inside an SWB along with three empty dunnage drums (Attachment 4, photo 2) and was sealed. LANS applied two additional TIDs to either end of the SWB as shown in the attached photo (Attachment 4, photo 3).

On May 16, 2014, the empty parent containers for the two drums of initial interest (68660 and 68533) in the WIPP underground repository were identified onsite at LANL. As a result, LANS applied TIDs to both empty parent containers (69120 and 68359) during the early afternoon of May 16, 2014. This evolution was observed by DOE Los Alamos Field Office. Since that time S855793 was determined to be the parent container of drums 68685 and 68660.

These TIDs, and all subsequent TIDs, were installed in accordance with the LANL TID User Manual, NMCA-TID-FWI-002 R.1 (Attachment 5) by trained and qualified LANL TID users.

No additional TIDs have been applied to date, nor do the Permittees intend to install any additional TIDs at this time. However, additional TIDs will be applied as necessary to ensure that valuable information is not lost or as otherwise needed.

If directed to open the containers, the TIDs must be removed by qualified TID personnel in accordance with the TID User Manual (Section 3.21). In this instance, a two-person rule must be followed to verify chain of custody has been maintained and to verify that the TID has been properly destroyed once removed. Additionally, to ensure the TIDs are not removed without approval from the Facility Operations Director (FOD), they also have postings that clearly address that the TIDs cannot be removed without FOD approval.

- 2) On May 18, 2014, the Permittees completed overpacking the 57 remediated nitrate salt-bearing waste containers at LANL into SWBs. These containers were first placed into isolated storage in Dome 230 at TA-54, Area G, which has an active fire protection system. This dry-pipe fire protection system is not included within the LANL Hazardous Waste Facility Permit ("Permit"), Attachment D ("Contingency Plan") as it was inoperable during the re-application process for the Permit. This system became operable in November 2011, and currently the Permittees have chosen not to credit this system as fire control equipment in the Contingency Plan.

Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

- 3) The Permittees moved all remediated nitrate salt-bearing waste SWBs originally identified at LANL to the Permacon in Dome 375 located at TA-54, Area G. This move was completed on June 3, 2014. In the future, for operational efficiency, the Permittees may also utilize the Permacon in Dome 231 for storage of these containers.

- 4) The 4 newly identified suspect remediated nitrate salt-bearing waste containers located at LANL were moved from Domes 232 and 153 into the Permacon in Dome 375 on March 27, 2015.
- 5) As described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Domes 231 and 375. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

The Los Alamos Fire Department (LAFD) is manned and available 24-hours a day. They are able to utilize fire hydrants in the event of a fire or reaction. Additionally, the LANL emergency management organization is also on call 24-hours a day, and will respond promptly.

The Permacon in Dome 375 and the Permacon in Dome 231, as part of permitted units, are authorized under the LANL Permit for storage of mixed TRU wastes. The dry-pipe fire protection systems within the Permacons in the Domes are not included within the Permit Contingency Plan as the Permacons have been generally used for processing waste containers, a process that requires added safety / emergency controls more prescriptive than those of normal waste storage. Therefore, currently the Permittees have chosen not to credit these systems as fire control equipment in the Contingency Plan.

Pre-action fire suppression systems (FSSs) were installed in the Permacon within Dome 231 in November 2012, and in the Permacon within Dome 375 in February 2013. The FSSs are designed as an ordinary group 2 pre-action sprinkler system to protect the moderate hazard operations in the Permacon. Drawings of these FSSs are found in *TA-54 Area G Nitrate Salt Waste Container Response Instructions*, EWMO-AREAG-PLAN-1248, R.1 (Attachment 6). This system uses water for fire suppression, which is compatible with the nitrate salt waste. Should the fire suppression system activate, Pad 9 has a fire water collection system that would contain water from the 231 Permacon FSS. Dome 375 has curbing that provides approximately 49,000 gallons of retention capacity.

The sprinkler system pre-action valve is automatically activated by a combination of any 2 of 3 types of electronic initiating devices located in the Dome or the Permacon: smoke detection, heat detection, or fire alarm pull stations. During an event, fire alarm pull stations can be accessed and manually activated by staff. Pull stations are located in accordance with National Fire Protection Association (NFPA) standards, and are in both Domes and both Permacons. Also, access is facilitated by maintaining emergency egress aisles with a minimum aisle space of two feet in the Domes and the Permacons. Further, in compliance with Permit Section 3.5.1(1), the Permittees will maintain adequate aisle

space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and 375 Domes and Permacons. Finally, in the event of an abnormal condition, staff will evacuate quickly and will promptly report to 911, the operations center or the shift manager. Should an abnormal condition be observed, the Permittees will implement their emergency response plan and provide notice to NMED within 24 hours.

The Permacons are constructed of stainless steel frame and sheeting. They are contamination-control structures that are temperature-controlled and equipped with a High Efficiency Particulate Air (HEPA) filtration and fire suppression systems. The Permacons are also maintained at negative pressure. Additionally, the remediated drums were overpacked into new SWBs and suspect nitrate salt-bearing waste are packaged in POCs. Since SWBs and POCs are considered robust enough to prevent lid loss due to deflagration or fire based on information in DOE-STD-5506-2007, they would act as a barrier to provide a significant measure of worker protection. While the energy of the WIPP event in Panel 7, Room 7 has not been determined at this time, should an event occur, the 231 and 375 Permacons are designed to contain a radiological release.

- 6) The Permittees are monitoring, on a daily basis, the temperature of the SWBs and POCs that contain remediated or suspect nitrate salt-bearing waste drums. As discussed above, all remediated nitrate salt-bearing containers are overpacked in SWBs or are within POCs. Daily temperature measurements are taken of the external surface of the SWB using a calibrated infrared thermometer. The target temperature at which the nitrate salt-bearing waste containers are maintained in both the 375 and 231 Permacons is less than 90°F.

The Permittees will maintain records of all such temperature monitoring. These activities will be performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMO-AREAG-FO-DOP-1246, R.6 (Attachment 7). These records will be updated on a daily basis. The temperature data (both daily, and if conducted as an additional measure under Section I, hourly) that the Permittees have collected since the Isolation Plan was implemented was included with the Isolation Plan, Revision 2 as two attachments. The attachments were discs containing documentation of daily and hourly temperature measurements obtained by the Permittees up to the time the Permittees began including temperature data in the daily written submissions provided to NMED, as established in Section IX below. Between the data included with the Isolation Plan, Revision 2 in Attachments 8 and 9 of that document and the data that the Permittees provide in the daily submissions, the Permittees have provided a current set of information to NMED. Additionally, these records and all temperature data (both daily, and if conducted as an additional measure under Section I, hourly) will be available to NMED for inspection.

The Permittees are also performing visual inspections of these containers on an hourly basis, 24 hours per day, to identify abnormal conditions (e.g., signs of smoking and fire, evidence of deterioration, bulging). These activities will be performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMO-AREAG-FO-DOP-1246, R.6. The Permittees will maintain records of all such visual monitoring. (See, Attachment 7) These records will be updated on a daily basis and be available to NMED for inspection.

Additionally, the Permittees are using continuous air monitors (CAMs) with alarm capability, and will continue their use until further notice. There are CAMs in place in the 375 Permacon, two of which have remote alarm notification capability. These two remotely monitored CAMs provide remote notification if there is a significant airborne release (the 375 Permacon currently contains the LANL remediated nitrate salt-bearing waste). Additionally, there are CAMs in place in the 231 Permacon. Lastly, the Emergency Response/Hazardous Materials organization has been briefed on the storage configuration.

Action levels have been established and response instructions prepared. These are contained in LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMO-AREAG-FO-DOP-1246, R.6 (Attachment 7). Should an abnormal condition be observed, the Permittees will implement their emergency response plan and provide notice to NMED within 24 hours. Area G's building emergency plan is found at Attachment 8, and associated procedures are found at Attachments 9, 10 and 11.

- 7) Remediated and suspect nitrate salt-bearing waste containers are spaced an adequate distance apart to limit any potential interactions between SWBs and POCs. This distance has been determined to be a minimum of 2 feet between containers. This distance is based on the Permittees' review of evidence from the event at WIPP, a calculation on the heat transfer from an SWB or POC undergoing a similar reaction, and a review of fire protection and Permit requirements.

The Permittees have reviewed photographs of the impacted drum in WIPP Room 7, Panel 7 and the adjacent containers. From the photographs, the adjacent drum and the adjacent SWB appear to have minimal damage and no release. The adjacent drums are in contact with the impacted drum and the adjacent SWBs are within inches of the impacted drum.

The Permittees have performed a preliminary calculation on the minimum separation distance between SWBs and POCs to ensure that an incident in one container will not impact an adjacent container. Assuming the offending container reaches a maximum temperature of approximately 1100°F and that the adjacent container does not to exceed 200°F, the heat generated from the offending container drops off to below 200°F within 1

inch. The 2 foot spacing in use provides additional assurance that the adjacent containers will not be impacted by the heat generated during an exothermic event in a single container. Drawings that include the locations of the containers are included in TA-54 Area G Nitrate Salt Waste Container Response Instructions, EWMO-AREAG-PLAN-1248, R.1 (Attachment 6). The use of fire curtains in between containers will not provide a measurable reduction in the thermal conductivity across the 24 inches but does provide protection from flame impingement.

SWBs and POCs are placed in rows that allow for emergency egress and that have Permit compliant spacing between each row. If used, the fire curtains will be placed within a row (that is, between the adjacent containers in that row) to mitigate the potential for interaction between adjacent containers. While the temperatures of the event in Panel 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent temperatures of 2500°F.

The NFPA consensus standards were also reviewed and NFPA 211 provided the most similar type of control. NFPA 211 covers the installation of chimney pipes and stoves and the distance recommended between the pipe and unprotected combustibles is 18 inches. There are no unprotected combustibles in the Permacons in Domes 231 and 375.

This 2 foot distance also meets the requirements in Permit Section 3.5.1(1). This section requires the Permittees to maintain adequate aisle space to allow for the unobstructed movement of personnel, fire protection equipment, spill control equipment, and decontamination equipment within the 231 and 375 Domes and Permacons.

The Permittees may also use fire resistant curtains in lieu of spacing. Containers will be placed in rows that allow for safe egress and that have Permit compliant spacing between each row. If used, the curtains will be placed within a row (that is, between the adjacent containers in that row) to mitigate the potential for interaction between adjacent containers. While the temperatures of the event in Panel 7, Room 7 have not been determined at this time, the Permittees have procured fire curtains that are rated to a continuous temperature of 1800°F and intermittent temperatures of 2500°F. Prior to using fire resistant curtains, the Permittees will discuss the details of their use with NMED during the technical calls established in Section IX below.

The Permittees will protect workers by restricting access to the remediated nitrate salt-bearing waste containers. Only those personnel performing the ongoing container monitoring activities (e.g., daily temperature monitoring), other sampling/data collection work (e.g., periodic head space gas sampling), and other required inspections (e.g., Permit required inspections) will be allowed into the storage areas. This is documented in Standing Order EP-AREAG-SO-1247, R.2 (Attachment 12). Also, there will be warning

signs posted at the entrance to the Permacon in Dome 375 that will inform personnel of access restrictions.

Additionally, all originally identified remediated nitrate salt-bearing waste were packed in new drums and overpacked into new SWBs, and suspect nitrate salt-bearing waste is located in POCs. Since SWBs and POCs are considered robust enough to prevent lid loss due to deflagration or fire, based on information in DOE-STD-5506-2007, they would act as a barrier to provide a significant measure of worker protection. No other protective shields or barriers are deemed necessary for the protection of workers at this time.

Furthermore, the ongoing data collection activities provide continuing information on the physical condition of the waste so that appropriate additional worker safety measures can be taken, if required.

- 8) Prior to moving nitrate salt-bearing containers, the Permittees will notify the LANL Emergency Operations Center (EOC). The EOC will notify the Los Alamos Fire Department and other responders, if needed. The Permittees will notify the EOC at the completion of the move. The Permittees do not anticipate that responders will be present during the movement of these containers, or that responders will be present / alerted during other actions.
- 9) The Permittees have updated all procedures and safety basis documents to convert the processing facilities into storage facilities.
- 10) SWBs will display the required labels for all inner containers or will be reclassified as a new container in WCATS. The 61 subject containers (including the sister drum to the suspect drum in WIPP) have been clearly labeled with the appropriate warning labels and any other required labeling. Specifically, the containers have the hazardous waste labels required by Permit Section 3.6(1). Additionally, the remediated nitrate salt-bearing waste containers are also marked as "Radioactive", as required by Permit Section 3.6(1). In addition, the 4 POCs have been labeled as containing "Free Liquids" and have been placed on adequate secondary containment within the Permacon in Dome 375
- 11) The Permittees have conducted headspace gas (HSG) sampling on all 55 SWBs that contain nitrate salt-bearing waste containers. Each SWB has been sampled for at least 7 days.

Gas chromatography with thermal conductivity detection is used for the analysis of He₂, H₂, O₂, N₂, CH₄, CO, CO₂, and NO₄ in HSG samples. The HSG sample data (H₂, CO₂, CO, and N₂O) that the Permittees have collected from the time the Isolation Plan was implemented through September 11, 2014 is attached to this Isolation Plan, Revision 3 at Attachment 13. Between the data in Attachment 13 and the data that the Permittees have

already begun to provide in the daily submissions, the Permittees have provided a current set of information to NMED. Attachment 13 also graphically presents the H₂, CO₂, CO, and N₂O data collected for each SWB, and the range of H₂ and CO₂ concentrations from the HSG for each.

Additionally, He₂ and CH₄ have not been detected in these samples, and O₂ and N₂ are observed at atmospheric concentrations. More detailed information on these compounds is available to the NMED at their request. If there is any change to this status, the Permittees will inform the NMED during the technical calls established in Section IX below.

The Permittees began this HSG sampling on May 19, 2014, when they began daily HSG sampling of SWB 68685. This SWB contains TRU waste drum 68685 which is the sister drum related to the suspect drum at WIPP.

On June 18, 2014, the Permittees began HSG sampling on the additional SWBs containing nitrate salt-bearing waste containers, in order to better be able to compare and evaluate results against SWB 68685. On July 24, 2014, the Permittees began daily HSG sampling of SWB SB50522. On August 13, 2014, LANL had conducted HSG sampling of all 55 SWBs that contain remediated nitrate salt-bearing waste. The Permittees transitioned to sampling a subset of the 55 SWBs on a regular basis (this subset may change over time). All of this headspace gas monitoring was an additional measure above those described in the original May 19, 2014 Isolation Plan and the May 29, 2014 Revised Isolation Plan.

On September 3, 2014, upon receipt (email) of the NMED's letter dated August 29, 2014, the Permittees immediately resumed daily HSG sampling of SWBs 68685 and SB50522. (The Permittees had been sampling both of these containers on a daily basis until August 28, 2014, when they shifted sampling to twice per week. The Permittees had also conducted HSG sampling of both SWBs on September 2, 2014.)

The Permittees will continue to conduct HSG sampling. This HSG sampling will measure concentrations of H₂, CO₂, CO and N₂O. The Permittees will:

1. Conduct daily HSG sampling of SWB SB50522 and the SWB that contains 68685.
2. Periodically sample HSG of all other SWBs that contain nitrate salt-bearing waste containers. This HSG sampling occurs on a schedule that ensures that each of these SWBs and POCs are sampled for HSG at least once per calendar month. The Permittees began implementation of this monthly HSG sampling in September, 2014. The monthly schedule is supported by the graphical

presentations of the H₂, CO₂, CO and N₂O data in Attachment 13 which indicate stability in the analyzed gas constituents and is protective of human health and the environment.

HSG sampling was conducted for at least 7 days on the 4 newly identified POCs. After the 7 day sampling was completed, the POCs were added to the monthly schedule described above. The Permittees will include this HSG data (H₂, CO₂, CO and N₂O) in the daily written submissions provided to NMED, as established in Section IX below.

Additionally, as part of initial investigations, the Permittees have performed solid phase micro-extraction (SPME) analyses. This work is being performed as part of the Permittees additional measures under Section I. SPME monitors for trace levels of organic compounds (< 1ppm). The detection limits for organic compounds without SPME is sufficient to establish that concentrations of organic vapors do not approach flammability limits. SPME was performed for the purpose of detecting organic molecules which could be an ignition initiator at very low concentrations. No noteworthy detections of compounds have been observed. A summary of this data is available as Attachment 14.

12) The Permittees evaluated the HSG data (H₂, CO₂, CO, and N₂O) collected from SWB SB50522 collected from July 24, 2014 through September 11, 2014. SB50522 contains 4 drums, with the following container identification numbers and waste stream identification numbers:

- Container 69490 (LA-MIN02-V.001)
- Container 69271 (LA-MIN03-NC.001)
- Container 68799 (LA-MIN03-NC.001)
- Container 57653 (LA-CIN01.001)

The range (high to low) of H₂ levels the Permittees observed in HSG data during that time frame was 28,020 parts per million (ppm) to 6,986 ppm. On July 30, 2014, the Permittees installed additional filters in the SWB to decrease concentrations. This approach was successful and concentrations of H₂ are present at a lower level. From August 18, 2014 through September 11, 2014, H₂ levels remained below 10,000 ppm. The range (high to low) of CO₂ levels the Permittees observed in HSG data was 76,858 ppm to 39,338 ppm during that time frame.

The range of temperature measurements the Permittees observed during hourly temperature measurements through September 11, 2014 were:

| SB50522 Temperature | Degrees Fahrenheit |
|---------------------|--------------------|
| High | 83.7 |
| Low | 55.5 |

For comparison the ambient temperature range in Dome 375 Cell 1 where SB50522 is located during the same time period is:

| Dome 375 Cell 1 Temperature | Degrees Fahrenheit |
|-----------------------------|--------------------|
| High | 85.1 |
| Low | 54.9 |

Prior to packaging the four containers into SB50522, the Permittees conducted flammable gas analysis on three of the containers (57653, 69271 and 69490). (Note: although flammable gas analysis is not required for the LA-MIN03-NC.001 waste stream it was conducted for 69271.) The Quantitation Reports for flammable gas analysis for these three containers are provided at Attachment 15.

The HSG data for SB50522 is presented in Attachment 13. This Attachment also graphically presents the H₂, CO₂, CO and N₂O data collected.

- 13) The Permittees also evaluated the HSG data (H₂, CO₂, CO, and N₂O) collected from all of the SWBs with remediated nitrate salt-bearing waste.

As background information, radiolytic processes produce simple gas molecules from the interaction of radiation with organic and inorganic material in TRU waste. Hydrogen is typically the principal gas produced from the interaction of radiation with organic material. During headspace analysis for hydrogen, levels of other gases including CO, CO₂, and N₂O are also measured. Gaseous CO₂ can also be formed from radiolysis, and its concentration depends on the specific composition of the waste. From studying the radiolysis of selected simulated TRU waste, the relative amount of CO₂ and H₂ that is produced has been established under a range of conditions. From these investigations, the ratio of the amount of CO₂ to H₂ produced was greatest for poly vinyl chloride, with a maximum ratio for this material to be 6.5 CO₂/H₂. Other waste types did not produce as much CO₂ and therefore this ratio would be less than 6.5.

The conducted HSG analysis initially selected revealed that some drums had CO₂ to H₂ ratios of >100. This suggests that gas generation in some cases cannot be attributed solely to radiolysis of the waste. This supposition is reinforced by the observation of nitrous oxide > 1,000 ppm, which would likely be indicative of nitrate salt chemistry.

Atmospheric concentrations for these gases are approximately 450 ppm and 350 parts per billion (ppb) respectively.

LANL began characterizing the headspace gas of 55 SWBs containing remediated nitrate salt-bearing waste for Volatile Organic Compounds (VOCs) by Gas Chromatography/Mass Spectrometry (GC-MS) and for permanent gases using GC with a Thermal Conductivity Detector (GC-TCD). Permanent gases are those that remain gaseous at standard temperature and pressure. Daily monitoring of a subset of these 55 SWBs was initiated on May 19, 2014. All 55 SWBs have now been characterized. Elevated concentrations of HSG compounds have been observed at concentrations well above normal atmospheric concentrations in some of these 55 SWBs (Attachment 13). These concentrations cannot be explained based on radiolysis of waste drum content and suggest that the gases are being produced from other processes. Specifically, N_2O is believed to result from the oxidation of material contained within the nitrate salt containing waste. The N_2O concentrations observed, ranging from (100 – 9000 ppm), are above the normal atmospheric concentration of ~ 350 ppb. The Permittees have ongoing work that may provide insight into this chemistry.

While high CO_2 concentrations (and potentially the ratio of CO_2 and H_2) are expected to be proportional to the magnitude of potential changes taking place in any given drum, they are not, on their own an indicator of significant changes to the waste within the container. To date, LANL has collected over 700 HSG samples. The graphical representation of this HSG data indicates stability in the analyzed gas constituents and supports the monthly sampling schedule set out in Section IV.10 above.

The Permittees initially suspected the CO_2 to H_2 ratio might be an indicator of radiolytic decomposition, and tracked that ratio. However, analysis of the HSG data (H_2 , CO_2 , CO , and N_2O) gathered to date indicates there are potentially other gas generating mechanisms occurring within some containers. The concentrations of oxidation products (e.g.: CO_2 and N_2O) is ancillary to the H_2 concentration measurement. While it provides additional insight into the nitrate salt-bearing waste, the Permittees no longer consider tracking the CO_2 to H_2 ratio to be a useful indicator. The Permittees have focused ongoing analyses on the monitoring of H_2 concentrations and temperature measurements rather than ratio of CO_2 and H_2 because: the lower flammability limit (LFL) for H_2 is established; both H_2 gas concentrations and temperature are readily measured; and actionable levels can be established. The H_2 and temperature measurements are a more direct way to monitor potential changes in the waste.

- 14) The Permittees conclude that the concentration of H_2 is an appropriate indicator to track and to use as a basis for action levels to trigger specific actions.

If the Permittees observe an H₂ concentration at or above 20,000 ppm (~50% of the lower explosive limit [LEL]), they will conduct daily HSG (H₂, CO₂, CO, and N₂O) for that SWB.

If the Permittees observe an H₂ concentration at or above 30,000 ppm (~75% of the LEL), they will install additional filters in the SWB, if the SWB is configured to accept additional filters. (This approach was successfully implemented by the Permittees with SB50522. Concentrations of H₂ were reduced after the installation of additional filters in that SWB, and have since been maintained at a lower level.)

If additional filters cannot be added to the SWB or if concentrations are not reduced to below 30,000 ppm at the next daily HSG sample, then the Permittees will apply a 15 foot stand-off exclusion zone. (The stand-off exclusion zone is a 15 foot area that is used at LANL to surround a container that is or has become unvented, thereby unable to vent contents adequately. This area is segregated from normal operations except those operations specific to disposition or inspection of the container of concern. Surrounding containers may exist in the exclusion zone. Entry into the exclusion zone is controlled by the FOD who will determine what actions can be taken – including entry for sampling, temperature measurements or visual monitoring.) This approach is consistent with the hazard analysis that has been performed for an unvented drum discovery. The Permittees will notify LANL Emergency Management to assume responsibility for the container if the container poses a threat, e.g. bulging.

The Permittees will include this HSG data (H₂, CO₂, CO, and N₂O) in the daily written submissions provided to NMED, as established in Section IX below.

- 15) The isolation configuration described in this Section IV continues to be protective of human health and the environment in light of the observed concentrations of H₂ and CO₂ in SWBs, and in light of the conservative assignment of EPA Hazardous Waste Number D001. The facility being used for isolation is compliant with the LANL Hazardous Waste Facility Permit. The fire suppression systems, climate control and filtration systems, and other mechanisms described above are designed to protect human health and the environment in the event of a reaction within a container, a release, a fire, or an explosion. The Permittees continue to evaluate the effectiveness of the isolation configuration and will make changes to this configuration as appropriate.

V. Immediate Actions for Unremediated Nitrate Salt-Bearing Waste Containers

There are currently 29 unremediated nitrate salt-bearing waste containers at LANL. The Permittees validated this number through review of data from the WCATS database and a field walk-down verification. Below is a description of the activities DOE/LANS implemented

isolating, securing, and then removing from isolation the unremediated nitrate salt-bearing waste containers.

- 1) The 29 unremediated containers were first placed into isolated storage in Dome 230 at TA-54, Area G, which has an active fire protection system. This dry-pipe fire protection system is not included within the Permit Contingency Plan as it was inoperable during the re-application process for the Permit. This system became operable in November 2011, and currently the Permittees have chosen not to credit this system as fire control equipment in the Contingency Plan.

Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

- 2) The Permittees moved all unremediated nitrate salt-bearing waste SWBs at LANL to the Permacon in Dome 231 located at TA-54, Area G. This move was completed on June 3, 2014 .
- 3) The Permittees monitored the temperature daily of the 85-gallon overpacks that contain unremediated nitrate salt-bearing waste drums from the time the Isolation Plan was implemented until the approval of the Isolation Plan, Revision 3. Daily temperature measurements were taken of the external surface of the 85-gallon overpack using a calibrated infrared thermometer. The target temperature at which the nitrate salt-bearing waste containers were maintained while in isolation was less than 90°F.

The Permittees will maintain records of all such temperature monitoring. These activities were performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMO-AREAG-FO-DOP-1246, R.6 (Attachment 7). These records will be updated on a daily basis. The temperature data (both daily, and if conducted as an additional measure under Section I, hourly) that the Permittees collected since the Isolation Plan was implemented was included with the Isolation Plan, Revision 2 as two attachments. The attachments were discs containing documentation of daily and hourly temperature measurements obtained by the Permittees up to the time the Permittees began including temperature data to NMED in the daily written submissions provided to NMED, as established in Section IX below. Between the data included with the Isolation Plan, Revision 2 in Attachments 8 and 9 of that plan and the data that the Permittees have provided in the daily submissions, the Permittees have provided a current set of information to NMED. Additionally, these records and all temperature data (both

daily, and if conducted as an additional measure under Section I, hourly) will be available to NMED for inspection.

The Permittees also performed visual inspections of these containers on an hourly basis, 24 hours per day, to identify abnormal conditions (e.g., signs of smoking and fire, evidence of deterioration, bulging) from the time the Isolation Plan was implemented until the approval of the Isolation Plan, Revision 3. These activities were performed in accordance with LANL's Procedure on *Nitrate Salt-bearing TRU Waste Container Monitoring*, EWMO-AREAG-FO-DOP-1246, R.6. The Permittees will maintain records of all such visual monitoring (see Attachment 7). These records will be updated on a daily basis and be available to NMED for inspection.

Additionally, the Permittees used continuous air monitors (CAMs) with alarm capability. There were CAMs in place in the 231 Permacon for the entire time unremediated nitrate salt-bearing waste containers were stored within the Permacon. Lastly, the Emergency Response/Hazardous Materials organization were briefed on the storage configuration while the containers were isolated.

- 4) During isolation, unremediated nitrate salt-bearing containers were spaced an adequate distance apart to limit any potential interactions with other containers. This distance has been determined to be 2 feet between containers. This distance was based on the Permittees' review of evidence from the event at WIPP, a calculation on the heat transfer from an SWB undergoing a similar reaction, and a review of fire protection and Permit requirements.
- 5) During isolation, the Permittees protected workers by restricting access to the unremediated nitrate salt-bearing waste containers. Only those personnel performing the ongoing container monitoring activities (e.g., daily temperature monitoring), other sampling/data collection work (e.g., periodic head space gas sampling), and other required inspections (e.g., Permit required inspections) were allowed into the storage areas. This is documented in Standing Order EP-AREAG-SO-1247, R.2 (Attachment 12). Also, there were warning signs posted at the entrance to the Permacon in Dome 231 informing personnel of access restrictions.

Additionally, all unremediated nitrate salt-bearing waste is in 55-gallon drums that have been overpacked into 85-gallon containers of good integrity.

- 6) This waste has been stored above-ground for many years and the Permittees continued data collection activities to provide information on the physical condition of the waste so that appropriate additional worker safety measures could be taken, if required.

- 7) Further evaluation of unremediated nitrate salt waste has led to the conclusion that the 29 unremediated nitrate salt-bearing waste containers do not require specific isolation from other waste containers stored at permitted units at TA-54 Area G. Unremediated salts are determined to not present the potential hazard of spontaneous combustion or enhanced combustion in their current configuration; therefore, they can be stored in any area in which combustible material is minimized and separated from the nitrate salt waste containers, without fear of a release. Attachment 16 for this Isolation Plan details the assessment conducted to reach this conclusion.
- 8) As a result of this evaluation, the Permittees will remove the 29 unremediated nitrate salt-bearing waste containers located within the Dome 231 Permacon from isolation and into a compliant permitted storage unit at TA-54, Area G, Pad 9 within Dome 230. Storage of the waste containers within Dome 230 will continue to be protective of human health and the environment. In light of the conservative assignment of EPA Hazardous Waste Number D001 and D002 (D002 conservatively assigned to some containers as described above), storage of the containers will meet all applicable conditions in Permit Section 2.8 and all other applicable sections of the LANL Hazardous Waste Facility Permit.

Dome 230 at TA-54, Area G, is equipped with an active dry-pipe fire protection system. Additionally, as described in Permit Attachment A.4.5 and Attachment D, TA-54 Area G, Table D-2, fire control equipment is located throughout Area G, including Dome 230. This equipment includes ABC-rated or BC-rated fire extinguishers and several fire hydrants. These fire hydrants will supply water at an adequate volume and pressure to satisfy the requirements of 40 CFR 264.32(d).

Additional precautions that will be maintained for these containers of ignitable waste include:

- Waste will be stored with adequate aisle space (at least 2 feet) and separate from other wastes within the permitted unit.
- The waste will be protected from sources of ignition by facility procedure.
- Sources of open flames will not be allowed in, on, or around the containers and smoking is not permitted within the boundaries of TA-54, Area G.
- Dome 230 has appropriate lightning protection for storage of ignitable waste.
- Non-sparking tools will be used when managing ignitable waste containers (e.g. opening waste container or sampling waste).
- Movement of the containers will be achieved using a drum grapppler or a forklift with the container strapped to the mast.
- Although Dome 230 is designed for secondary containment, the 26 unremediated nitrate salt-bearing waste containers that have free liquids will be stored on

secondary containment pallets. The remaining 3 containers will be stored elevated.

- Waste containers will not be stacked.

VI. Remediation Planning

- 1) The Permittees have established a “Remediation Team” to identify a path forward for remediation of these containers as necessary and appropriate. The Remediation Team has met regularly. The Permittees have met with NMED on multiple occasions to discuss the Team’s progress, and will continue these communications.

As discussed in Paragraphs IV.2 and IV.3 above, the Permittees have overpacked the 57 remediated nitrate salt-bearing waste containers at LANL into 55 SWBs. These 55 SWBs are currently located in the Permacon in Dome 375. As discussed in IV.4 above, an additional 4 POCs are also located in the Permacon in Dome 375.

NMED and the Permittees have had initial discussions on these potential remediation actions and the Permittees will continue their contact with NMED to set meeting(s) to discuss these potential actions in more detail. The Permittees will use these meetings to help develop a proposal for submission to NMED.

- 2) Any treatment plans or proposals that are developed by the Remediation Team shall be discussed with NMED. These plans or proposals shall include, but not be limited to, the neutralization steps, the reagents used, the location of the process for treating wastes, and any other key specific information related to all potential treatment options. Any treatment plans that are developed shall detail which characteristic (toxicity, reactivity, ignitability, corrosivity) mixed TRU wastes the Permacons (or other locations) are authorized to treat – including, as appropriate, the removal of the characteristics of ignitability (D001) and/or corrosivity (D002). Permittees shall discuss with NMED any permit modifications or authorizations that may be necessary for treatment of the nitrate salt-bearing wastes.
- 3) The key events, actions and activities to be documented as specified in the treatment plan. The Permittees will maintain records of all key events, actions and activities related to the disposition of the unremediated nitrate salt-bearing waste as documented in the treatment plan (e.g. safe storage configuration, the neutralization steps, the reagents used, the location of the process for treating drums). These records will be updated on a daily basis and be available to NMED for inspection.

VII. Cemented Legacy and Newly Generated Cemented Nitrate Salt-Bearing Waste

Since 1991, the nitrate salt waste stream generated from the evaporator process at TA-55 has been sent to cement fixation immediately upon generation. Remediated and unremediated nitrate salt-bearing waste containers generated at TA-55 prior to 1991 are discussed above. Additional information about the review that the Permittees conducted to identify containers with nitrate salt-bearing waste is included in Enclosure 2 of the Permittees' letter to NMED dated September 19, 2014 (DIR-14-149). This enclosure also includes a discussion on how the evaluation was conducted for a specific subset of waste containers (all of which were pre-1991 containers).

There are approximately 378 containers of post-1991 cemented nitrate salt containers within the LANL Area G inventory.

The cementation process removes characteristics of ignitability and reactivity from the nitrate salt waste stream. Nitrate salt waste containers generated at TA-55 after 1991 have been cemented and are therefore not ignitable per the definition in 40 CFR §264.21 (Characteristic of Ignitability) or reactive per the definition in §264.23 (Characteristic of Reactivity).

The waste characterization by Acceptable Knowledge used at TA-55 to demonstrate that the cement from the stabilization process meets the waste acceptance criteria at WIPP was centered around two primary elements (1) no free liquids were present in the cemented waste and 2) the Portland cement created an inert solid monolith. These elements support the determination that the waste does not exhibit the characteristics of ignitability and reactivity.

The ignitability characteristic is not a concern for the following reasons: (1) the cement from the stabilization process is a solid and does not meet the definition of a liquid per 40 CFR 261.21(a)(1); (2) the cement has never exhibited the characteristic of an ignitable solid that is capable "under standard temperature and pressure of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard" per 40 CFR 261.21(a)(2); and (3) the cement has never exhibited oxidizing behavior per 40 CFR 261.21(a)(4).

The reactivity characteristic has never been observed regarding cement. The cement has never exhibited the following properties per 40 CFR 261.23: (1) it is normally unstable and readily undergoes violent change without detonating; (2) it reacts violently with water; (3) it forms potentially explosive mixtures with water; (4) when mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment; (5) it is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement; and (6) it is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

The basis for this determination has been established by direct personnel observations, the facility operating record, and the chemical nature of the Portland cement used in the LANL stabilization process. LANL staff has never observed any ignitable or reactive behavior associated with the cemented waste from the stabilization process. Facility records also confirm that no ignitable or reactive behavior was ever observed from the cemented waste. Lastly, Portland cement by its chemical nature will not react with oxidizers and has no available hydrogen, oxygen, and carbon molecules to help sustain a reaction. In addition, the stabilization process produces a solid monolith, which is an absorber of heat, further reducing any potential for reactive behavior within the cement matrix.

Characterization and stabilization (cementation) treatment of newly generated evaporator bottom waste at TA-55 is conducted in accordance with the Permit as approved. The waste treated at the TA-55 Mixed Waste Stabilization Unit is characterized using the procedure outlined in Permit Attachment C (Waste Analysis Plan), Section C.3.2.4.

Based on the above facts, the Permittees recommend that no further controls be implemented for the cemented legacy and newly generated cemented nitrate salt-bearing waste generated since 1991.

VIII. Immediate Action Implementation Schedule

| <u>Activity</u> | <u>Due Date</u> |
|--|--|
| Remediated Nitrate Salt-Bearing Waste Containers | |
| Overpacking (into SWBs) of all nitrate salt-bearing wastes at LANL | Completed 5/18/14 |
| Movement of SWBs to designated areas (e.g., Domes 230, 231 and 375) – (Remediated nitrate salt-bearing drums were in Dome 230, but have been moved to the 375 Permacon) | Move to Dome 230 completed on 5/1/14. All remaining moves completed on 6/3/14 |
| Daily/Hourly monitoring of containers | Daily monitoring began on 5/1/14. Hourly monitoring began on 5/17/14 |
| Appropriate spacing of SWBs | Completed in Dome 230 on 5/1/14. Completed in Dome 375 & 231 Permacons on 6/3/14 |
| Updating procedures/safety basis documents as appropriate | Completed on 5/30/14 |
| Labels for SWBs (display inner container label) | Completed 5/18/14 |
| Remediation Team kick off | Completed 5/20/14 |

| <u>Activity</u> | <u>Due Date</u> |
|--|---|
| Unremediated Nitrate Salt-Bearing Containers | |
| Movement of 85-gallon drums to designated areas (e.g., Domes 230, 231 and 375) | Began in Dome 230 on 5/1/14. All remaining moves completed on 6/3/14 |
| Daily/Hourly monitoring of containers | Daily/Hourly; began on 5/20/14 |
| Appropriate spacing of containers | Completed in Dome 230 on 5/1/14. Completed in Domes 375 and 231 Permacons on 6/3/14 |
| Updating procedures/safety basis documents as appropriate | 5/30/14 |
| Remediation Team kick off | Completed 5/20/14 |

IX. Updates/Submissions

The Permittees shall provide updates to NMED during the twice weekly pre-scheduled technical calls. The Permittees shall also provide updates to NMED in the form of daily written submissions that will be sent to NMED via electronic mail (email) by close of business (COB) on a daily basis until NMED indicates otherwise. For purposes of this Plan, daily refers to business days, and excludes state and federal holidays.

All submissions related to this Order shall be placed in both the electronic and hard-copy Information Repositories within five (5) working days of submission to NMED.

All procedures and plans attached to this Revised Isolation Plan may be revised by the Permittees as required. Revisions will be submitted to NMED and placed in Information Repositories as required in this Section IX.

All submissions required by NMED's Order will be sent to the following addresses:

Bureau Chief
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87508-6303

Division Director
Environmental Health Division
Harold Runnels Building

1190 Saint Francis Drive, PO Box 5469
Santa Fe, New Mexico 87502-5469

LA-UR-15-20472
April 2015

Attachment 1

**Attachment 1
LANL D001 (Ignitability) Testing To Date**

| RCRA D001 definition | TEST METHOD | TESTING OF REMEDIATED WASTE SURROGATES | | | | | |
|--|---|--|--|---|---|--|--|
| | | TEST 1 | RESULT | TEST 2 | RESULT | TEST 3 | RESULT |
| 40 CFR 261.21(a)(2) - <ul style="list-style-type: none"> Is the waste capable...of causing fire through friction, absorption of moisture or spontaneous chemical changes? <u>and</u> | EPA SW-846 Method 1050 <i>(not required)</i> | SWRI July 7 <i>("simple" surrogate, sample no. WST54-14-MIX)</i> | PASS (not pyrophoric or self-heating) | -- | -- | -- | -- |
| <ul style="list-style-type: none"> When ignited, does it burn so vigorously and persistently that it creates a hazard? | EPA SW-846 Method 1030 <i>(not required)</i> | SWRI June 26 <i>("simple" surrogate, sample ID WST54-14-MIX)</i> | PASS (not ignitable) | -- | -- | -- | -- |
| 40 CFR 261.21(a)(4) - Is the waste an oxidizer [according to DOT]? <ul style="list-style-type: none"> <i>(does it yield oxygen readily to stimulate the combustion of organic matter?)</i> | EPA SW-846 Method 1040 <i>(not required)</i> | SWRI July 29 <i>("revised" dry surrogate, sample ID CYA-D)</i> | 1.PASS (Non-oxidizer); 2.FAIL (Category III oxidizer) <i>(duplicate)</i> | SWRI July 29 <i>("revised" surrogate w/ 70% acid, sample ID CYA-N)</i> | FAIL (Category III oxidizer) | SWRI September 9 <i>("simple" surrogate, sample ID 560542-1LY)</i> | FAIL (Category II oxidizer) |
| 49 CFR 173.127(a)(1) - Is the waste a "DOT oxidizing solid"? | UN Manual of Tests and Criteria, Section 34, Method O.1 <i>(required)</i> | SWRI August 5 <i>("revised" dry surrogate, sample ID CYA-D)</i> | 1. PASS (Not Division 5.1 oxidizer); 2. FAIL (Packing Group III oxidizer) <i>(duplicate)</i> | SWRI August 5 <i>("revised" surrogate w/ 70% acid, sample ID CYA-N)</i> | FAIL (DOT Packing Group III oxidizer) | SWRI September 9 <i>("simple" surrogate, sample ID 560542-2MX)</i> | FAIL (DOT Packing Group II oxidizer) |

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

June 26, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

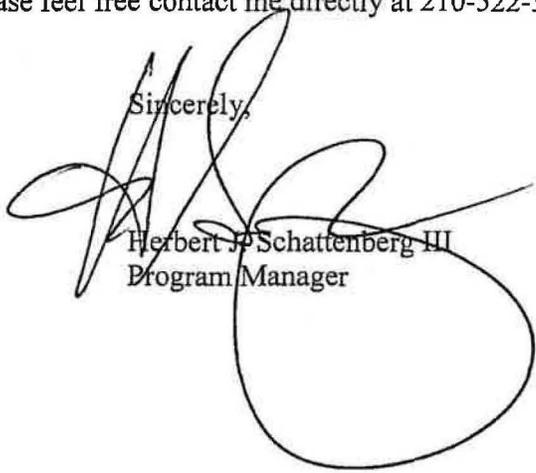
Attn: Keith R. Greene

Subject: COC ID: ADEP
SwRI Project Number: 19869.01.00X
SDG: 553447
SwRI Task Order Number: 140609-9
SwRI Sample Receipt Number: 53282
Samples received: 06/06/14
Analysis: Method 1030

Dear Mr. Greene,

Please find the enclosed results for the solid sample received on the above referenced date. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,


Herbert J. Schattenberg III
Program Manager

APPROVED:


Michael J. Dammann
Director

HJS: dr
Encl



Benefiting government, industry and the public through innovative science and technology

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

NARRATIVE

Total Page Count: 010001-
Fraction: Method Pages: 010027
1030

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140609-9

010002

INORGANICS ANALYSIS

NFPA / Method 1030

Sample WST54-14-MIX was tested according to NFPA 484 *Standard for Combustible Metals*, Section 4.2 Determination of Combustibility. This procedure is equivalent to SW 846 Method 1030 *Ignitability of Solids*, Section 7.1 Preliminary Screening. The sample was formed into a 250-mm long by 20 mm wide and 10 mm high powder train on a low thermal conductive plate. The flame from a propane torch, verified to be > 1000 °C, was applied to the powder train for 2 minutes. Glowing was observed at the heated zone but did not propagate along the powder train. Therefore, according to NFPA standard, the material shall be considered a noncombustible form. Also, by Method 1030 standards, the material is not considered flammable. Magnesium was tested for a positive control.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."



Group Leader

06/26/14

Date

010003

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

METHOD 1030

010004

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

SAMPLE RESULTS

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010005

Sample ID

WST54-14-MIX

Lab Name: Southwest Research Institute

Client: Los Alamos National Lab.

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 06/06/14

SRR #: 53282

Date Analyzed: 06/09/14

Task Order #: 140609-9

Lab System ID: 553447

| Method Reference | Results |
|--|---|
| NFPA 484 <i>Standard for Combustible Metals</i> Section 4.2 Determination of Combustibility | The material shall be considered a <u>nonbombustible</u> form |
| SW 846 Method 1030 <i>Ignitability of Solids</i> Section 7.1 Preliminary Screening | The material is <u>not</u> considered flammable. |

* Note: Magnesium metal was used as laboratory control sample and gave positive results.

010006

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

Method 1030
Logbook Data

Southwest Research Institute® Logbook: Physical Testing

010007

Analysis / Method: SW 846 1030 (NEPA 484) Project# TE DAM 6/9/14 1986a. 01.006
 Client: LANL TO# 140609-9

LCS Info: _____ TV= _____ Balance#: N/A

Notes: magnesium powder was used as a positive control

| Sample ID | glowing | propagated past heat zone | flame | | |
|---|---------|------------------------------|-------|--|--|
| LCS | Yes | Yes | Yes | | |
| 553447 | Yes | No | No | | |
| 553447D | Yes | No | No | | |
| <p>Sample 553447 was heated with the end of a torch for two minutes. The heated area glowed, became molten, and would shoot a spark off every so often. However, the burning did not propagate past the burn zone. After heating, the burn zone was charred and a bit heated while the rest of the train was unheated loose sample.</p> <p>According to NEPA 484 section 4.2, sample 553447 is considered noncombustible.</p> | | | | | |
| <p>TE DAM 6/9/14</p> | | | | | |
| <p>Calculation: _____</p> | | | | | |

Analyst Signature: [Signature] Date: 6/9/14

Reviewed by: [Signature] Date: 6/23/14

010008

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

010009

Southwest Research Institute

Sample Receipt

VTSR: 06/06/14

Time: 09:15:00

Project: 19869.01.00X

Sample Receipt Number: 53282

Revision: 1

Manager: DAMMANN, MIKE

Case #: ADEP

Client: Los Alamos National Laboratory *This Receipt was Revised Jun 9 2014 8:19AM*

Logged in by: SRAMIREZ

Creation Date:

Notes

Sample was delivered intact at 0.5 °C (blue/wet ice).

Fed Ex #(s): 5908 1777 1295

See Task Order for full requirements.

See chain of custody as part of the SRR system for more information.

Phases:

001 - admin

002 - extraction

005 - 8082

006 - metals/radchem

007 - drg

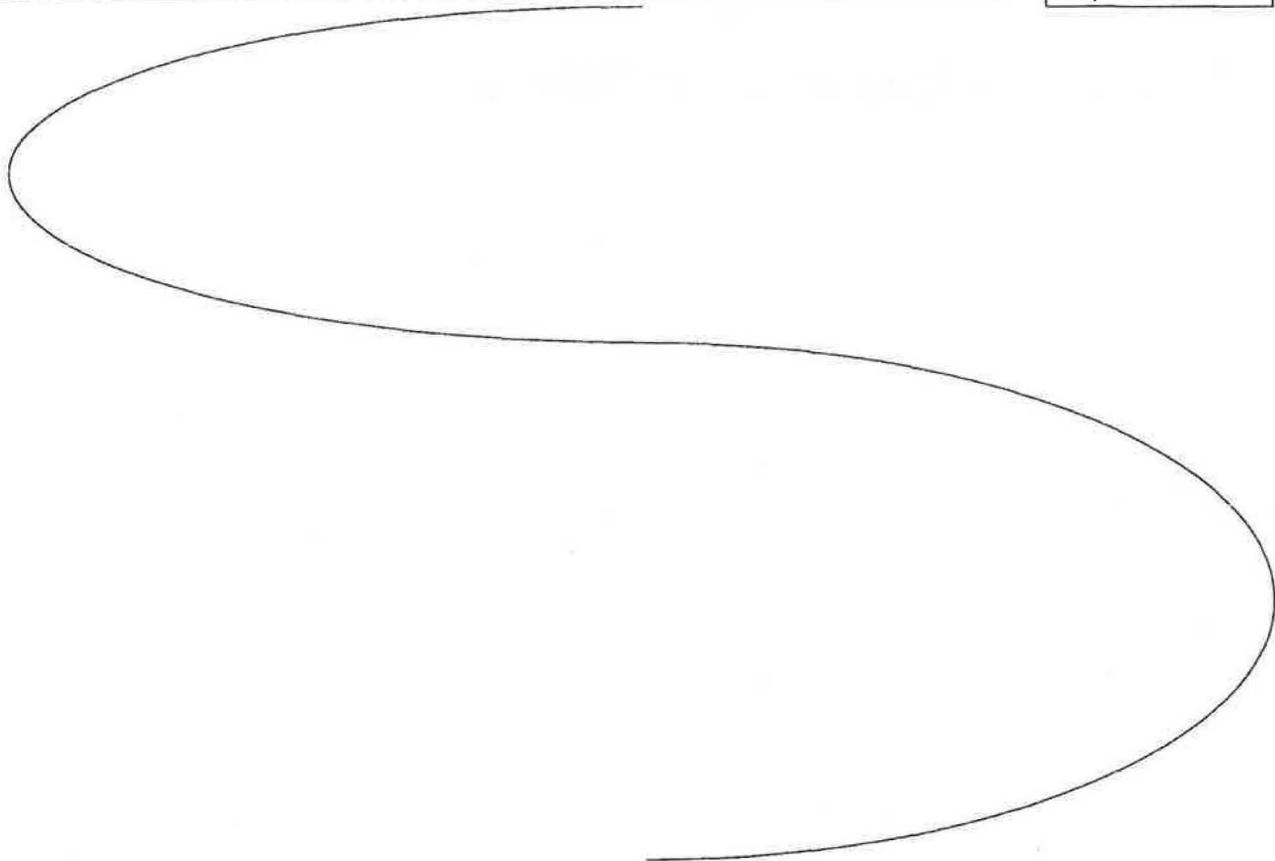
Rev. 1 changed case name and moved system ID 553446 to new SRR 53291.

| |
|------------------------------|
| Background CPM: <100 cpm |
| Container Wipe CPM: <100 cpm |
| Total CPM: <100 |

| System ID | Customer ID | CED | Matrix | Containers | Special Reqs. |
|---------------|--------------|----------|--------|------------|---------------|
| 553447 | WST54-14-MIX | 06/04/14 | Solid | 1 | |
| Containers: 1 | | | | Samples: 1 | |

These documents are associated with this receipt: 159435[COC for SRR 53282], 159436[SRR Paperwork for SRR 53282]

Thermometer: 18439
Temperature: 0.5



Client: Los Alamos National Laboratory SRR#: 53282

Laboratory Task Order

010010

TO #: 140609-9 Revision: 1

SDG: 553447
 VTSR: 06/06/14
 CASE: ADEP

SRR #s: 53282
 Client(s): Los Alamos National Laboratory

Project(s): 19869.01.00X
 Manager(s): DAMMANN, MIKE
 To PM:
 To QA:
 To Client: 06/09/14

Instructions

Los Alamos National Laboratory _ Subcontract No. 250954
 Lab Request # ADEP
 SDG is 553447.

RUSH TAT. 3-business days
 ALL DATA IS DUE TO THE CLIENT ON 06/11/2014.

1 overall SOLID sample (1 container) was received on 06/06/2014.

50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio

Requires:
 sw-846:1030 (NFPA 484)

PRELIMS _ Email prelims to: Keith Greene kgreene@lanl.gov

 EDD REQUIRED. Please note, All results have to be merged under 1 EDD "file."
 See Exhibit "D" Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services

Main point-of-contact is Keith R. Greene, kgreene@lanl.gov; Additional contact Nita Patel npatel@lanl.gov

Send Hardcopy & CD TO:
 Los Alamos National Laboratory
 ATTN: Keith R. Greene
 TA-3 SM-271 Drop point 02U
 Los Alamos, NM 87545

REVISION 1, DRmz 06/26/14: Task Order revised to remove test Method 1050. Due to limited volume only Method 1030 was able to be completed. Method 1050 moved to Task Order # 140626-2, since additional volume to complete the test might be forthcoming.

Documents Related to this task order: 159435[COC for SRR 53282], 159436[SRR Paperwork for SRR 53282]

Deliverables -> Hard Copy: -YES- EDD: no PDF: -YES-

Test: COMB_1050 Holding: 180 days from CED
 Section: WETCHEM SW846 1050 Test A & C Spontaneous Combustion Cnt: 1

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|--------------|-----------|-------------|
| 553447 | | 1 | Solid | WST54-14-MIX | 04 Jun 14 | 01 Dec 14 |

Test: IGNIT_1030 Holding: 180 days from CED
 Section: WETCHEM SW 846 Method 1030 Ignitability of solids Cnt: 1

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|--------------|-----------|-------------|
| 553447 | | 1 | Solid | WST54-14-MIX | 04 Jun 14 | 01 Dec 14 |

Southwest Research Institute

Traffic Report

010012



Sample Custodian Signature: _____

- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present
Sample Tag Numbers Not on COC
- 4. SMO Forms Not Present

Client: Los Alamos National Laboratory

Project: 19869.01.00X

Case: ADEP / SDG: _____

Sample Receipt: 53282

Airbill: 5908 1777 1295

Custody Seal #(s): N/A

| Date Received | Time Received | COC Record | SMO Sample # | Corresponding | | Traffic Rpt, Tags, COC Agree | Sample Condition |
|---------------|---------------|------------|--------------|---------------|--------|------------------------------|------------------|
| | | | | Sample Tag # | SwRI # | | |
| 06/06/14 | 09:15:00 | ADEP | WST54-14-MIX | N/A | 553447 | YES | Intact |

| | | | |
|--|--|-------------------------------|----------------|
| Lab Name Southwest Research Institute | | Page 1 of 1 | |
| Received By (Print Name) STEVEN RAMIREZ | | Log-in Date 06/06/2014 | |
| Received By (Signature) <i>Steven Ramirez</i> | | | |
| Case Number ADEP | Sample Delivery Group No. N/A | SAS Number N/A | |
| Remarks: 19069.01.00X | | | |
| | EPA Sample # | Corresponding Sample Tag # | Assigned Lab # |
| 1. Custody Seal(s) | Present Absent* Intact Broken | WST54-14-MIX | N/A |
| 2. Custody Seal Nos. | N/A | | |
| 3. Chain-of Custody Records | Present Absent* | | |
| 4. Traffic Reports or Packing Lists | Present Absent | | |
| 5. Airbill | Airbill/Sticker Present Absent* | | |
| 6. Airbill No. | 5908 1777 1295 | | |
| 7. Sample Tags | Present Absent | | |
| Sample Tag Numbers | Listed Not listed on Chain of Custody | | |
| 8. Sample Condition | Intact Broken*/ Leaking | | |
| 9. Cooler Temperature | 0.5C | | |
| 10. Does Information on custody records, traffic reports, and sample tags agree? | Yes No* | | |
| 11. Date Received at Lab | 06/06/2014 | | |
| 12. Time Received | 09:15:00 | | |
| Sample Transfer | | | |
| Fraction URG | Fraction | | |
| Area # COOLER 13 | Area # | | |
| By STEVEN | By | | |
| On RAMIREZ | On | | |
| 06/06/2014 | | | |

* Contact SMO and attach record of resolution

| | |
|-----------------------------|------------------------------------|
| Reviewed By <i>Debra</i> | Logbook No. Sample Receipt (53282) |
| Date 6.9.14 | Logbook Page No. 8747 SEC 2,3 of 6 |

010014

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140609-9
SRR#: 53282
SDG: 553447
VTSR: 06/06/14

Client Communication

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Wednesday, June 11, 2014 9:27 AM
To: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

Spoke with Nita –

She said that they will likely send us the kitty litter and we can mix it and retest the 100mm cube

From: Spies, Radonna S.
Sent: Wednesday, June 11, 2014 7:54 AM
To: 'Patel, Nita'; 'Greene, Keith R'
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

WST54-14-MIX

Method 1030

Glowing was observed at the heated zone but did not propagate along the powder train. Therefore, according to NFPA standard, the material shall be considered a non-combustible form. Also, by Method 1030 standards, the material is not considered flammable

Method 1050

The temperature of the material in a 25x25mm cube exceed 200C (max temp = 141C). According to the method, if 25-mm cube test is negative, then the waste must be evaluated by the 100-mm cube test.

Therefore, we need more material to perform the 100-mm test for the results to be conclusive.

Please let us know how to proceed.

Thanks

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Spies, Radonna S.
Sent: Monday, June 09, 2014 10:57 AM
To: 'Patel, Nita'; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

Nita -

010016

With 50g of samples, we will have to use the 25 x 25 mm cube for METHOD 1050 TEST METHODS TO DETERMINE SUBSTANCES LIKELY TO SPONTANEOUSLY COMBUST - but according to the method, Section 11.4.9 states, " If the waste is suspected to have strong self-heating properties, the 25-mm cube test may be performed in lieu of the 100-mm cube test. If the results of this test are positive, then the test using the 100-mm cage need not be performed because the waste has self-heating properties. If the results of the 25-mm cube test are negative, then the waste must be evaluated by the 100-mm cube test in order to make a proper self-heating determination." Therefore, if no self heating is indicated, then we will not have enough to perform the 100x100mm cube test.

We are begin the test today and should know by tomorrow morning if the material appears to be self heating. If it is not, then we will need to repeat with the 100x100mm cube. I know that a limited amount of sample was probably sent due to the oxidizer.

If you'd like, let us know the brand of kitty liter and we can purchase here, if available, and do the mixing of the concoction in the lab.

Thanks

Radonna Spies
Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Patel, Nita [mailto:npatel@lanl.gov]
Sent: Wednesday, June 04, 2014 9:09 PM
To: Ramirez, Daniel; Greene, Keith R
Cc: Spies, Radonna S.
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [mailto:daniel.ramirez@swri.org]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,
Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

010017

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Wednesday, June 11, 2014 7:54 AM
To: Patel, Nita; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

WST54-14-MIX

Method 1030

Glowing was observed at the heated zone but did not propagate along the powder train. Therefore, according to NFPA standard, the material shall be considered a non-combustible form. Also, by Method 1030 standards, the material is not considered flammable

Method 1050

The temperature of the material in a 25x25mm cube exceed 200C (max temp = 141C). According to the method, if 25-mm cube test is negative, then the waste must be evaluated by the 100-mm cube test.

Therefore, we need more material to perform the 100-mm test for the results to be conclusive.

Please let us know how to proceed.

Thanks

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Spies, Radonna S.
Sent: Monday, June 09, 2014 10:57 AM
To: 'Patel, Nita'; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

Nita -

With 50g of samples, we will have to use the 25 x 25 mm cube for METHOD 1050 TEST METHODS TO DETERMINE SUBSTANCES LIKELY TO SPONTANEOUSLY COMBUST - but according to the method, Section 11.4.9 states, " If the waste is suspected to have strong self-heating properties, the 25-mm cube test may be performed in lieu of the 100-mm cube test. If the results of this test are positive, then the test using the 100-mm cage need not be performed because the waste has self-heating properties. If the results of the 25-mm cube test are negative, then the waste must be evaluated by the 100-mm cube test in order to make a proper self-heating determination." Therefore, if no self heating is indicated, then we will not have enough to perform the 100x100mm cube test.

010019

We are begin the test today and should know by tomorrow morning if the material appears to be self heating. If it is not, then we will need to repeat with the 100x100mm cube. I know that a limited amount of sample was probably sent due to the oxidizer.

If you'd like, let us know the brand of kitty liter and we can purchase here, if available, and do the mixing of the concoction in the lab.

Thanks

Radonna Spies
Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Patel, Nita [mailto:npatel@lanl.gov]
Sent: Wednesday, June 04, 2014 9:09 PM
To: Ramirez, Daniel; Greene, Keith R
Cc: Spies, Radonna S.
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [mailto:daniel.ramirez@swri.org]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,
Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

010020

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Monday, June 09, 2014 10:57 AM
To: Patel, Nita; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

Nita -

With 50g of samples, we will have to use the 25 x 25 mm cube for METHOD 1050 TEST METHODS TO DETERMINE SUBSTANCES LIKELY TO SPONTANEOUSLY COMBUST - but according to the method, Section 11.4.9 states, " If the waste is suspected to have strong self-heating properties, the 25-mm cube test may be performed in lieu of the 100-mm cube test. If the results of this test are positive, then the test using the 100-mm cage need not be performed because the waste has self-heating properties. If the results of the 25-mm cube test are negative, then the waste must be evaluated by the 100-mm cube test in order to make a proper self-heating determination." Therefore, if no self heating is indicated, then we will not have enough to perform the 100x100mm cube test.

We are begin the test today and should know by tomorrow morning if the material appears to be self heating. If it is not, then we will need to repeat with the 100x100mm cube. I know that a limited amount of sample was probably sent due to the oxidizer.

If you'd like, let us know the brand of kitty liter and we can purchase here, if available, and do the mixing of the concoction in the lab.

Thanks

Radonna Spies
Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspiess@swri.org

-----Original Message-----

From: Patel, Nita [<mailto:npatel@lanl.gov>]
Sent: Wednesday, June 04, 2014 9:09 PM
To: Ramirez, Daniel; Greene, Keith R
Cc: Spies, Radonna S.
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,

Will it require a rush TAT?

010022

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greere, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

Ramirez, Daniel

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Thursday, June 05, 2014 11:42 AM
To: Ramirez, Daniel
Subject: RE: FYI

590817771295 says has departed local fed-ex location

-----Original Message-----

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Thursday, June 05, 2014 10:38 AM
To: Greene, Keith R
Subject: RE: FYI

Keith,

Could you provide me with a tracking number for the below shipment, we have yet to receive it. FED EX has been experiencing lots of delays this week.

thanks

-----Original Message-----

From: Greene, Keith R [<mailto:kgreene@lanl.gov>]
Sent: Wednesday, June 04, 2014 6:35 PM
To: Ramirez, Daniel
Subject: Re: FYI

Yes if we could have something by early next week that would be great!

----- Original Message -----

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,

Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

010024

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

Ramirez, Daniel

From: Patel, Nita [npatel@lanl.gov]
Sent: Thursday, June 05, 2014 9:21 AM
To: Dammann, Michael J.
Cc: Ramirez, Daniel
Subject: Mike.. FW: FYI

HI Mike, this sample has a mass ratio of 1:5 to 1. Kitty litter to sodium nitrate.

And the volume is 3:1.

Please email the preliminary results like last time. Also, send edd and data package to SMO.

-----Original Message-----

From: Patel, Nita
Sent: Wednesday, June 04, 2014 8:09 PM
To: 'daniel.ramirez@swri.org'; Greene, Keith R
Cc: 'radonna.spies@swri.org'
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,

Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

010026

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

010027

Ramirez, Daniel

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5168 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

July 7, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

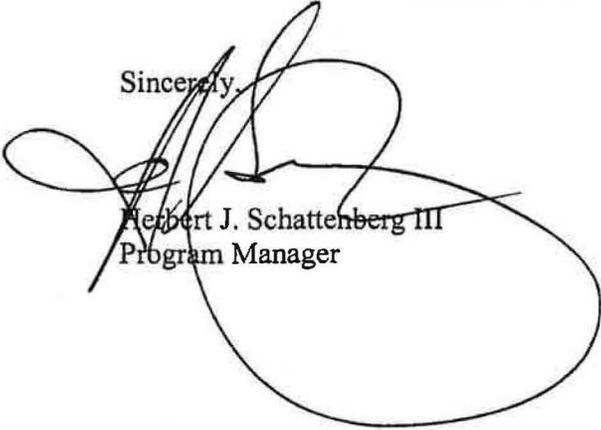
Attn: Keith R. Greene

Subject: COC ID: ADEP
SwRI Project Number: 19869.01.00X
SDG: 553447
SwRI Task Order Number: 140626-2
SwRI Sample Receipt Number: 53282
Samples received: 06/06/14, 07/01/14
Analysis: Method 1050

Dear Mr. Greene,

Please find the enclosed results for the sample received on the above referenced dates. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,



Herbert J. Schattenberg III
Program Manager

APPROVED:



Michael J. Dammann
Director

HJS: dr
Encl



Benefiting government, industry and the public through innovative science and technology

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140626-2
SRR#: 53282
SDG: 553447
VTSR: 06/06/14, 07/01/14
CASE: ADEP

METHOD 1050 ANALYSIS

Total Page Count:
Fraction: ~~Data~~ Report Pages: 6

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140626-2

INORGANICS ANALYSIS

Method 1050 25-mm analysis

Sample WST54-14-MIX was tested according to SW 846 Method 1050, *Test Methods to Determine Substances Likely to Spontaneously Combust*, Method C - Self-heating wastes. The sample was received on 06/06/14 and due to the limited volume the self-heating test was performed using two 25-mm cubes. Once the sample was placed into the 25-mm cube it was loaded into an outer cage and suspended in an oven. A thermocouple was positioned near the center of the sample and its duplicate, with an additional thermocouple monitoring the oven temperature. The oven temperature was ramped to 140°C, with a 2°C range. Temperatures were continuously monitored. After 24-hours, the temperatures were graphed and evaluated. Figure 1 illustrates the graph for the 25-mm cube analysis. Since the temperature of the sample did not exceed 200°C and did not exhibit self heating tendencies, a 100-mm cube test was further needed in order to determine if the sample was considered self-heating.

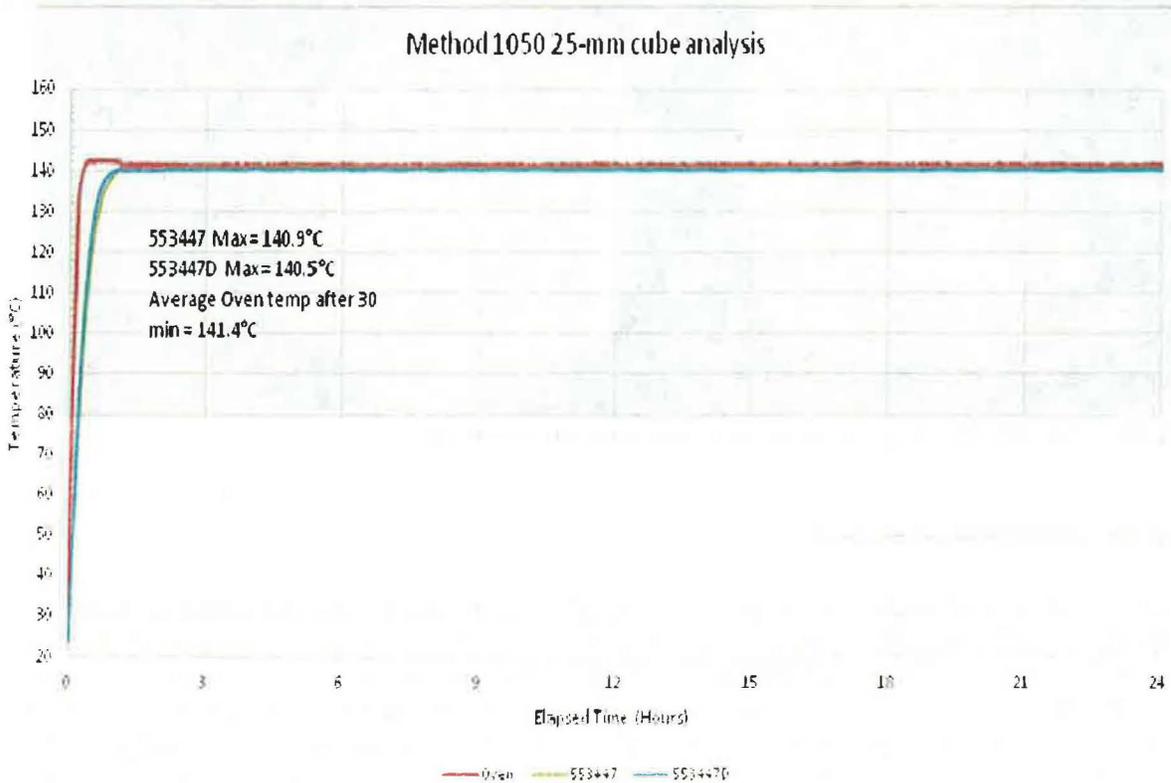


Figure 1. 25-mm cube analysis

After 24-hours:

Air Temp at Samples Average after 30 minute warm up period 141.4 C

Maximum Temp for sample LANL # WST54-14-MIX = 140.9 C @ Time= 3 Hrs 22 Min

Maximum Temp for sample LANL # WST54-14-MIX DUP = 140.5 C @ Time= 4 Hrs 7 Min

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140626-2

When the samples were removed from the oven, it was noted that they appeared slightly darker than they were at the beginning of test, reference Image 1.

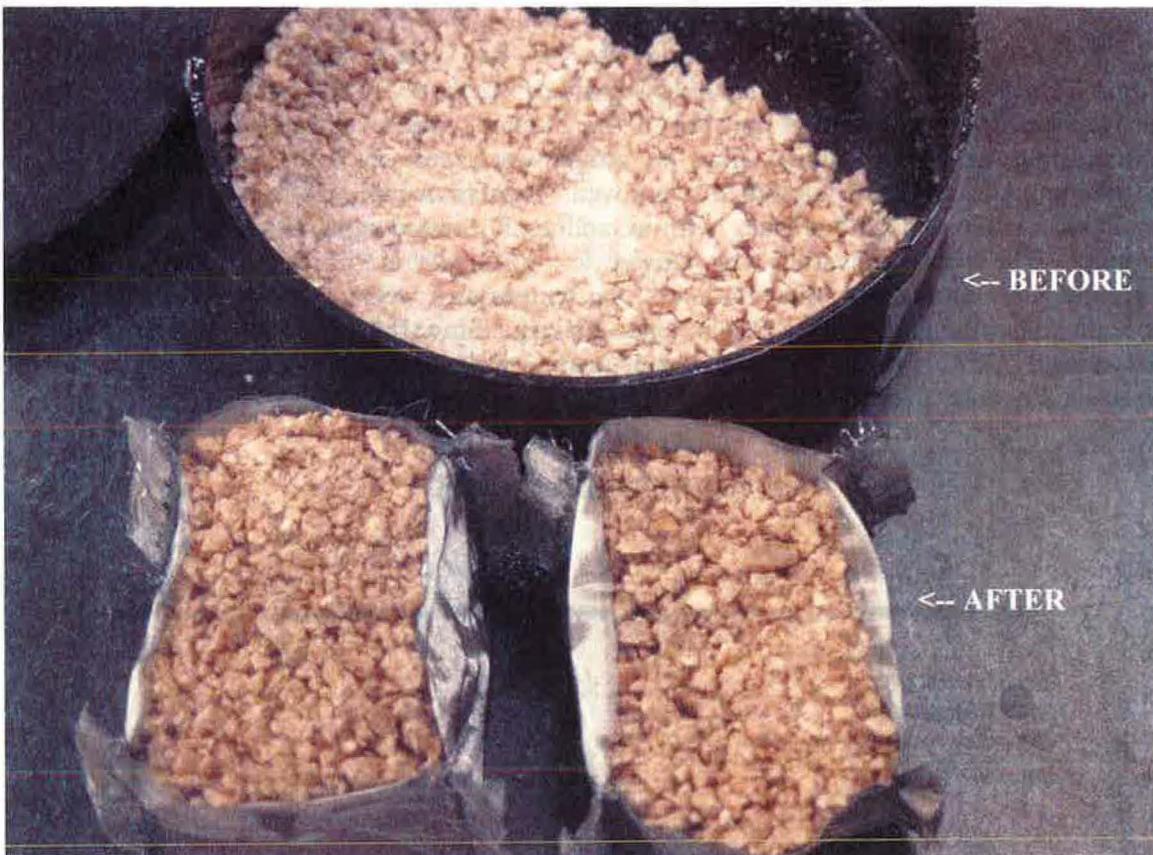


Image 1. Sample for 25-mm analysis before and after testing

Method 1050 100-mm analysis

On 07/01/14, an additional 1L container of sample was obtained from the client in order to perform the 100-mm cube analysis, to determine if the sample was self-heating according to Method C. Upon receipt a visual inspection was performed and it was noticed that the bottle had compressed in on itself. Pictures were taken to document the incident and can be viewed in Image 2, which show the unadulterated bottle as received by the lab before analysis was performed. Pictures were sent to LANL and permission was granted to the lab to proceed with the 100-mm test. The sample was placed into the 100-mm cube, loaded into an outer cage, and suspended in an oven. A thermocouple was positioned near the center of the sample and its duplicate, with an additional thermocouple monitoring the oven temperature. The oven temperature was ramped to 140°C, with a 2°C range. Temperatures were continuously monitored. After 24-hours, the temperatures were graphed and evaluated. Figure 2 illustrates the graph for the 100-mm cube analysis.

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140626-2

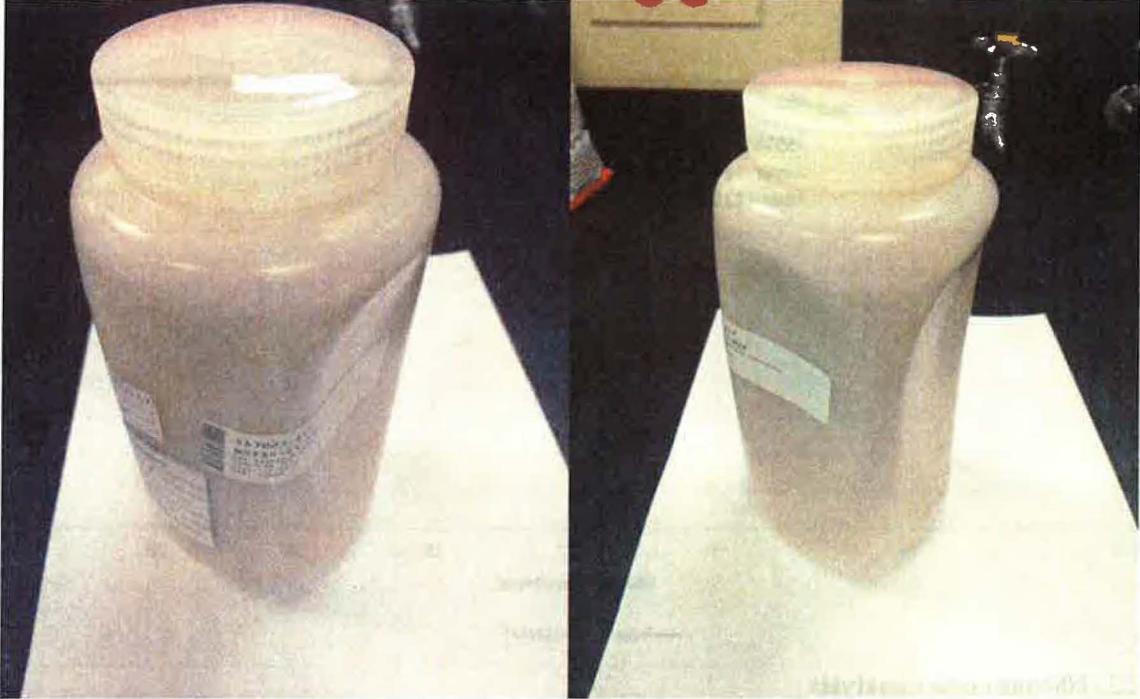


Image 2. Sample bottle as received prior to analysis.

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140626-2

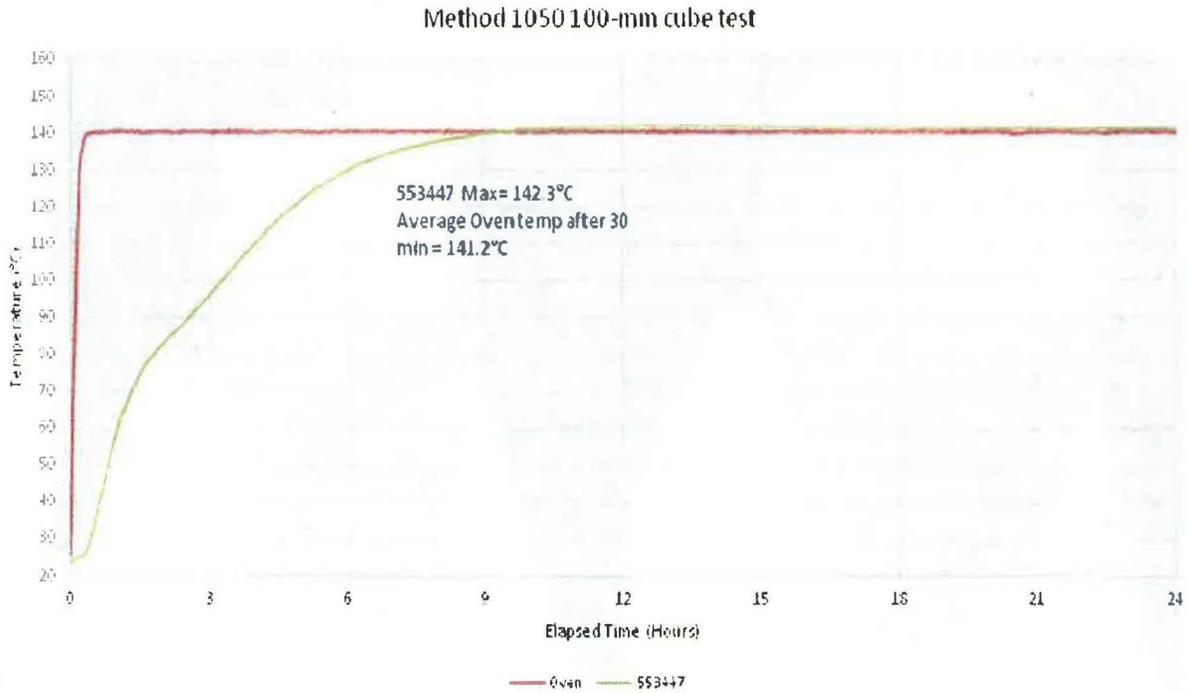


Figure 2. 100-mm cube analysis

After 24-hours:

Air Temp at Samples Average after 30 minute warm up period 141.2 C

Maximum Temp for sample LANL # WST54-14-MIX = 142.3 C @ Time= 13 Hrs 24 Min

After the 24-hr time period the temperature of the sample did not exceed 200°C; therefore the material is considered not to be self-heating. The material is also not considered pyrophoric according to Method A- Pyrophoric Solids. When the samples were removed from the oven, an observation was noted that they appeared slightly darker than they were at the beginning of test. Also, upon emptying out the cages, it was noticed that approximately ¼ of the sample mass formed two clumps, which were buried in the central region of the cage. These clumps can be seen in Image 3.

Client: Los Alamos National Laboratory
SDG: 553447
SwRI Project Number: 19869.01.006
SwRI Task Order Number: 140626-2



Image 3. Clumps formed during 100-mm cube analysis.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

RSpies

Group Leader

07/07/14

Date

010001

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER#: 140626-2

SRR#: 53282

SDG: 553447

VTSR: 06/06/14, 07/01/14

CASE: ADEP

METHOD 1050

Form I

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010002

Sample ID

WST54-14-MIX

Lab Name: Southwest Research Institute

Client: Los Alamos National Lab.

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 06/06/14, 07/01/14

SRR #:53282

Date Analyzed: 06/09/14, 07/01/14

Task Order #: 140626-2

Lab System ID: 553447

| Method Reference | Results |
|--|---|
| SW 846 Method 1050 <i>Test Method to Determine Substances Likey to Spontaneously Combust</i> Method C | The material is <u>not</u> considered pyrophoric or self heating. |

010003

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140626-2
SRR#: 53282
SDG: 553447
VTSR: 06/06/14, 07/01/14
CASE: ADEP

METHOD 1050
Logbook Data

Southwest Research Institute®
Logbook: Miscellaneous

010004

Logbook #/ Page #_15 0069_

Book I.D. #_13-0406-035

Analysis / Method: comb 1050 Project# 19869.01.006
 TAP# (if applicable): NIA NIA
 Client: LANL TO# 140609-9

Balance # NIA
 LCS Info: NIA TV: NIA
 Notes: Time start 15:28 6/9/14

| Sample ID | | | | |
|---|--|--|--|--|
| <p>Sample 553447 was placed into 25mm cages due to limited sample volume. 553447 was placed in cage 1 and the duplicate in cage 2. Testing begins at 15:28 on 6/9/14 with two thermocouples monitoring the oven, sample, and duplicate. The oven was set to $140 \pm 2^\circ\text{C}$. After 24 hours the oven was turned off. Neither the sample or duplicate exceeded 200°C they both remained at the oven temperature of $140 \pm 2^\circ\text{C}$. According to the method the 100mm cage will now be needed in order to determine if the sample is combustible or self heating. Due to limited sample more will need to be obtained to perform the heating in the 100mm cube. When pulled from the oven after cooling, the sample was darker brown than when it began. In the sample cage a small amount of temp. samples together.</p> | | | | |
| <p><i>S.A.M. 6/19/14</i></p> | | | | |
| <p>Calculation:</p> | | | | |

Analyst Signature: *James M...* Date: 6/9/14
 Reviewed by: *Quayle...* Date: 07/07/14

010006

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory

TASK ORDER#: 140626-2

SRR#: 53282

SDG: 553447

VTSR: 06/06/14, 07/01/14

CASE: ADEP

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

Sample Receipt

010007

Southwest Research Institute

Sample Receipt Number: 53282

VTSR: 06/06/14

Time: 09:15:00

Project: 19869.01.00X

Revision: 4

Manager: DAMMANN, MIKE

Case #: ADEP

Logged in by: SRAMIREZ

Client: Los Alamos National Laboratory *This Receipt was Revised Jul 1 2014 10:02AM*

Creation Date:

Notes

Sample was delivered intact at 0.5 °C (blue/wet ice).

Fed Ex #(s): 5908 1777 1295- sample #1 0.5 °C (blue/wet ice).

Fed Ex #(s): 5908 1777 2410- sample #2 22.0 °C (no ice).
received sample at 07/01/14 at 08:38am

See Task Order for full requirements.

See chain of custody as part of the SRR system for more information.

Phases:

- 001 - admin
- 002 - extraction
- 005 - 8082
- 006 - metals/radchem
- 007 - drg

Rev. 1 changed case name and moved system ID 553446 to new SRR 53291.

Rev. 2 Moved Sample 557023 to SRR 53282 as ADDITIONAL volume.

Rev. 3 added notes (shipping info, temperature, date and time received) for new sample.

Rev. 4 deleted sample 557023 and added second container for sample 553447. see attached email

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

| System ID | Customer ID | CED | Matrix | Containers | Special Reqs. |
|---------------|--------------|----------|--------|------------|---------------|
| 553447 | WST54-14-MIX | 06/04/14 | Solid | 2 | |
| Containers: 2 | | | | Samples: 1 | |

These documents are associated with this receipt: 159435[COC for SRR 53282], 159436[SRR Paperwork for SRR 53282], 160598[]

Thermometer: 18439
Temperature: 0.5

Client: Los Alamos National Laboratory
SR#: 53282
FRM-002

Laboratory Task Order

010008

TO #: 140626-2 Revision: 1

SDG: 553447
 VTSR: 06/06/14, 07/01/14
 CASE: ADEP

SRR #'s: 53282
 Client(s): Los Alamos National Laboratory

Project(s): 19869.01.00X
 Manager(s): DAMMANN, MIKE
 To PM:
 To QA:
 To Client: 07/07/14

Instructions

Los Alamos National Laboratory _ Subcontract No. 250954
 Lab Request # ADEP
 SDG is 553447.

RUSH TAT. 3-business days
 ALL DATA IS DUE TO THE CLIENT ON 06/11/2014.

1 overall SOLID sample (1 container) was received on 06/06/2014. See also Task Order # 140609-9.

PLEASE NOTE _ Tests originally listed in Task Order # 140609-9. Method 1030 was able to be completed and submitted to client.

ADDITIONAL volume was received on 07/01/14, which was added to SRR 53282, listed as Container No. 2 under Lab System ID 553447.

Requires:

sw-846:1050

50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio

PRELIMS _ Email prelims to: Keith Greene kgreene@lanl.gov

 EDD REQUIRED. Please note, All results have to be merged under 1 EDD "file."
 See Exhibit "D" Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services

Main point-of-contact is Keith R. Greene, kgreene@lanl.gov; Additional contact Nita Patel npatel@lanl.gov

Send Hardcopy & CD TO:

Los Alamos National Laboratory

ATTN: Keith R. Greene

TA-3 SM-271 Drop point 02U

Los Alamos, NM 87545

REVISION 1, DRmz 07/01/14: Task Order revised to indicate additional volume was received. See SRR notes and TO instructions.

Documents Related to this task order: 159435[COC for SRR 53282], 159436[SRR Paperwork for SRR 53282], 161598[]

Deliverables --> Hard Copy: -YES- EDD: no PDF: -YES-

Test: COMB_1050
 Section: WETCHEM

Holding: 180 days from CED

SW846 1050 Test A & C Spontaneous Combustion

Cnt: 1

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|--------------|-----------|-------------|
| 553447 | | 1 | Solid | WST54-14-MIX | 04 Jun 14 | 01 Dec 14 |
| 553447 | | 2 | Solid | WST54-14-MIX | 04 Jun 14 | 01 Dec 14 |

FIELD CHAIN- OF CUSTODY

A DEP

010009

NAME: Keith Greene

TA: _____

Z#: _____

OU: _____

PHONE: 665-9966

CHAGE CODE: _____

| SAMPLE # | ORDER CODE | CONTAINER | PREV. COLLECTED: Time /date | SPECIAL instructions |
|--|------------|-----------|--------------------------------|-------------------------------|
| WST54-14-mix | | 125 poly | 6/4/14 1:30 | Flamability + Ignitability |
| Additional Sample Received 6/30/14 1:35 <i>Must Change</i> | | | | |
| Send to SWRI 6/30/14 15:00 | | | | |
| <p>Client: Los Alamos National Laboratory SWRI Project: #1898 01.00X VTR: 06/05/14 0815 Battery Check: Y Cooler/Container Wipe: <100 cpm Total cpm-mR/h (samples): <100 cpm / <0.5mR/h (see Radioactive Material Receiving Form for more information)</p> <p>SWSI BRS #53282 Case: ADEP Sample(s) Received: Intact Background Check: <100 cpm (Lab 103) Temp: 0.5°C (wet/blue ice) / #18438 Wipe Frisk Description: Cooler(s) - 1</p> | | | | |
| Send results to Keith Greene / Aita Patel | | | | |

| RELINQUISHED BY: | Date/Time | RECEIVED BY: | Date/Time |
|---------------------------------|----------------|-----------------------------------|------------------|
| Keith Greene <i>[Signature]</i> | 6/4/14 3:00 | STEVEN RAMIREZ <i>[Signature]</i> | 07/01/14 0838 |

Southwest Research Institute

Traffic Report

010011



Sample Custodian Signature: _____

- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present
Sample Tag Numbers Not on COC
- 4. SMO Forms Not Present

Client: Los Alamos National Laboratory
 Project: 19869.01.00X
 Case: ADESH / SDG: _____
 Sample Receipt: 53282
 Airbill: 5908 1777 1295

Custody Seal #(s): N/A

| Date Received | Time Received | COC Record | SMO Sample # | Corresponding | | Traffic Rpt, Tags, COC Agree | Sample Condition |
|---------------|---------------|------------|----------------|---------------|--------|------------------------------|------------------|
| | | | | Sample Tag # | SwRI # | | |
| 06/06/14 | 09:15:00 | ADESH | NP048-14-80011 | N/A | 553446 | YES | Intact |
| 06/06/14 | 09:15:00 | ADEP | WST54-14-MIX | N/A | 553447 | YES | Intact |

SAMPLE LOG-IN SHEET

010012

| | | | |
|--|--|--|----------------|
| Lab Name Southwest Research Institute | | Page 1 of 1 | |
| Received By (Print Name) STEVEN RAMIREZ | | Log-in Date 06/06/2014 | |
| Received By (Signature) <i>Steven Ramirez</i> | | | |
| Case Number ADESH | | Sample Delivery Group No. N/A | |
| Remarks: 19869.01.00X | | SAS Number N/A | |
| | | Corresponding | |
| | | Remarks: Condition of Sample Shipment, etc | |
| | | EPA Sample # | Sample Tag # |
| | | | Assigned Lab # |
| 1. Custody Seal(s) | <input checked="" type="checkbox"/> Present / Absent* <input checked="" type="checkbox"/> Intact / Broken | NP048-14-80011 | N/A |
| 2. Custody Seal Nos. | N/A | WST54-14-MIX | N/A |
| 3. Chain-of Custody Records | <input checked="" type="checkbox"/> Present / Absent* | | 553446 |
| 4. Traffic Reports or Packing Lists | Present <input checked="" type="checkbox"/> Absent | | 553447 |
| 5. Airbill | Airbill / Sticker <input checked="" type="checkbox"/> Present / Absent* | | |
| 6. Airbill No. | 5908 1777 1295 | | |
| 7. Sample Tags | Present <input checked="" type="checkbox"/> Absent | | |
| Sample Tag Numbers | Listed <input checked="" type="checkbox"/> Not listed on Chain of Custody | | |
| 8. Sample Condition | <input checked="" type="checkbox"/> Intact / Broken* / Leaking | | |
| 9. Cooler Temperature | 0.5C | | |
| 10. Does Information on custody records, traffic reports, and sample tags agree? | <input checked="" type="checkbox"/> Yes / No* | | |
| 11. Date Received at Lab | 06/06/2014 | | |
| 12. Time Received | 09:15:00 | | |
| Sample Transfer | | | |
| Fraction | Fraction | | |
| Area # | Area # | | |
| By | By | | |
| On | On | | |

* Contact SMO and attach record of resolution

| | |
|--------------------------------------|---|
| Reviewed By <i>Steven Ramirez</i> | Logbook No. Sample Receipt (53282) |
| Date 06-14 | Logbook Page No. 8747 <i>see 2, 3, 4, 6</i> |

010013

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER#: 140626-2
SRR#: 53282
SDG: 553447
VTSR: 06/06/14, 07/01/14
CASE: ADEP

CLIENT COMMUNICATION

Ramirez, Daniel

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Tuesday, July 01, 2014 9:39 AM
To: Ramirez, Daniel
Subject: FW: sample

010014

From: Greene, Keith R
Sent: Tuesday, July 01, 2014 8:26 AM
To: MDammann@swri.org
Cc: Patel, Nita
Subject: sample

Mike, you should receive today the extra sample needed to complete the 1050 test on the kitty litter, txs

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Wednesday, June 11, 2014 7:54 AM
To: Patel, Nita; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

010015

WST54-14-MIX

Method 1030

Glowing was observed at the heated zone but did not propagate along the powder train. Therefore, according to NFPA standard, the material shall be considered a non-combustible form. Also, by Method 1030 standards, the material is not considered flammable

Method 1050

The temperature of the material in a 25x25mm cube exceed 200C (max temp = 141C). According to the method, if 25-mm cube test is negative, then the waste must be evaluated by the 100-mm cube test.

Therefore, we need more material to perform the 100-mm test for the results to be conclusive.

Please let us know how to proceed.

Thanks

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Spies, Radonna S.
Sent: Monday, June 09, 2014 10:57 AM
To: 'Patel, Nita'; Greene, Keith R
Cc: Ramirez, Daniel; Dammann, Michael J.
Subject: RE: FYI

Nita -

With 50g of samples, we will have to use the 25 x 25 mm cube for METHOD 1050 TEST METHODS TO DETERMINE SUBSTANCES LIKELY TO SPONTANEOUSLY COMBUST - but according to the method, Section 11.4.9 states, " If the waste is suspected to have strong self-heating properties, the 25-mm cube test may be performed in lieu of the 100-mm cube test. If the results of this test are positive, then the test using the 100-mm cage need not be performed because the waste has self-heating properties. If the results of the 25-mm cube test are negative, then the waste must be evaluated by the 100-mm cube test in order to make a proper self-heating determination." Therefore, if no self heating is indicated, then we will not have enough to perform the 100x100mm cube test.

We are begin the test today and should know by tomorrow morning if the material appears to be self heating. If it is not, then we will need to repeat with the 100x100mm cube. I know that a limited amount of sample was probably sent due to the oxidizer.

If you'd like, let us know the brand of kitty liter and we can purchase here, if available, and do the mixing of the concoction in the lab.

010016

Thanks

Radonna Spies
Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

-----Original Message-----

From: Patel, Nita [mailto:npatel@lanl.gov]
Sent: Wednesday, June 04, 2014 9:09 PM
To: Ramirez, Daniel; Greene, Keith R
Cc: Spies, Radonna S.
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [mailto:daniel.ramirez@swri.org]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,
Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

010017

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

Ramirez, Daniel

From: Patel, Nita [npatel@lanl.gov]
Sent: Thursday, June 05, 2014 9:21 AM
To: Dammann, Michael J.
Cc: Ramirez, Daniel
Subject: Mike.. FW: FYI

010018

HI Mike, this sample has a mass ratio of 1:5 to 1. Kitty litter to sodium nitrate.

And the volume is 3:1.

Please email the preliminary results like last time. Also, send edd and data package to SMO.

-----Original Message-----

From: Patel, Nita
Sent: Wednesday, June 04, 2014 8:09 PM
To: 'daniel.ramirez@swri.org'; Greene, Keith R
Cc: 'radonna.spies@swri.org'
Subject: Re: FYI

Hi Daniel. The sample is on a rush tat. Thank you, Nita

----- Original Message -----

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Wednesday, June 04, 2014 05:33 PM
To: Greene, Keith R
Cc: Spies, Radonna S. <radonna.spies@swri.org>; Patel, Nita
Subject: FW: FYI

Keith,
Will it require a rush TAT?

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

-----Original Message-----

From: Dammann, Michael J.
Sent: Wednesday, June 04, 2014 6:32 PM
To: Spies, Radonna S.; Ramirez, Daniel
Subject: FW: FYI

From: Greene, Keith R [kgreene@lanl.gov]
Sent: Wednesday, June 04, 2014 3:13 PM
To: Dammann, Michael J.
Cc: Patel, Nita
Subject: FYI

We are sending you guys another sample today that is 50 grams of a concocted matrix of sodium nitrate and kitty litter 1:1.5 ratio, for ignitability and flammability, txs

010019

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78236-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 884-5111 • WWW.SWRI.ORG

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

July 29, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

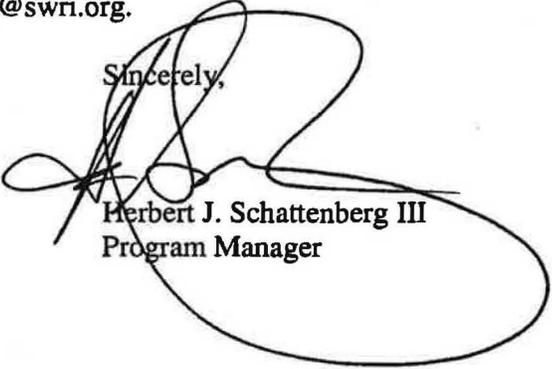
Attn: Keith R. Greene

Subject: COC ID: ADEP
SwRI Project Number: 19869.01.00X
SDG: 558804
SwRI Task Order Number: 140722-8
SwRI Sample Receipt Number: 53554
Samples received: July 22, 2014
Analysis: Method 1040

Dear Mr. Greene,

Please find the enclosed results for the two (02) overall solid samples received on the above referenced dates. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,


Herbert J. Schattenberg III
Program Manager

APPROVED:



 Michael J. Dammann
Director

HJS: mg
Encl



Benefiting government, industry and the public through innovative science and technology

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

NARRATIVE

Total Page Count: 010001 -
Date Report Pages: 010023

Client: Los Alamos National Laboratory

SDG: 558804

SwRI Project Number: 19869.01.00X

SwRI Task Order Number(s): 140722-8

OXIDIZER TEST

The sample was tested in accordance with the SW 846 Method 1040 *Test Method for Oxidizing Solids*. "This method provides a qualitative means to measure the potential of a solid waste to increase the burning rate or burning intensity of a combustible substance, specifically fibrous cellulose. The burning rates for 1:1 and 4:1 waste:cellulose mixtures (w/w) are compared to the burning rates for 3:7, 2:3, and 3:2 potassium bromate:cellulose mixtures. Potassium bromate is used as the reference oxidizing standard. The three mixing ratios of potassium bromate and cellulose provide a range of burning times by which the waste is classified. The 3:7 mixture ratio provides the longest burning time, the 3:2 mixture ratio provides the shortest burning time, and the 2:3 mixture ratio provides an intermediate burning time. The burning times for the potassium bromate:cellulose mixtures are correlated to their relative oxidizing strengths, i.e., the shorter the burning time, the greater the relative oxidizing strength. If the mean burning time for either waste/cellulose mixture is shorter than the mean burning time for the 3:7 potassium bromate/cellulose mixture, the waste is shown to exhibit oxidizer properties." See Table 1.

Table 1. Classification of Oxidizer Categories

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is.... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

Table 2 presents the results for the reference standards.

Table 2. Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 | Mean Burn Time, sec 2:3 | Mean Burn Time, sec 3:2 |
|------------------------------------|------------------------------------|------------------------------------|
| KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio |
| 141.56 | 92.02 | 31.01 |

The standard or reference mixtures and the sample mixtures were tested five times at each cellulose mixing ratio. The sample was dried at 65 °C for a minimum of 12 hours and the clumps were broken up using a mortar and pestle. Testing was performed in a Fire Cabinet (Figure 1). A stainless steel mold was used to create individual ignition wires (Figure 2); a new wire was used for each test.

Client: Los Alamos National Laboratory
SDG: 558804
SwRI Project Number: 19869.01.00X
SwRI Task Order Number(s): 140722-8

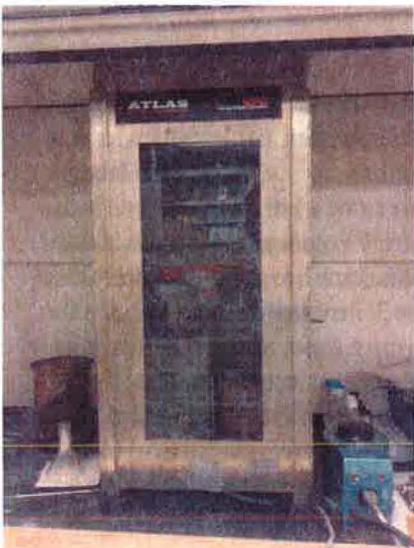


Figure 1. Fire Cabinet

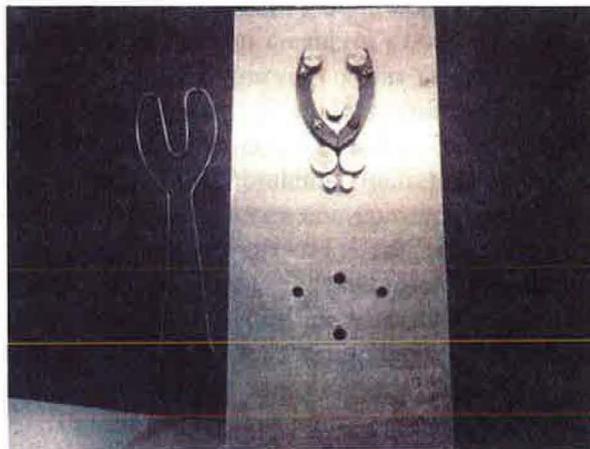


Figure 2. Ignition wire and mold

Client sample CYA-D (system ID 558804) was analyzed in duplicate. In each case, the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced a very small amount of liquefied molten salt during the burning. The 1:1 mixture burned steadily and had a very small amount of liquid molten salt produced. Based on Table 1, the original result was classified as a Category IV (non-oxidizer) but the duplicate was classified as a Category III. Although the mean burn time of the original and duplicate analysis were comparable (143.56 and 135.23 seconds, respectively), they fell on either side of the 3:7 KBrO_3 :Cellulose Ratio burn time of 141.56 second.

Client sample CYA-N (system ID 558805), the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced a very small amount of liquefied molten salt during the burning. The 1:1 mixture, burned steadily and had a very small amount of liquid molten salt produced. The 4:1 sample-to-cellulose ratios had a shorter mean burn rate than that of 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 bromate:cellulose standard which classifies it as a Category III (oxidizer) according to the method.

“I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI.”

RSpies

Group Leader

07/29/14

Date

010004

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

WETCHEM ANALYSIS
SAMPLES RESULTS

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010005

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with SW 846 Method 1040

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-----------|----------------|--|--|------------------------------|
| CYA-D | 558804 | 143.56 | 196.52 | Category IV (a non-oxidizer) |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is.... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SAMPLE ANALYSIS DATA SHEET

010006

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with SW 846 Method 1040

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-----------|----------------|--|--|-------------------------|
| CYA-D | 558804 | 135.23 | 185.3 | Category III (oxidizer) |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010007

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with SW 846 Method 1040

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec | Mean Burn Time, sec | Classification |
|-----------|----------------|-------------------------------|-------------------------------|-------------------------|
| | | 4:1 Sample:Cellulose Ratio | 1:1 Sample:Cellulose Ratio | |
| CYA-N | 558805 | 121.48 | 183.56 | Category III (oxidizer) |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is.... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

010008

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

OXIDIZER RAW DATA

Southwest Research Institute

010009

Method: SW 8410 1040
 Project #: 19869.01 006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

RSprus
7/28/14

Sample Analysis

System ID: 558804

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---|
| 4:1 | 1 | 24.0204 | 6.0046 | 98.48 | |
| 4:1 | 2 | 24.0102 | 6.0151 | 120.12 | |
| 4:1 | 3 | 24.0286 | 6.0061 | 121.00 | |
| 4:1 | 4 | 24.0067 | 6.0099 | 186.88 | After 3min (180 sec.) variac turned off |
| 4:1 | 5 | 24.0130 | 6.0047 | 191.34 | ↓ |
| 4:1 | Avg | | | 143.56 | |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|--------------------------------------|
| 1:1 | 1 | 15.0217 | 15.0159 | 193.98 | After 3min/180sec. variac turned off |
| 1:1 | 2 | 15.0159 | 15.0178 | 223.21 | ↓ |
| 1:1 | 3 | 15.0137 | 15.0037 | 188.32 | ↓ |
| 1:1 | 4 | 15.0102 | 15.0047 | 188.16 | ↓ |
| 1:1 | 5 | 15.0112 | 15.0093 | 188.94 | ↓ |
| 1:1 | Avg | | | 196.52 | |

Weighted Samples: Monica Mendoza Balance#: 135 Date: 7/25/14
 Tested Samples: Monica Mendoza Timer ID: Fisher Scientific Date: 7/25/14
 Sample Dried? (YES) NO Dried: 65°C oven # 22 * 7/24 - 7/25 overnight
 Cellulose: Inorg# 52038 Dried: 105°C oven # 1 7/22 - 7/23 overnight
 Variac Setting: 120 v; 20

x wo 7/25/14

Due to large particle size, samples were ground ^{mm} then weighed.

Southwest Research Institute

010010

Method: SW846 1040
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

Sample Analysis

System ID: 558804.D

RS
 7/28/14
 29 RS
 7/29/14

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---------------------------------------|
| 4:1 | 1 | 24.0180 | 6.0153 | 107.81 | |
| 4:1 | 2 | 24.0135 | 6.0097 | 135.47 | |
| 4:1 | 3 | 24.0116 | 6.0165 | 111.41 | |
| 4:1 | 4 | 24.0169 | 6.0033 | 186.88 | |
| 4:1 | 5 | 24.0120 | 6.0249 | 134.60 | |
| 4:1 | Avg | | | 135.23 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0118 | 15.0183 | 181.37 | variac turned off at 180 sec. / 3 min |
| 1:1 | 2 | 15.0043 | 15.0077 | 186.34 | ↓ |
| 1:1 | 3 | 15.0067 | 15.0072 | 187.25 | |
| 1:1 | 4 | 15.0028 | 15.0158 | 185.97 | |
| 1:1 | 5 | 15.0224 | 15.0097 | 185.59 | |
| 1:1 | Avg | | | 185.30 | |

Weighted Samples: M. Mendez Balance#: 135 Date: 7/29/14
 Tested Samples: M. Mendez Timer ID: Fisher Scientific Date: 7/29/14
 Sample Dried? (YES) NO Dried: 65°C oven #22 7/28-7/29
 Cellulose: Inorg# 52038 Dried: 105°C oven #01 7/28-7/29
 Variac Setting: 120v, 20

Sample was mortar & pestled prior to weighing.

010011

Southwest Research Institute

Method: SW 846 1040
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

✓ R Spivey
7/28/14

Sample Analysis

System ID: 558805

| Sample: Cellulose | Wt Sample, g | Wt Cellulose, g |
|-------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

* RE 7/25/14 mm

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|-------------------------------------|
| 4:1 | 1 | 24.0142 | 6.01286 | 119.78 | |
| 4:1 | 2 | 24.0128 | 6.0134 | 129.66 | |
| 4:1 | 3 | 24.0320 | 6.0135 | 118.09 | |
| 4:1 | 4 | 24.0336 | 6.0169 | 122.41 | |
| 4:1 | 5 | 24.0070 | 6.0689 | 117.44 | |
| 4:1 | Avg | | | 121.48 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0468 | 15.0199 | 170.09 | |
| 1:1 | 2 | 15.0406 | 15.0272 | 185.91 | turned variac off after 3min/180sec |
| 1:1 | 3 | 15.0156 | 15.0185 | 189.06 | |
| 1:1 | 4 | 15.0100 | 15.0209 | 186.28 | |
| 1:1 | 5 | 15.0327 | 15.0287 | 186.47 | |
| 1:1 | Avg | | | 183.56 | |

Weighted Samples: Monica Mendonca Balance#: 135 Date: 7/25/14
 Tested Samples: Monica Mendonca Timer ID: Fisher Scientific Date: 7/25/14
 Sample Dried? (YES) NO Dried: 105°C oven #22 7/24-7/25 over night
 Cellulose: Inorg# 52038 Dried: 105°C oven #01 7/22-7/23 over night
 Variac Setting: 120V; 20

Due to large particle size, samples were ground prior to weighing.

010012

Southwest Research Institute

Method: SW846 1040
 Project #: 19869.01.0060
 Client: Los Alamos National Lab
 TO#: 140722-8

✓ R Spis
7/28/14

Reference Substance

| KBrO ₃ :Cellulose | Wt KBrO ₃ , g | Wt Cellulose, g |
|------------------------------|--------------------------|-----------------|
| 3:7 | 9 | 21 |
| 2:3 | 12 | 18 |
| 3:2 | 18 | 12 |

* RE 7/24/13 mm

| Ratio | Rep | Actual KBrO ₃ Wt, g * | Actual Cellulose Wt, g * | Burning Time, sec | Comment |
|-------|-----|----------------------------------|--------------------------|-------------------|-------------------------------|
| 3:7 | 1 | 9.01085 | 21.0042 | 164.56 | 7/24/13 (burned) weighed 7/24 |
| 3:7 | 2 | 9.0128 | 21.0010 | 133.18 | 7/23 (burned) weighed 7/23 |
| 3:7 | 3 | 9.3698 | 21.0045 | 120.88 | 7/23 (burned) weighed 7/23 |
| 3:7 | 4 | 9.0522 | 21.0011 | 142.76 | 7/24 (burned) weighed 7/23 |
| 3:7 | 5 | 9.0098 | 21.0040 | 146.44 | 7/24 (burned) weighed 7/23 |
| 3:7 | Avg | | | 141.56 | ✓ |
| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 2:3 | 1 | 12.0464 | 18.0048 | 92.83 | 7/24 (burned) weighed 7/23 |
| 2:3 | 2 | 12.0097 | 18.0110 | 84.03 | 7/24 (burned) weighed 7/23 |
| 2:3 | 3 | 12.0200 | 18.0080 | 97.91 | 7/24 (burned) weighed 7/23 |
| 2:3 | 4 | 12.00893 | 18.0154 | 94.81 | 7/24 (burned) weighed 7/23 |
| 2:3 | 5 | 12.0054 | 18.0630 | 90.53 | 7/24 (burned) weighed 7/23 |
| 2:3 | Avg | | | 92.02 | ✓ |
| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 3:2 | 1 | 18.0176 | 12.0147 | 29.35 | 7/25 burned weighed 7/25 |
| 3:2 | 2 | 18.003 | 12.0175 | 34.43 | |
| 3:2 | 3 | 18.0130 | 12.0103 | 40.94 | |
| 3:2 | 4 | 18.0187 | 12.0007 | 24.78 | |
| 3:2 | 5 | 18.0172 | 12.0109 | 25.57 | |
| 3:2 | Avg | | | 31.01 | ↓ |

Weighted Samples: Monica Mendoza Balance#: 135 Date: 7/23 - 7/25
 Tested Samples: Monica Mendoza Timer ID: Fisher Scientific Date: 7/23 - 7/25
 Potassium Bromate: Inorg# 52035 & 52037 Dried: 65°C oven #22 (overnight) 7/22 - 7/23
 Cellulose: Inorg# 52038 Dried: 105°C oven #01 (overnight) 7/22 - 7/23
 Variac Setting: 120V, 20

010013

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

COMMUNICATION

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Tuesday, July 29, 2014 2:56 PM
To: Patel, Nita
Cc: Ramirez, Daniel
Subject: 140722-8WCoxidizer.xls
Attachments: 140722-8WCoxidizer.xls

010014

Nita –

In the final review of the data, CYN-N was classified as a Category III. Sample CYN-D was analyzed in duplicate and gave two different categories. The original result was Category IV (non-oxidizer) and the in the duplicate result a Category III. Classifications are based on burn times. Although the mean burn time of the original and duplicate analysis were comparable (143.56 and 135.23, respectively), they fell on either side of the lowest standard's burn time of 141.56, which is used for classification.

The full data package should follow shortly.

Let me know if you have any questions.

Thanks

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Monday, July 28, 2014 5:09 PM
To: Ramirez, Daniel
Subject: FW: OXIDIZER TEST - CYA-N result

010015

Danny –

Talked to Nita and I got the go ahead from Nita to repeat CYN-D:1 ratio. I told her we will have it tomorrow.

Thanks
Radonna

From: Spies, Radonna S. [<mailto:radonna.spies@swri.org>]
Sent: Monday, July 28, 2014 12:37 PM
To: Patel, Nita
Subject: RE: OXIDIZER TEST - CYA-N result

The oxidizer classification of the sample is based on the average burn rate of 5 replicates – at two different ratios of sample:cellulose. This shortest average burn rate of the two ratios is used for comparison against burn rates of three reference standard:cellulose ratios.

For CYN-D, the fastest burn times were from the 4:1 sample:cellulose. The burn times of the 5 replicates were:

98.48 sec
120.12 sec
121.00 sec
186.88 sec
191.34 sec
Avg 143.56 sec

The lowest reference standard mean burn time was 141.56 sec.

Note that the first three replicates had burn times less than the lowest reference standard (but greater than the intermediate standard) which would be a Category II classification; however, the remaining two standards had burn times substantially longer, which lead to a higher average and resulted in a Category IV (non-oxidizer) classification. Therefore, it is questionable whether the material should received a Category II or IV.

Its believe the inconsistent results may have been caused by sample inhomogeneity. Although the sample was particle size reduced with a mortar and pestle, the organic kitty litter did not “pulverize” well, and the particle size and density differences in the kitty litter and sodium nitrate salts cause settleability issues, which may have led to uneven aliquots. I know that CYN-D is likely a duplicate sample of CYN-N but we didn’t encounter an issue and the replicates were within 117.44-129.66 sec with an average of 121.48 sec – thus making is a Category II classification.

Want to know if you would like use to repeat the testing for this sample? Or include this write up in the narrative?

010016

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

From: Patel, Nita [<mailto:npatel@lanl.gov>]
Sent: Monday, July 28, 2014 10:08 AM
To: Ramirez, Daniel
Cc: Spies, Radonna S.; Dammann, Michael J.
Subject: RE: OXIDIZER TEST - CYA-N result

Hi Radonna. Hope you had a good break... Please let me know when the data is available. I already have folks asking...
☺

From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Friday, July 25, 2014 5:16 PM
To: Greene, Keith Robert; Patel, Nita
Cc: Spies, Radonna S.; Dammann, Michael J.
Subject: OXIDIZER TEST - CYA-N result

Keith / Nita,
See below. SDG 558804, SwRI Sample Receipt 53554, assigned Task Order 140722-8.

We will have the final report to upload, with some videos on Monday, which will give Radonna an opportunity to review all the applicable data.

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry
Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

From: Mendoza, Monica V.
Sent: Friday, July 25, 2014 6:10 PM
To: Ramirez, Daniel
Subject: RE: SAMPLE ONE FOR OXIDIZER TEST

| Sample ID | SwRI System ID | Mean Burn Time, sec | Mean Burn Time, sec |
|-----------|----------------|---------------------|---------------------|
|-----------|----------------|---------------------|---------------------|

| | | 4:1 | 1:1 | Classification |
|-------|--------|---------------------------|---------------------------|------------------------|
| | | Sample:Cellulose Ratio | Sample:Cellulose Ratio | |
| CYA-N | 558805 | 121.48 | 183.56 | Category II (oxidizer) |

Monica Mendoza

010017

Analytical and Environmental Chemistry
 Southwest Research Institute
monica.mendoza@swri.org

010018

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

010019

Sample Receipt

Sample Receipt Number: 53554

VTSR: 07/22/14

Time: 08:10:00

Southwest Research Institute

Project: 19869.01.00X
Case #: ADEP
Client: Los Alamos National Laboratory

Manager: DAMMANN, MIKE
Logged In by: SRAMIREZ
Creation Date:

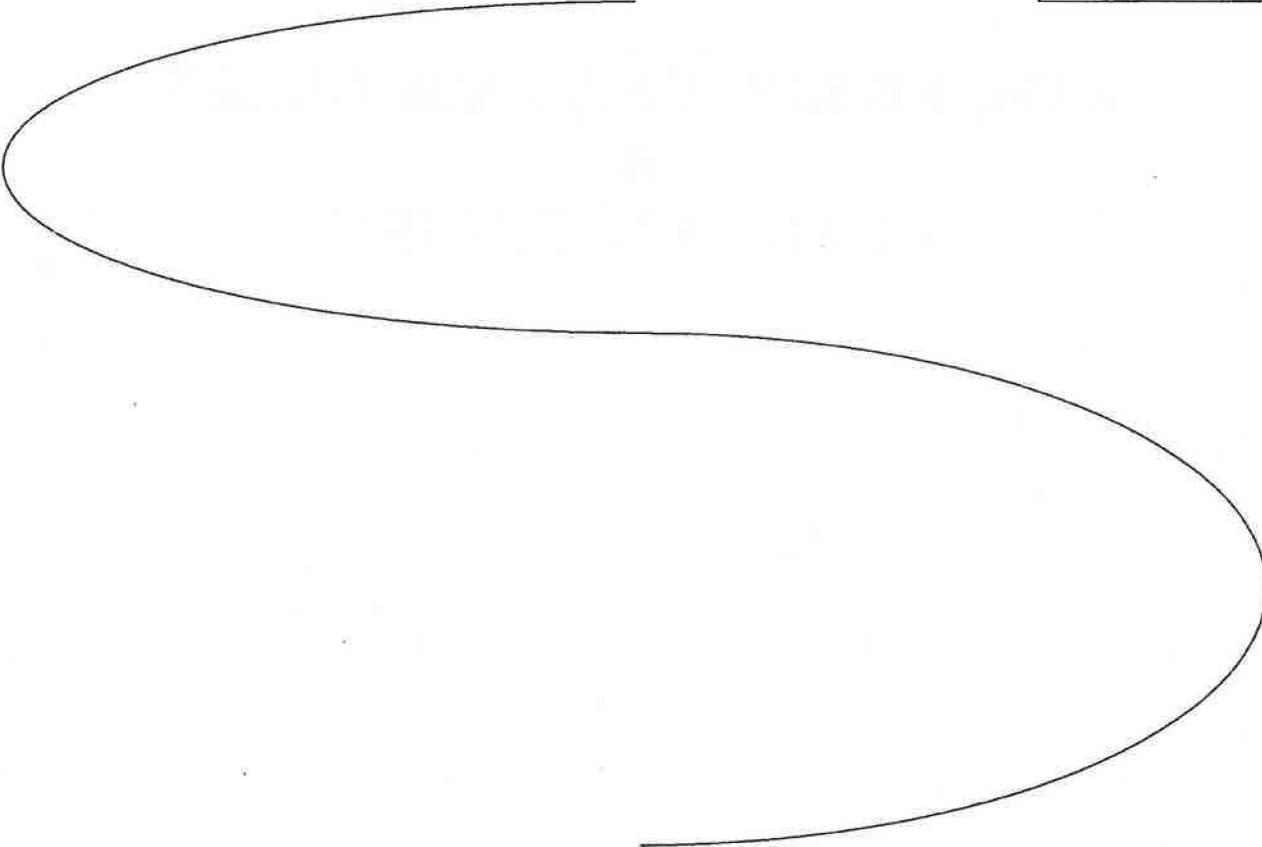
| Notes |
|--|
| <p>Sample was delivered intact at 5.0 °C (blue ice).</p> <p>Fed Ex #(s): 5908 1777 3747</p> <p>See Task Order for full requirements.</p> <p>See chain of custody as part of the SRR system for more information.</p> <p>Phases: 001 - admin 002 - extraction 005 - 8082 006 - metals/radchem 007 - drg</p> |

| |
|---|
| <p>Background CPM: <100 cpm Container Wipe CPM: <100 cpm Total CPM: <100</p> |
|---|

| System ID | Customer ID | CED | Matrix | Containers | Special Reqs. |
|----------------------|-------------|----------|--------|-------------------|---------------|
| 558804 | CYA-D | 07/17/14 | Solid | 1 | |
| 558805 | CYA-N | 07/17/14 | Solid | 1 | |
| Containers: 2 | | | | Samples: 2 | |

These documents are associated with this receipt: 161753[COC for SRR 53554], 161754[SRR Paperwork for SRR 53554]

Thermometer: 010209
Temperature: 5.0



CLIENT: LOS ALAMOS NATIONAL LABORATORY SR#: 53554

Laboratory Task Order

TO #: 140722-8 Revision: 0

Project(s): 19869.01.00X
Manager(s): DAMMANN, MIKE
To Client: 07/24/14

SDG: 558804
VTSR: 07/22/14
CASE: ADEP

SRR #'s: 53554
Client(s): Los Alamos National Laboratory

010020

Instructions

Los Alamos National Laboratory _ Subcontract No. 250954
Lab Request # ADEP
SDG is 558804.

RUSH TAT. 3-business days
ALL DATA IS DUE TO THE CLIENT ON 07/25/2014.

2 overall SOLID samples (2 containers) were received on 07/22/2014.

Requires:

Method 1040
See client email for additional info.

PRELIMS _ Email prelims to: Keith Greene kgreene@lanl.gov, Nita Patel npatel@lanl.gov

EDD REQUIRED. Please note, All results have to be merged under 1 EDD "file."
See Exhibit "D" Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services

Main point-of-contact is Keith R. Greene, kgreene@lanl.gov; Additional contact Nita Patel npatel@lanl.gov
Send Hardcopy & CD TO:
Los Alamos National Laboratory
ATTN: Keith R. Greene
TA-3 SM-271 Drop point 02U
Los Alamos, NM 87545

Documents Related to this task order: 161753[COC for SRR 53554], 161754[SRR Paperwork for SRR 53554]

Deliverables -> Hard Copy: -YES- EDD: no PDF: -YES-

Test: OXIDIZING_1040
Section: WETCHEM

Holding: 180 days from CED

SW846 Method 1040 for Oxidizing Solids

Cnt: 2

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|-------------|-----------|-------------|
| 558804 | | 1 | Solid | CYA-D | 17 Jul 14 | 13 Jan 15 |
| 558805 | | 1 | Solid | CYA-N | 17 Jul 14 | 13 Jan 15 |

FIELD CHAIN- OF CUSTODY

ADEP

NAME: Philip Leonard

TA: _____ 010021

Z#: _____

OU: _____

PHONE: 695-8884

CHAGE CODE: _____

| SAMPLE # | ORDER CODE | CONTAINER | PREV. COLLECTED: Time /date | SPECIAL instructions |
|----------|------------|-----------|--------------------------------|-------------------------|
|----------|------------|-----------|--------------------------------|-------------------------|

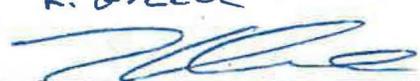
| | | | | |
|-------|----------------|-----------|---------|-------|
| CYA-W | UNDOT oxidizer | 1L Poly | 7/17/14 | 12:00 |
| CYA-D | " | " 1L Poly | 7/17/14 | 12:00 |

Need results by 7/25 if possible.

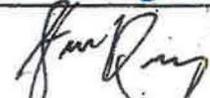
Client: Los Alamos National Laboratory
 SWRI Proj: 91868.01.002
 VTR: 07/22/14 0815
 Battery Check: Y
 Cooler/Container Wipe: <100 cpm
 Total cpm-mR/h (samples): <100 cpm / <0.5mR/hr
 (see Radioactive Material Receiving Form for more information)

SWRI SWR #51554
 Case: ADEP
 Sample(s) Received: Intact
 Background Check: <100 cpm (Lab 107)
 Temp.: 5.0°C (blue ice) / #010200
 Wipe Pkts Description: Cooler(s) - 1

Send results to Keith Greene at LANL.

| RELINQUISHED BY: | Date/Time | RECEIVED BY: | Date/Time |
|---|---------------|--|------------------|
|  | 7/18/14 10:30 | K. Greene  | 7/18/14 10:30 |

K. Greene
 7/21/14 15:00

 07/22/14 08

Southwest Research Institute

Traffic Report

010022



Sample Custodian Signature: _____

- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present
Sample Tag Numbers Not on COC
- 4. SMO Forms Not Present

Client: Los Alamos National Laboratory
 Project: 19869.01.00X
 Case: ADEP / SDG: _____
 Sample Receipt: 53554
 Airbill: 5908 1777 3747

Custody Seal #(s): N/A

| Date Received | Time Received | COC Record | SMO Sample # | Corresponding | | Traffic Rpt, Tags, COC Agree | Sample Condition |
|---------------|---------------|------------|--------------|---------------|--------|------------------------------|------------------|
| | | | | Sample Tag # | SwRI # | | |
| 07/22/14 | 08:10:00 | ADEP | CYA-D | N/A | 558804 | YES | Intact |
| 07/22/14 | 08:10:00 | ADEP | CYA-N | N/A | 558805 | YES | Intact |

SAMPLE LOG-IN SHEET

010023

| | | | |
|--|--|--|----------------|
| Lab Name Southwest Research Institute | | Page 1 of 1 | |
| Received By (Print Name) STEVEN RAMIREZ | | Log-in Date 07/22/2014 | |
| Received By (Signature) <i>Steven Ramirez</i> | | | |
| Case Number ADEP | Sample Delivery Group No. N/A | SAS Number N/A | |
| Remarks: 19869.01.00X | | Remarks: Condition of Sample Shipment, etc | |
| | | Corresponding | |
| | | EPA Sample # | Sample Tag # |
| | | | Assigned Lab # |
| 1. Custody Seal(s) | Present Absent* Intact Broken | CYA-D | N/A |
| | | | 558804 |
| 2. Custody Seal Nos. | N/A | CYA-N | N/A |
| | | | 558805 |
| 3. Chain-of Custody Records | Present Absent* | | |
| 4. Traffic Reports or Packing Lists | Present Absent | | |
| 5. Airbill | Airbill/Sticker Present Absent* | | |
| 6. Airbill No. | 5908 1777 3747 | | |
| 7. Sample Tags | Present Absent | | |
| Sample Tag Numbers | Listed Not listed on Chain of Custody | | |
| 8. Sample Condition | Intact Broken* / Leaking | | |
| 9. Cooler Temperature | 5.0C | | |
| 10. Does information on custody records, traffic reports, and sample tags agree? | Yes No* | | |
| 11. Date Received at Lab | 07/22/2014 | | |
| 12. Time Received | 08:10:00 | | |
| Sample Transfer | | | |
| Fraction | Fraction | | |
| Area # | Area # | | |
| By | By | | |
| On | On | | |

* Contact SMO and attach record of resolution

| | |
|--------------------------------------|---|
| Reviewed By <i>Steven Ramirez</i> | Logbook No. Sample Receipt (53554) |
| Date 7.23.14 | Logbook Page No. <i>8793 SEC 1 of 5</i> |

SOUTHWEST RESEARCH INSTITUTE®

8220 CULEBRA ROAD 78238-5188 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

August 05, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

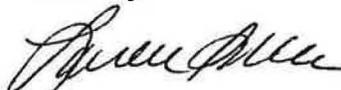
Attn: Keith R. Greene

| | | |
|----------|-----------------------------|---------------|
| Subject: | COC ID: | ADEP |
| | SwRI Project Number: | 19869.01.00X |
| | SDG: | 558804 |
| | SwRI Task Order Number: | 140722-8 |
| | SwRI Sample Receipt Number: | 53554 |
| | Samples received: | July 22, 2014 |
| | Analysis: | UN Oxidizer |

Dear Mr. Greene,

Please find the updated report, which was revised to correct the method referenced throughout. The revised forms are notated in the data package with a "REV" on them. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,



HJS Herbert J. Schattenberg III
Program Manager

APPROVED:



Michael J. Dammann
Director

HJS: mg
Encl



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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

July 29, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

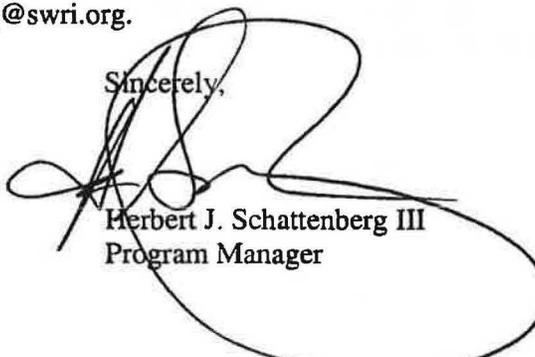
Attn: Keith R. Greene

Subject: COC ID: ADEP
SwRI Project Number: 19869.01.00X
SDG: 558804
SwRI Task Order Number: 140722-8
SwRI Sample Receipt Number: 53554
Samples received: July 22, 2014
Analysis: Method 1040

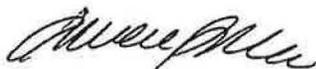
Dear Mr. Greene,

Please find the enclosed results for the two (02) overall solid samples received on the above referenced dates. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,


Herbert J. Schattenberg III
Program Manager

APPROVED:



Michael J. Dammann
Michael J. Dammann
Director

HJS: mg
Encl



Benefiting government, industry and the public through innovative science and technology

010001

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

NARRATIVE

Total Page Count: 010001-
Fraction: Date Report Pages: 010023

Client: Los Alamos National Laboratory
 SDG: 558804
 SwRI Project Number: 19869.01.00X
 SwRI Task Order Number(s): 140722-8

OXIDIZER TEST

The samples were tested in accordance with the United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34, *Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of Division 5.1*. (SW 846 Method 1040 *Test Method for Oxidizing Solids* is based on the UN method). The UN test procedure assesses the relative hazard of oxidizing substances so that an appropriate classification for transport can be made. Tests are conducted on the samples mixed with dry fibrous cellulose in mixing ratios of 1:1 and 4:1, by mass, of sample to cellulose. The burning characteristics of the mixtures are compared with the standard 3:7 mixture, by mass, of potassium bromate to cellulose. If the burning time is equal to or less than the standard mixture, the burning times should be compared with those from packing group I or II reference standards, 3:2 and 2:3, by mass, of potassium bromate to cellulose, respectively. See Table 1 for classification. Table 2 presents the results for the reference standards.

Table 1. UN Packing Group Classifications

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ratio (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

Table 2. Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 | Mean Burn Time, sec 2:3 | Mean Burn Time, sec 3:2 |
|------------------------------------|------------------------------------|------------------------------------|
| KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio |
| 141.56 | 92.02 | 31.01 |

The standard or reference mixtures and the sample mixtures were tested five times at each cellulose mixing ratio. The sample was dried at 65 °C for a minimum of 12 hours and the clumps were broken up using a mortar and pestle. Testing was performed in a Fire Cabinet (Figure 1). A stainless steel mold was used to create individual ignition wires (Figure 2); a new wire was used for each test.

Client: Los Alamos National Laboratory
SDG: 558804
SwRI Project Number: 19869.01.00X
SwRI Task Order Number(s): 140722-8

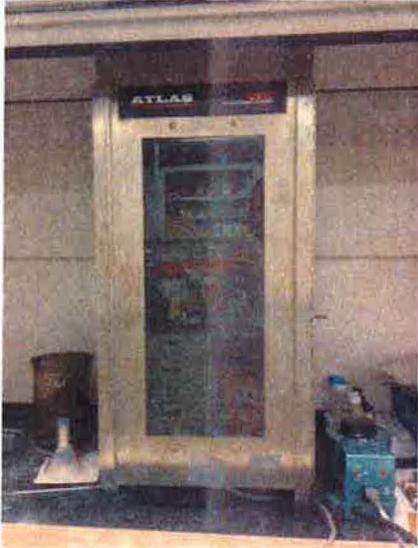


Figure 1. Fire Cabinet



Figure 2. Ignition wire and mold

Client sample CYA-D (system ID 558804) was analyzed in duplicate. In each case, the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced a very small amount of liquefied molten salt during the burning. The 1:1 mixture burned steadily and had a very small amount of liquid molten salt produced. Based on Table 1, the original result was classified as a "Not Division 5.1" but the duplicate was classified as a "Packing group III". Although the mean burn time of the original and duplicate analysis were comparable (143.56 and 135.23 seconds, respectively), they fell on either side of the 3:7 KBrO_3 :Cellulose Ratio burn time of 141.56 second.

Client sample CYA-N (system ID 558805), the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced a very small amount of liquefied molten salt during the burning. The 1:1 mixture, burned steadily and had a very small amount of liquid molten salt produced. The 4:1 sample-to-cellulose ratios had a shorter mean burn rate than that of 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 bromate:cellulose standard which classifies it as a "Packing group III" according to the method.

"I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI."

Group Leader

08/05/14

Date

010004

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

WETCHEM ANALYSIS
SAMPLES RESULTS

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010005
Rev 1

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-----------|----------------|--|--|------------------|
| CYA-D | 558804 | 143.56 | 196.52 | Not Division 5.1 |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing groups I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SAMPLE ANALYSIS DATA SHEET

010006
Rev 1

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-----------|----------------|--|--|-------------------|
| CYA-D | 558804 | 135.23 | 185.3 | Packing group III |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing groups I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

SOUTHWEST RESEARCH INSTITUTE

SAMPLE ANALYSIS DATA SHEET

010007
Rev 1

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 07/22/14

SRR #: 53554

Task Order #: 140722-8

Tested in accordance with United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-----------|----------------|--|--|-------------------|
| CYA-N | 558805 | 121.48 | 183.56 | Packing group III |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 141.56 | 92.02 | 31.01 |

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing groups I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

010008

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

OXIDIZER RAW DATA

Southwest Research Institute

(c) 8/5/14 mm

Method: SW 8410 1040 UN Oxidizer method
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

010009
Rev 1

RS plus
7/28/14

Sample Analysis

System ID: 558804

| Sample: Cellulose | Wt Sample, g | Wt Cellulose, g |
|-------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---|
| 4:1 | 1 | 24.0204 | 6.0046 | 98.48 | |
| 4:1 | 2 | 24.0102 | 6.0151 | 120.12 | |
| 4:1 | 3 | 24.0286 | 6.0010 | 121.00 | |
| 4:1 | 4 | 24.0067 | 6.0099 | 1810.88 | After 3min (180 sec.) variac turned off |
| 4:1 | 5 | 24.0130 | 6.0047 | 191.34 | ↓ |
| 4:1 | Avg | | | 143.56 | |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|--------------------------------------|
| 1:1 | 1 | 15.0217 | 15.0159 | 193.98 | After 3min/180sec. variac turned off |
| 1:1 | 2 | 15.0159 | 15.0178 | 223.21 | ↓ |
| 1:1 | 3 | 15.0137 | 15.0031 | 188.32 | ↓ |
| 1:1 | 4 | 15.0102 | 15.0047 | 188.16 | ↓ |
| 1:1 | 5 | 15.0112 | 15.0093 | 188.94 | ↓ |
| 1:1 | Avg | | | 196.52 | |

Weighted Samples: Monica Mendoza Balance#: 135 Date: 7/25/14
 Tested Samples: Monica Mendoza Timer ID: Fisher Scientific Date: 7/25/14
 Sample Dried? (YES) NO Dried: 65°C oven # 22 * 7/24 - 7/25 overnight
 Cellulose: Inorg# 52038 Dried: 105°C oven # 1 7/22 - 7/23 overnight
 Variac Setting: 120 v; 20

x wo 7/25/14

Due to large particle size, samples were ground mm then weighed.

Southwest Research Institute

Ⓢ 3/5/14 mm

Method: 52846 1040 UN oxidizer method
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

010010
Rev-1

Sample Analysis

System ID: 558804.D

✓ RSP
7/28/14
29 R8
7/29/14

| Sample: Cellulose | Wt Sample, g | Wt Cellulose, g |
|-------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---------|
| 4:1 | 1 | 24.0180 | 6.0153 | 107.81 | |
| 4:1 | 2 | 24.0135 | 6.0097 | 135.47 | |
| 4:1 | 3 | 24.0116 | 6.0165 | 111.41 | |
| 4:1 | 4 | 24.0169 | 6.0033 | 186.88 | |
| 4:1 | 5 | 24.0120 | 6.0249 | 134.60 | |
| 4:1 | Avg | | | 135.23 | |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|-------------------------------------|
| 1:1 | 1 | 15.0118 | 15.0183 | 181.37 | variatic turned off at 180sec./3min |
| 1:1 | 2 | 15.0043 | 15.0071 | 186.34 | |
| 1:1 | 3 | 15.0067 | 15.0072 | 187.25 | |
| 1:1 | 4 | 15.0028 | 15.0158 | 185.97 | |
| 1:1 | 5 | 15.0224 | 15.0091 | 185.59 | ↓ |
| 1:1 | Avg | | | 185.30 | |

Weighted Samples: M. Mendez Balance#: 135 Date: 7/29/14
 Tested Samples: M. Mendez Timer ID: Fisher Scientific Date: 7/29/14
 Sample Dried? YES/NO Dried: 65°C oven #22 7/28-7/29
 Cellulose: Inorg# 52038 Dried: 105°C oven #01 7/28-7/29
 Variac Setting: 120v; 20

Sample was mortar & pestled prior to weighing.

Ⓢ 8/5/14 mm

Southwest Research Institute

Method: SW 846-1040 UN oxidizer method
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140722-8

RS
 7/28/14

Sample Analysis

System ID: 558805

010011
 Rev 1

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

* RE 7/25/14 mm

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---------------------------------------|
| 4:1 | 1 | 24.0142 | 6.0128 | 119.78 | |
| 4:1 | 2 | 24.0128 | 6.0134 | 129.66 | |
| 4:1 | 3 | 24.0320 | 6.0135 | 118.09 | |
| 4:1 | 4 | 24.0336 | 6.0164 | 122.41 | |
| 4:1 | 5 | 24.0070 | 6.0689 | 117.44 | |
| 4:1 | Avg | | | 121.48 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0468 | 15.0199 | 170.09 | |
| 1:1 | 2 | 15.0406 | 15.0272 | 185.91 | turned variac off after 3min/180 sec. |
| 1:1 | 3 | 15.0156 | 15.0185 | 189.06 | |
| 1:1 | 4 | 15.0100 | 15.0209 | 186.28 | |
| 1:1 | 5 | 15.0327 | 15.0287 | 186.47 | |
| 1:1 | Avg | | | 183.36 | |

Weighted Samples: Monica Mendez Balance#: 135 Date: 7/25/14
 Tested Samples: Monica Mendez Timer ID: Fisher Scientific Date: 7/25/14
 Sample Dried? YES / NO Dried: 105°C oven #22 7/24-7/25 over night
 Cellulose: Inorg# 52038 Dried: 105°C oven #01 7/22-7/23 over night
 Variac Setting: 120V; 20

Due to large particle size, samples were ground prior to weighing.

Southwest Research Institute

Ⓢ 8/5/14 mm

Method: SW846 1040 UN oxidizer method
 Project #: 19869.01.0010
 Client: Los Alamos National Lab
 TO#: 140722-8

✓ RSP
7/28/14

Reference Substance

010012

Rev 1

| KBrO ₃ :Cellulose | Wt KBrO ₃ , g | Wt Cellulose, g |
|------------------------------|--------------------------|-----------------|
| 3:7 | 9 | 21 |
| 2:3 | 12 | 18 |
| 3:2 | 18 | 12 |

* RE 7/24/13 mm

| Ratio | Rep | Actual KBrO ₃ Wt, g * | Actual Cellulose Wt, g * | Burning Time, sec | Comment |
|-------|------------|----------------------------------|--------------------------|-------------------|-------------------------------|
| 3:7 | 1 | 9.01085 | 21.0042 | 164.510 | 7/24/13 (burned) weighed 7/24 |
| 3:7 | 2 | 9.0128 | 21.0010 | 133.18 | 7/23 (burned) weighed 7/23 |
| 3:7 | 3 | 9.3198 | 21.0045 | 120.88 | 7/23 (burned) weighed 7/23 |
| 3:7 | 4 | 9.0522 | 21.0011 | 142.76 | 7/24 (burned) weighed 7/23 |
| 3:7 | 5 | 9.0698 | 21.0040 | 146.44 | 7/24 (burned) weighed 7/23 |
| 3:7 | Avg | | | 141.516 | |

| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|------------|--------------------------------|------------------------|-------------------|----------------------------|
| 2:3 | 1 | 12.0464 | 18.0048 | 92.83 | 7/24 (burned) weighed 7/23 |
| 2:3 | 2 | 12.0097 | 18.0110 | 84.03 | 7/24 (burned) weighed 7/23 |
| 2:3 | 3 | 12.0200 | 18.0080 | 97.91 | 7/24 (burned) weighed 7/23 |
| 2:3 | 4 | 12.00893 | 18.0154 | 94.81 | 7/24 (burned) weighed 7/23 |
| 2:3 | 5 | 12.0054 | 18.0630 | 90.53 | 7/24 (burned) weighed 7/23 |
| 2:3 | Avg | | | 92.021 | |

| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|------------|--------------------------------|------------------------|-------------------|--------------------------|
| 3:2 | 1 | 18.0176 | 12.0147 | 29.35 | 7/25 burned weighed 7/25 |
| 3:2 | 2 | 18.003 | 12.0175 | 34.43 | |
| 3:2 | 3 | 18.0130 | 12.0103 | 40.94 | |
| 3:2 | 4 | 18.0187 | 12.0007 | 24.78 | |
| 3:2 | 5 | 18.0172 | 12.0109 | 25.57 | |
| 3:2 | Avg | | | 31.014 | |

Weighted Samples: Monica Mendoza Balance#: 135 Date: 7/23 - 7/25
 Tested Samples: Monica Mendoza Timer ID: Fisher Scientific Date: 7/23 - 7/25
 Potassium Bromate: Inorg# 52035 & 52037 Dried: 65°C Oven #22 (overnight) 7/22 - 7/23
 Cellulose: Inorg# 52038 Dried: 105°C Oven #01 (overnight) 7/22 - 7/23
 Variac Setting: 120V; 20

010013

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

COMMUNICATION

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Tuesday, July 29, 2014 2:56 PM
To: Patel, Nita
Cc: Ramirez, Daniel
Subject: 140722-8WCoxidizer.xls
Attachments: 140722-8WCoxidizer.xls

010014

Nita –

In the final review of the data, CYN-N was classified as a Category III. Sample CYN-D was analyzed in duplicate and gave two different categories. The original result was Category IV (non-oxidizer) and the in the duplicate result a Category III. Classifications are based on burn times. Although the mean burn time of the original and duplicate analysis were comparable (143.56 and 135.23, respectively), they fell on either side of the lowest standard's burn time of 141.56, which is used for classification.

The full data package should follow shortly.

Let me know if you have any questions.

Thanks

Radonna Spies

Group Leader

Analytical and Environmental Chemistry

Southwest Research Institute

ph: 210-522-3242

fax: 210-522-3649

email: rspies@swri.org

Ramirez, Daniel

From: Spies, Radonna S.
Sent: Monday, July 28, 2014 5:09 PM
To: Ramirez, Daniel
Subject: FW: OXIDIZER TEST - CYA-N result

010015

Danny –

Talked to Nita and I got the go ahead from Nita to repeat CYN-D:1 ratio. I told her we will have it tomorrow.

Thanks
Radonna

From: Spies, Radonna S. [<mailto:radonna.spies@swri.org>]
Sent: Monday, July 28, 2014 12:37 PM
To: Patel, Nita
Subject: RE: OXIDIZER TEST - CYA-N result

The oxidizer classification of the sample is based on the average burn rate of 5 replicates – at two different ratios of sample:cellulose. This shortest average burn rate of the two ratios is used for comparison against burn rates of three reference standard:cellulose ratios.

For CYN-D, the fastest burn times were from the 4:1 sample:cellulose. The burn times of the 5 replicates were:

98.48 sec
120.12 sec
121.00 sec
186.88 sec
191.34 sec
Avg 143.56 sec

The lowest reference standard mean burn time was 141.56 sec.

Note that the first three replicates had burn times less than the lowest reference standard (but greater than the intermediate standard) which would be a Category II classification; however, the remaining two standards had burn times substantially longer, which lead to a higher average and resulted in a Category IV (non-oxidizer) classification. Therefore, it is questionable whether the material should received a Category II or IV.

Its believe the inconsistent results may have been caused by sample inhomogeneity. Although the sample was particle size reduced with a mortar and pestle, the organic kitty litter did not “pulverize” well, and the particle size and density differences in the kitty litter and sodium nitrate salts cause settleability issues, which may have led to uneven aliquots. I know that CYN-D is likely a duplicate sample of CYN-N but we didn’t encounter an issue and the replicates were within 117.44-129.66 sec with an average of 121.48 sec – thus making is a Category II classification.

Want to know if you would like use to repeat the testing for this sample? Or include this write up in the narrative?

010016

Radonna Spies

Group Leader
Analytical and Environmental Chemistry
Southwest Research Institute
ph: 210-522-3242
fax: 210-522-3649
email: rspies@swri.org

From: Patel, Nita [<mailto:npatel@lanl.gov>]
Sent: Monday, July 28, 2014 10:08 AM
To: Ramirez, Daniel
Cc: Spies, Radonna S.; Dammann, Michael J.
Subject: RE: OXIDIZER TEST - CYA-N result

Hi Radonna. Hope you had a good break... Please let me know when the data is available. I already have folks asking...



From: Ramirez, Daniel [<mailto:daniel.ramirez@swri.org>]
Sent: Friday, July 25, 2014 5:16 PM
To: Greene, Keith Robert; Patel, Nita
Cc: Spies, Radonna S.; Dammann, Michael J.
Subject: OXIDIZER TEST - CYA-N result

Keith / Nita,

See below. SDG 558804, SwRI Sample Receipt 53554, assigned Task Order 140722-8.

We will have the final report to upload, with some videos on Monday, which will give Radonna an opportunity to review all the applicable data.

Daniel Ramirez
Southwest Research Institute
Department of Analytical and Environmental Chemistry
Division 01
6220 Culebra Road
San Antonio, Texas 78238
Phone (210) 522.3867
Fax (210) 522.5938

From: Mendoza, Monica V.
Sent: Friday, July 25, 2014 6:10 PM
To: Ramirez, Daniel
Subject: RE: SAMPLE ONE FOR OXIDIZER TEST

| Sample ID | SwRI System ID | Mean Burn Time, sec | Mean Burn Time, sec | |
|-----------|----------------|---------------------|---------------------|--|
|-----------|----------------|---------------------|---------------------|--|

| | | 4:1 Sample:Cellulose Ratio | 1:1 Sample:Cellulose Ratio | Classification |
|-------|--------|----------------------------------|----------------------------------|------------------------|
| CYA-N | 558805 | 121.48 | 183.56 | Category II (oxidizer) |

Monica Mendoza

010017

Analytical and Environmental Chemistry
 Southwest Research Institute
monica.mendoza@swri.org

010018

SOUTHWEST RESEARCH INSTITUTE
CLIENT: Los Alamos National Laboratory
TASK ORDER: 140722-8
SRR: 53554
SDG: 558804
VTSR: July 22, 2014
PROJECT#: 19869.01.00X

SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY

010019

Sample Receipt

Sample Receipt Number: 53554

Southwest Research Institute

VTSR: 07/22/14

Time: 08:10:00

Project: 19869.01.00X
Case #: ADEP
Client: Los Alamos National Laboratory

Manager: DAMMANN, MIKE
Logged In by: SRAMIREZ
Creation Date:

Notes

Sample was delivered intact at 5.0 °C (blue ice).

Fed Ex #(s):
5908 1777 3747

See Task Order for full requirements.

See chain of custody as part of the SRR system for more information.

Phases:
001 - admin
002 - extraction
005 - 8082
006 - metals/radchem
007 - drg

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

| System ID | Customer ID | CED | Matrix | Containers | Special Reqs. |
|---------------|-------------|----------|--------|------------|---------------|
| 558804 | CYA-D | 07/17/14 | Solid | 1 | |
| 558805 | CYA-N | 07/17/14 | Solid | 1 | |
| Containers: 2 | | | | Samples: 2 | |

These documents are associated with this receipt: 161753[COC for SRR 53554], 161754[SRR Paperwork for SRR 53554]

Thermometer: 010209
Temperature: 5.0

Client: Los Alamos National Laboratory SRR# 53554 FRT-002

Laboratory Task Order

010020 Rev 1

TO #: 140722-8 Revision: 1

SDG: 558804
 VTSR: 07/22/14
 CASE: ADEP

SRR #s: 53554
 Client(s): Los Alamos National Laboratory

Project(s): 19869.01.00X
 Manager(s): DAMMANN, MIKE
 To Client: 07/24/14

Instructions

Los Alamos National Laboratory _ Subcontract No. 250954
 Lab Request # ADEP
 SDG is 558804.

RUSH TAT. 3-business days
 ALL DATA IS DUE TO THE CLIENT ON 07/25/2014.

2 overall SOLID samples (2 containers) were received on 07/22/2014.

Requires:

United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34, Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of Division 5.1.

See client email for additional info.

PRELIMS _ Email prelims to: Keith Greene kgreene@lanl.gov, Nita Patel npatel@lanl.gov

EDD REQUIRED. Please note, All results have to be merged under 1 EDD "file."

See Exhibit "D" Scope of Work and Technical Specifications for Off-Site Analytical Laboratory Services

Main point-of-contact is Keith R. Greene, kgreene@lanl.gov; Additional contact Nita Patel npatel@lanl.gov

Send Hardcopy & CD TO:

Los Alamos National Laboratory
 ATTN: Keith R. Greene
 TA-3 SM-271 Drop point 02U
 Los Alamos, NM 87545

REVISION 1, DRmz 08/05/14: Task Order revised to remove method 1040 and replace with correct one.

Documents Related to this task order: 161753[COC for SRR 53554], 161754[SRR Paperwork for SRR 53554]

Deliverables -> Hard Copy: -YES- EDD: no PDF: -YES-

Test: Oxidizer_UN
 Section: WETCHEM

Holding: 180 days from CED

United Nations (UN) Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of Division 5.1.Division 5.1.

Cnt: 2

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|-------------|-----------|-------------|
| 558804 | | 1 | Solid | CYA-D | 17 Jul 14 | 13 Jan 15 |
| 558805 | | 1 | Solid | CYA-N | 17 Jul 14 | 13 Jan 15 |

FIELD CHAIN- OF CUSTODY

ADEP

NAME: Philip Leonard

TA: _____ 010021

Z#: _____

OU: _____

PHONE: 695-8884

CHAGE CODE: _____

| SAMPLE # | ORDER CODE | CONTAINER | PREV. COLLECTED: Time /date | SPECIAL instructions |
|----------|------------|-----------|--------------------------------|-------------------------|
|----------|------------|-----------|--------------------------------|-------------------------|

| | | | | |
|-------|-------|------------------|---------|-------|
| CYA-W | UNDOT | oxidizer 1L Poly | 7/17/14 | 12:00 |
| CYA-D | " | " 1L Poly | 7/17/14 | 12:00 |

Need Results by 7/25 if possible.

Client: Los Alamos National Laboratory
 BuRI Project: #1888.01.00X
 VTS#: 07/22/14 0810
 Battery Check: Y
 Cooler/Container Wipe: <100 cpm
 Total cpm-mR/h (samples): <100 cpm / <0.5mR/hr
 (see Radioactive Material Receiving Form for more information)

buRI SRN #51554
 Case: ADEP
 Sample(s) Received: Intact
 Background Check: <100 cpm (Lab 103)
 Temp.: 5.0°C (blue ice) #010209
 Wipe Frisk Description: Cooler(s) - 1

Send results to Keith Greene at LANL.

| RELINQUISHED BY: | Date/Time | RECEIVED BY: | Date/Time |
|-----------------------|---------------|---------------------|---------------|
| <i>Philip Leonard</i> | 7/18/14 10:30 | <i>K. Greene</i> | 7/18/14 10:30 |
| <i>K. Greene</i> | 7/21/14 15:00 | <i>Keith Greene</i> | 07/22/14 0810 |

Southwest Research Institute

Traffic Report

010022



Sample Custodian Signature: _____

[Handwritten Signature]

- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present
Sample Tag Numbers Not on COC
- 4. SMO Forms Not Present

Client: Los Alamos National Laboratory
 Project: 19869.01.00X
 Case: ADEP / SDG: _____
 Sample Receipt: 53554
 Airbill: 5908 1777 3747

Custody Seal #(s): N/A

| Date Received | Time Received | COC Record | SMO Sample # | Corresponding | | Traffic Rpt, Tags, COC Agree | Sample Condition |
|---------------|---------------|------------|--------------|---------------|--------|------------------------------|------------------|
| | | | | Sample Tag # | SwRI # | | |
| 07/22/14 | 08:10:00 | ADEP | CYA-D | N/A | 558804 | YES | Intact |
| 07/22/14 | 08:10:00 | ADEP | CYA-N | N/A | 558805 | YES | Intact |

SAMPLE LOG-IN SHEET

010023

| | | | |
|--|--|-------------------------------|----------------|
| Lab Name Southwest Research Institute | | Page 1 of 1 | |
| Received By (Print Name) STEVEN RAMIREZ | | Log-in Date 07/22/2014 | |
| Received By (Signature) <i>Steven Ramirez</i> | | | |
| Case Number ADEP | Sample Delivery Group No. N/A | SAS Number N/A | |
| Remarks: 19869.01.00X | | | |
| | EPA Sample # | Corresponding Sample Tag # | Assigned Lab # |
| 1. Custody Seal(s) | Present Absent* Intact Broken | CYA-D | N/A |
| 2. Custody Seal Nos. | N/A | CYA-N | N/A |
| 3. Chain-of-Custody Records | Present Absent* | | |
| 4. Traffic Reports or Packing Lists | Present Absent | | |
| 5. Airbill | Airbill/Sticker Present Absent* | | |
| 6. Airbill No. | 5908 1777 3747 | | |
| 7. Sample Tags | Present Absent | | |
| Sample Tag Numbers | Listed Not listed on Chain of Custody | | |
| 8. Sample Condition | Intact Broken* / Leaking | | |
| 9. Cooler Temperature | 5.0C | | |
| 10. Does Information on custody records, traffic reports, and sample tags agree? | Yes No* | | |
| 11. Date Received at Lab | 07/22/2014 | | |
| 12. Time Received | 08:10:00 | | |
| Sample Transfer | | | |
| Fraction INLET | Fraction | | |
| Area # (R. SPIES) | Area # | | |
| By STEVEN RAMIREZ | By | | |
| On 07/22/2014 | On | | |

* Contact SMO and attach record of resolution

| | |
|---|---------------------------------------|
| Reviewed By <i>David [Signature]</i> | Logbook No. Sample Receipt (53554) |
| Date 7.23.14 | Logbook Page No. ✓ 8793 SEC 1 OF 5 |

SOUTHWEST RESEARCH INSTITUTE®

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

September 9, 2014

Los Alamos National Laboratory
TA-3 SM-271 Drop Point 02U
Los Alamos, New Mexico 87545

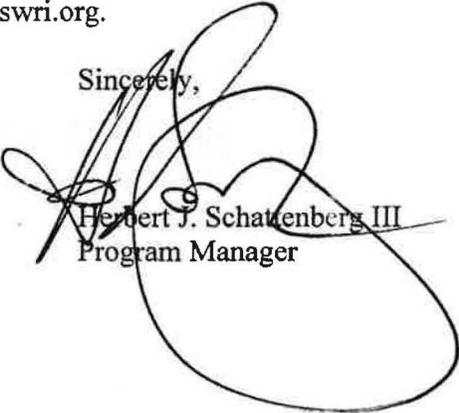
Attn: Keith R. Greene

Subject: COC ID: ADEP
SwRI Project Number: 19869.01.00X
SDG: 560542
SwRI Task Order Number: 140828-6
SwRI Sample Receipt Number: 53778
Samples received: 08.28.14
Analysis: Method 1040

Dear Mr. Greene,

Please find the enclosed results for the one (01) overall solid sample received on the above referenced dates. Should you have any questions, please feel free contact me directly at 210-522-3051, or by email at hschattenberg@swri.org.

Sincerely,


Herbert J. Schattenberg III
Program Manager

APPROVED:


Michael J. Dammann
Director

HJS: aa
Encl



Benefiting government, industry and the public through innovative science and technology

010001

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER: 140828-6

SRR: 53778

SDG: 560542

VTSR: 08.28.14

PROJECT #: 19869.01.00X

NARRATIVE

Client: Los Alamos National Laboratory
 SDG: 560542
 SwRI Project Number: 19869.01.00X
 SwRI Task Order Number(s): 140828-6

OXIDIZER TESTS

United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34, Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of Division 5.1

This method assesses the relative hazard of oxidizing substances so that an appropriate classification for transport can be made. The test method is designed to measure the potential for a solid substance to increase the burning rate or burning intensity of a combustible substance when the two are thoroughly mixed. Tests are conducted on the substance mixed with dry fibrous cellulose in mixing ratios of 1:1 and 4:1, by mass, of sample to cellulose. The burning characteristics of the mixtures are compared with the standard 3:7 mixture, by mass, of potassium bromate to cellulose. If the burning time is equal to or less than the standard mixture, the burning times should be compared with those from Packing Group I or II reference standards, 3:2 and 2:3, by mass, of potassium bromate to cellulose, respectively. See Table 1 for classification. Table 2 presents the results for the reference standards.

Since the method states that the test substance should be tested in the form in which it will be transported, the sample was tested "as received". The sample was not dried or particle size reduced.

Table 1. Oxidizer Classifications for UN Method

| The test criteria for determining oxidizing properties of the substance are: | UN Classification |
|--|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

Table 2. Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 | Mean Burn Time, sec 2:3 | Mean Burn Time, sec 3:2 |
|------------------------------------|------------------------------------|------------------------------------|
| KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio |
| 117.17 | 64.12 | 21.23 |

Client: Los Alamos National Laboratory
SDG: 560542
SwRI Project Number: 19869.01.00X
SwRI Task Order Number(s): 140828-6

Client sample SwheatScoop-NaNO₃ (system ID 560542-2MX) was analyzed in duplicate following the UN method. In each case, the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced liquefied molten salt during the burning. The 1:1 mixture burned fairly steadily with sporadic start and stopping of the flames. Timing of the sample was continued if the sample ignited again within a few seconds. The sample also produced a small amount of liquid molten salt. Based on Table 1, the 4:1 sample-to-cellulose ratios had a shorter mean burn rate than that of 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 bromate:cellulose standard which classifies it as a "Packing group II" according to the method.

SW 846 Method 1040 Test Method for Oxidizing Solids.

This method provides a qualitative means to measure the potential of a solid waste to increase the burning rate or burning intensity of a combustible substance, specifically fibrous cellulose. The burning rates for 1:1 and 4:1 waste:cellulose mixtures (w/w) are compared to the burning rates for 3:7, 2:3, and 3:2 potassium bromate:cellulose mixtures. Potassium bromate is used as the reference oxidizing standard. The three mixing ratios of potassium bromate and cellulose provide a range of burning times by which the waste is classified. The 3:7 mixture ratio provides the longest burning time, the 3:2 mixture ratio provides the shortest burning time, and the 2:3 mixture ratio provides an intermediate burning time. The burning times for the potassium bromate:cellulose mixtures are correlated to their relative oxidizing strengths, i.e., the shorter the burning time, the greater the relative oxidizing strength. If the mean burning time for either waste/cellulose mixture is shorter than the mean burning time for the 3:7 potassium bromate/cellulose mixtures, the waste is shown to exhibit oxidizer properties." See Table 3 for sample results and Table 2 for the reference mixture times.

The sample was dried at 65 °C for a minimum of 12 hours. The method states that the sample should be cut, crushed, or ground so that the particle size of the sample to be tested is no larger than 0.5 mm. Due to the nature of the sample, it was not feasible to particle size reduce the Swheat material to <0.5mm; however, the dried sample was passed through a 2.00 mm sieve and the larger particles retained on the sieve were then ground using a mortar and pestle to pass through the sieve openings. Therefore, the particle size of the sample tested was less than 2 mm. (See Figures 1 and 2).

According to Method 1040, "Once the pile is ignited, turn off the power to the ignition wire.... If the waste mixture does not appear to ignite, continue heating the ignition wire for a period of at least three minutes"; however, the UN method states "Power is applied to the ignition wire and is maintained for the duration of the test or for three minutes if the mixture does not ignite or burn." For the purposes of comparison and err on the side of caution, the power to the ignition wire was allowed to remain on for the duration of the test or three minutes if the mixture did not ignite for Method 1040. Therefore, since the timing of the power to the ignition wire remained the same for Method 1040 and the UN method, only one set of reference mixtures were needed (Table 2) to evaluate both method.

Client: Los Alamos National Laboratory
 SDG: 560542
 SwRI Project Number: 19869.01.00X
 SwRI Task Order Number(s): 140828-6



Figure 1. 2.00mm Testing Sieve



Figure 2. Sample poured through sieve

Table 3. Classification of Oxidizer Categories for 1040 Method

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is.... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

Client sample SwheatScoop- NaNO_3 (system ID 560542-1LY) was analyzed in duplicate following Method 1040. In each case, the 4:1 sample-to-cellulose ratios burned more quickly than the 1:1 ratio and produced a very small amount of liquefied molten salt during the burning. The 1:1 mixture, burned steadily and had little to no liquid molten salt produced. The 4:1 sample-to-cellulose ratios had a shorter mean burn rate than that of 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 bromate:cellulose standard which classifies it as a "Category II (oxidizer)" according to the method.

Client: Los Alamos National Laboratory
SDG: 560542
SwRI Project Number: 19869.01.00X
SwRI Task Order Number(s): 140828-6

Testing for both UN and Method 1040 were performed in a Fire Cabinet (Figure 3). A stainless steel mold was used to create individual ignition wires (Figure 4); a new wire was used for each test.

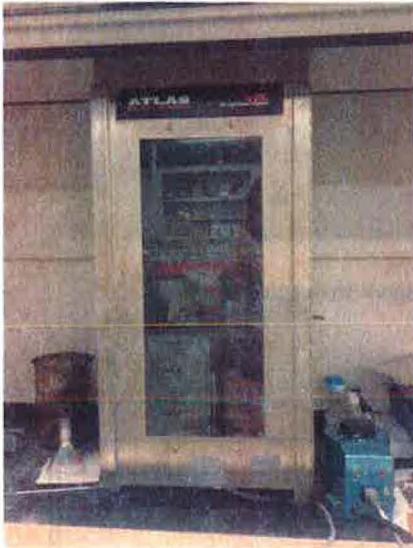


Figure 3. Fire Cabinet

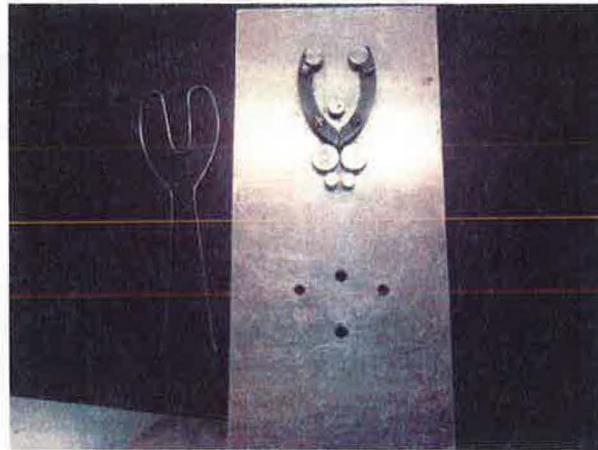


Figure 4. Ignition wire and mold

“I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the laboratory manager or his/her designee, as verified by the following signature. This report shall not be reproduced except in full without the written approval of SwRI.”

RSpies

Group Leader

09/09/14

Date

010006

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER: 140828-6

SRR: 53778

SDG: 560542

VTSR: 08.28.14

PROJECT #: 19869.01.00X

**SAMPLE RECEIPT, TASK ORDER
&
CHAIN OF CUSTODY**

Southwest Research Institute

Project: 19869.01.00X
Case #: ADEP
Client: Los Alamos National Laboratory

Sample Receipt

Sample Receipt Number: 53778

VTSR: 08/28/14

010007

Time: 08:45:00

Manager: DAMMANN, MIKE
Logged in by: SRAMIREZ
Creation Date: 08/28/14

Notes

Sample was delivered intact at a temperature of 11.0°C (blue ice).

Fed Ex #(s):
5908 1777 6492

See Task Order for full requirements.

See chain of custody as part of the SRR system for more information.

Phases:
001 - admin
002 - extraction
005 - 8082
006 - metals/radchem
007 - drg

Background CPM: <100 cpm
Container Wipe CPM: <100 cpm
Total CPM: <100

| System ID | Customer ID | CD | Matrix | Containers | Special Reqs. |
|-----------|-------------------|----------|--------|------------|---------------|
| 560542 | SwheatScoop-NaNO3 | 08/25/14 | Solid | 2 | |

Containers: 2

Samples: 1

These documents are associated with this receipt: 163889[COC for SRR 53778], 163890[SRR Paperwork for SRR 53778]

Thermometer: 021056
Temperature: 11.0

53778 Los Alamos National Laboratory

Laboratory Task Order

010008

TO #: 140328-6 Revision: 0

Project(s): 19869.01.00X
 Manager(s): DAMMANN, MIKE
 To Client: 09/03/14

SDG: 560542
 VTSR: 08/28/14
 CASE: ADEP

SRR #s: 53778
 Client(s): Los Alamos National Laboratory

Instructions

Los Alamos National Laboratory _ Subcontract No. 250954
 Lab Request # ADEP
 SDG is 560542.

RUSH TAT. 7-day TAT
 ALL DATA IS DUE TO THE CLIENT ON 09/04/2014.

1 overall SOLID sample (2 containers) was received on 08/28/2014.

Requires:

SW846 Method 1040 for Oxidizing Solids
 United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34,
 Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of
 Division 5.1.

PRELIMS _ Email prelims to: Keith Greene kgreene@lanl.gov, Nita Patel npatel@lanl.gov

EDD REQUIRED. Please note, All results have to be merged under 1 EDD "file."
 See Exhibit "D" Scope of Work and Technical Specifications for Off-Site Analytical Laboratory
 Services

Main point-of-contact is Keith R. Greene, kgreene@lanl.gov; Additional contact Nita Patel
 npatel@lanl.gov
 Send Hardcopy & CD TO:
 Los Alamos National Laboratory
 ATTN: Keith R. Greene
 TA-3 SM-271 Drop point 02U
 Los Alamos, NM 87545

Documents Related to this task order: 163889[CD for SRR 53778], 163890[SRR Paperwork for SRR 53778]

Deliverables --> Hard Copy: -YES- EDD: -YES- PDF: -YES-

Test: Oxidizer_UN
 Section: WETCHEM

Holding: 180 days from CED

United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34,
 Classification Procedures, Test Methods and Criteria Relating to Oxidizing Substances of Division 5.1

Cnt: 1

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|-------------|-----------|-------------|
| 560542 | | 1 | Solid | NaN03 | 25 Aug 14 | 21 Feb 15 |
| 560542 | | 2 | Solid | NaN03 | 25 Aug 14 | 21 Feb 15 |

Test: OXIDIZING_1040
 Section: WETCHEM

Holding: 180 days from CED

SW846 Method 1040 for Oxidizing Solids

Cnt: 1

| System ID | Type | Cont | Matrix | Customer ID | CED | Method Date |
|-----------|------|------|--------|-------------|-----------|-------------|
| 560542 | | 1 | Solid | NaN03 | 25 Aug 14 | 21 Feb 15 |
| 560542 | | 2 | Solid | NaN03 | 25 Aug 14 | 21 Feb 15 |

Southwest Research Institute

Traffic Report

010010



Sample Custodian Signature: _____

- 1. Custody Seal Present
- 2. Chain of Custody Present
- 3. Sample Tags Not Present
Sample Tag Numbers Not on COC
- 4. SMO Forms Not Present

Client: Los Alamos National Laboratory

Project: 19869.01.00X

Case: ADEP / SDG: _____

Sample Receipt: 53778

Airbill: 5908 1777 6492

Custody Seal #(s): N/A

| Date Received | Time Received | COC Record | SMO Sample # | Corresponding | | Traffic Rpt, Tags, COC Agree | Sample Condition |
|---------------|---------------|------------|-------------------|---------------|--------|------------------------------|------------------|
| | | | | Sample Tag # | SwRI # | | |
| 08/28/14 | 08:45:00 | Client COC | SwheatScoop-NaNO3 | N/A | 560542 | YES | Intact |

SAMPLE LOG-IN SHEET

010011

| | | | |
|--|--|--|----------------|
| Lab Name Southwest Research Institute | | Page 1 of 1 | |
| Received By (Print Name) STEVEN RAMIREZ | | Log-in Date 08/28/2014 | |
| Received By (Signature) <i>Steven Ramirez</i> | | | |
| Case Number ADEP | Sample Delivery Group No. N/A | SAS Number N/A | |
| Remarks: 19869.01.00X | | Remarks: Condition of Sample Shipment, etc | |
| | EPA Sample # | Sample Tag # | Assigned Lab # |
| 1. Custody Seal(s) | Present Absent* Intact Broken | SwheatScoop-Na N03 | 560542 |
| 2. Custody Seal Nos. | N/A | | |
| 3. Chain-of Custody Records | Present Absent* | | |
| 4. Traffic Reports or Packing Lists | Present Absent | | |
| 5. Airbill | Airbill/Sticker Present Absent* | | |
| 6. Airbill No. | 5908 1777 6492 | | |
| 7. Sample Tags | Present Absent | | |
| Sample Tag Numbers | Listed Not listed on Chain of Custody | | |
| 8. Sample Condition | Intact Broken*/ Leaking | | |
| 9. Cooler Temperature | 11.0C | | |
| 10. Does Information on custody records, traffic reports, and sample tags agree? | Yes No* | | |
| 11. Date Received at Lab | 08/28/2014 | | |
| 12. Time Received | 08:45:00 | | |
| Sample Transfer | | | |
| Fraction ORG | Fraction | | |
| Area # COOLER 13 | Area # | | |
| By STEVEN RAMIREZ | By | | |
| On 08/28/2014 | On | | |

* Contact SMO and attach record of resolution

| | |
|--------------------------------------|--|
| Reviewed By <i>Steven Ramirez</i> | Logbook No Sample Receipt (53778) |
| Date 9.2.14 | Logbook Page No. <i>8830</i> <i>Sec 2092</i> |

010012

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER: 140828-6

SRR: 53778

SDG: 560542

VTSR: 08.28.14

PROJECT #: 19869.01.00X

Data Forms

SOUTHWEST RESEARCH INSTITUTE ⁰¹⁰⁰¹³

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 08/28/14

SRR #: 53778

Task Order #: 140828-6

Tested in accordance with United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec | Mean Burn Time, sec | Classification |
|-------------------|----------------|-------------------------------|-------------------------------|------------------|
| | | 4:1 Sample:Cellulose Ratio | 1:1 Sample:Cellulose Ratio | |
| SwheatScoop-NaNO3 | 560542-2 | 45.69 | 146.33 | Packing group II |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec | Mean Burn Time, sec | Mean Burn Time, sec |
|------------------------------------|------------------------------------|------------------------------------|
| 3:7 | 2:3 | 3:2 |
| KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio |
| 117.17 | 64.12 | 21.23 |

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing groups I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

SOUTHWEST RESEARCH INSTITUTE 10014

DUPLICATE SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 08/28/14

SRR #: 53778

Task Order #: 140828-6

Tested in accordance with United Nations (UN) "Recommendations on the Transport of Dangerous Goods", Section 34

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec | Mean Burn Time, sec | Classification |
|-------------------|----------------|-------------------------------|-------------------------------|------------------|
| | | 4:1 Sample:Cellulose Ratio | 1:1 Sample:Cellulose Ratio | |
| SwheatScoop-NaNO3 | 560542-2 | 50.72 | 166.67 | Packing group II |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec | Mean Burn Time, sec | Mean Burn Time, sec |
|------------------------------------|------------------------------------|------------------------------------|
| 3:7 | 2:3 | 3:2 |
| KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio | KBrO ₃ :Cellulose Ratio |
| 117.17 | 64.12 | 21.23 |

| The test criteria for determining oxidizing properties of the substance are: | Classification |
|---|-------------------|
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose. | Packing group I |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing group I | Packing group II |
| Any substance which, in the 4:1 or 1:1 sample-to-cellulose ration (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose; and which does not meet the criteria for packing groups I and II. | Packing group III |
| Any substance which, in both the 4:1 and 1:1 sample-to-cellulose ration (by mass) tested, does not ignite and burn, or exhibit mean burning times greater than that of a 3:7 mixture (by mass) of potassium bromate and cellulose. | Not Division 5.1 |

SOUTHWEST RESEARCH INSTITUTE 010015

SAMPLE ANALYSIS DATA SHEET

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 08/28/14

SRR #: 53778

Task Order #: 140828-6

Tested in accordance with SW 846 Method 1040

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-------------------|----------------|--|--|------------------------|
| SwheatScoop-NaNO3 | 560542-1 | 30.57 | 126.45 | Category II (oxidizer) |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 117.17 | 64.12 | 21.23 |

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is.... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

SOUTHWEST RESEARCH INSTITUTE

DUPLICATE SAMPLE ANALYSIS DATA SHEET

010016

Lab Name: Southwest Research Institute

Client: Los Alamos National Laboratory

Lab Code: SwRI

Project No.: 19869.01.00X

Matrix: Solid

Date Received: 08/28/14

SRR #: 53778

Task Order #: 140828-6

Tested in accordance with SW 846 Method 1040

Test Substance

| Sample ID | SwRI System ID | Mean Burn Time, sec 4:1 Sample:Cellulose Ratio | Mean Burn Time, sec 1:1 Sample:Cellulose Ratio | Classification |
|-------------------|----------------|--|--|------------------------|
| SwheatScoop-NaNO3 | 560542-1 | 34.27 | 145.08 | Category II (oxidizer) |

Potassium Bromate and Cellulose Reference Mixtures

| Mean Burn Time, sec 3:7 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 2:3 KBrO ₃ :Cellulose Ratio | Mean Burn Time, sec 3:2 KBrO ₃ :Cellulose Ratio |
|--|--|--|
| 117.17 | 64.12 | 21.23 |

| If the Shortest Mean Burn Time in Seconds for Any Waste Mixture Is... | Then the Waste Is: |
|--|------------------------------|
| Less than or equal to that of the 3:2 potassium bromate:cellulose standard | Category I (oxidizer) |
| Less than or equal to that of the 2:3 potassium bromate:cellulose standard and greater than that of the 3:2 potassium bromate:cellulose standard | Category II (oxidizer) |
| Less than or equal to that of the 3:7 potassium bromate:cellulose standard and greater than that of the 2:3 potassium bromate:cellulose standard | Category III (oxidizer) |
| Greater than that of the 3:7 potassium bromate:cellulose standard or does not ignite or burn within three minutes. | Category IV (a non-oxidizer) |

010017

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER: 140828-6

SRR: 53778

SDG: 560542

VTSR: 08.28.14

PROJECT #: 19869.01.00X

UN Sec. 34 & Method 1040 Raw Data

Southwest Research Institute

Method: UN sec 34 1/2 method 1040
 Project #: 19869.01.000
 Client: Los Alamos National Laboratory
 TO#: 140828-6

Reference Substance

| KBrO ₃ :Cellulose | Wt KBrO ₃ , g | Wt Cellulose, g |
|------------------------------|--------------------------|-----------------|
| 3:7 | 9 | 21 |
| 2:3 | 12 | 18 |
| 3:2 | 18 | 12 |

RE 9/3/14 mm

| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|--------------------------------|------------------------|-------------------|---------|
| 3:7 | 1 | 9.0075 | 21.0141 | 115.32 | |
| 3:7 | 2 | 9.0139 | 21.0010 | 116.47 | |
| 3:7 | 3 | 9.0027 | 21.0030 | 103.90 | |
| 3:7 | 4 | 9.0133 | 21.0037 | 130.85 | |
| 3:7 | 5 | 9.0026 | 21.0056 | 119.31 | |
| 3:7 | Avg | | | 117.17 | |
| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 2:3 | 1 | 12.0099 | 18.0079 | 65.31 | |
| 2:3 | 2 | 12.0127 | 18.0036 | 69.03 | |
| 2:3 | 3 | 12.0606 | 18.0032 | 100.96 | |
| 2:3 | 4 | 12.0108 | 18.0011 | 69.72 | |
| 2:3 | 5 | 12.0237 | 18.0017 | 55.59 | |
| 2:3 | Avg | | | 64.122 | ≈ 64.12 |
| Ratio | Rep | Actual KBrO ₃ Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 3:2 | 1 | 18.0194 | 12.0044 | 20.16 | |
| 3:2 | 2 | 18.0198 | 12.0088 | 22.40 | |
| 3:2 | 3 | 18.0166 | 12.0031 | 22.63 | |
| 3:2 | 4 | 18.0041 | 12.0065 | 20.75 | |
| 3:2 | 5 | 18.0078 | 12.0035 | 20.19 | |
| 3:2 | Avg | | | 21.226 | ≈ 21.23 |

Weighted Samples: M. Mendez Balance#: 135 Date: 9/3/13
 Tested Samples: M. Mendez Timer ID: Fisher Scientific Date: 9/3/13
 Potassium Bromate: Inorg# 52035 Dried: Oven #31 @ 65°C
 Cellulose: Inorg# 35 34508 & 52038 Dried: Oven #01 @ 105°C
 Variac Setting: 152W Fluke true rms multimeter meter: AN# 008369
 probe: AN# 019168

010019

Southwest Research Institute

Method: UN
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140828-6

✓ RSP
9/8/14

Sample Analysis

System ID: 560542-2mx

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|------|------------------------|---------------------------|----------------------|---------|
| 4:1 | 1 | 24.0262 | 6.0293 | 47.72 | |
| 4:1 | 2 | 24.0427 | 6.0201 | 39.90 | |
| 4:1 | 3 | 24.0615 | 6.0419 | 44.59 | |
| 4:1 | 4 | 24.0340 | 6.0154 | 37.44 | |
| 4:1 | 5 | 24.0147 | 6.0365 | 58.78 | |
| 4:1 | Avg. | | | 45.69 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0183 | 15.0216 | 165.25 | |
| 1:1 | 2 | 15.0698 | 15.0384 | 104.56 | |
| 1:1 | 3 | 15.0328 | 15.0357 | 163.75 | |
| 1:1 | 4 | 15.0853 | 15.0618 | 164.24 | |
| 1:1 | 5 | 15.0061 | 15.0192 | 133.85 | |
| 1:1 | Avg. | | | 146.33 | |

Weighted Samples: M. mendocina Balance#: 135 Date: 9/4/14
 Tested Samples: M. mendocina Timer ID: Fisher Scientific Date: 9/4/14
 Sample Dried? YES (NO) Dried: NA
 Cellulose: Inorg# 34508 & 52038 Dried: OVEN # 01 @ 105°C
 Variac Setting: 152 W

010020

Southwest Research Institute

Method: UN
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140828-6

Sample Analysis

System ID: 560542-2mx Dup

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|------------------------|---------------------------|----------------------|------------------------------|
| 4:1 | 1 | 24.0390 | 6.0066 | 44.97 | |
| 4:1 | 2 | 24.0320 | 6.0199 | 53.79 | |
| 4:1 | 3 | 24.0168 | 6.0047 | 55.43 | |
| 4:1 | 4 | 24.0097 | 6.0047 | 49.87 | |
| 4:1 | 5 | 24.0286 | 6.0638 | 49.54 | |
| 4:1 | Avg | | | 50.72 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0336 | 15.0039 | 2180 ¹⁸⁰ | 15.0125; 15.0473; 203.04 sec |
| 1:1 | 2 | 15.0515 | 15.0036 | 175.27 | ↳ Ran on 9/08/14 |
| 1:1 | 3 | 15.0246 | 15.0114 | 145.52 | Power turned off at 180 sec. |
| 1:1 | 4 | 15.0184 | 15.0182 | 172.13 | Flames continued to burn |
| 1:1 | 5 | 15.0049 | 15.0171 | 137.41 | for 23.04 more seconds. |
| 1:1 | Avg | | | 162.07 | |

ci
 9/8/14
 mm 166.67

Weighted Samples: M. Mendez Balance#: 135 Date: 9/4/14
 Tested Samples: M. Mendez Timer ID: Fisher Scientific Date: 9/4/14
 Sample Dried? YES (NO) Dried: NA
 Cellulose: Inorg# 34508 & 52038 Dried: Oven #01 @ 105°C
 Variac Setting: 152 W

⊗ For the first 49 seconds only black smoke was observed. At 50 seconds flames were observed but would extinguish and start up again a few seconds later. Heat source was left on for 3min./180sec then turned off.
 ← Fire continued even after heat source was

Southwest Research Institute

010021

Method: 1040
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140828-6

Sample Analysis

System ID: 560542-1LY

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---------|
| 4:1 | 1 | 24.0186 | 6.0140 | 32.84 | |
| 4:1 | 2 | 24.0131 | 6.0092 | 31.53 | |
| 4:1 | 3 | 24.0022 | 6.0043 | 31.03 | |
| 4:1 | 4 | 24.0061 | 6.0057 | 28.03 | |
| 4:1 | 5 | 24.0058 | 6.0152 | 29.40 | |
| 4:1 | Avg | | | 30.57 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0082 | 15.0136 | 116.19 | |
| 1:1 | 2 | 15.0054 | 15.0175 | 140.65 | |
| 1:1 | 3 | 15.0140 | 15.0018 | 166.00 | |
| 1:1 | 4 | 15.0093 | 15.0020 | 103.47 | |
| 1:1 | 5 | 15.0001 | 15.0099 | 105.93 | |
| 1:1 | Avg | | | 126.45 | |

Weighted Samples: James Moken Balance#: 135 Date: 9/5/14
 Tested Samples: M. Mendoza Timer ID: Fisher Scientific Date: 9/5/14
 Sample Dried? (YES) NO Dried: Oven # 31 @ 65°C overnight.
 Cellulose: Inorg# 34508 & 52038 Dried: Oven # 01 @ 65°C
 Variac Setting: 152W 105 RE 9/5/15 mm

After sample was allowed to cool, all of the sample was particulate sized through ~~but~~ a standard testing sieve No. 10 2mm opening.
 RSS
 9/18/14

010022

Southwest Research Institute

Method: 1040
 Project #: 19869.01.006
 Client: Los Alamos National Laboratory
 TO#: 140828-6

Sample Analysis

System ID: 560542-1LY Dup

| Sample:Cellulose | Wt Sample, g | Wt Cellulose, g |
|------------------|--------------|-----------------|
| 4:1 | 24 | 6 |
| 1:1 | 15 | 15 |

| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
|-------|-----|---------------------|------------------------|-------------------|---------|
| 4:1 | 1 | 24.0085 | 6.0007 | 33.75 | |
| 4:1 | 2 | 24.0134 | 6.0027 | 29.69 | |
| 4:1 | 3 | 24.0141 | 6.0013 | 32.81 | |
| 4:1 | 4 | 24.0108 | 6.0019 | 37.60 | |
| 4:1 | 5 | 24.0110 | 6.0004 | 37.50 | |
| 4:1 | Avg | | | 34.27 | |
| Ratio | Rep | Actual Sample Wt, g | Actual Cellulose Wt, g | Burning Time, sec | Comment |
| 1:1 | 1 | 15.0032 | 15.0001 | 127.32 | |
| 1:1 | 2 | 15.0120 | 15.0066 | 149.63 | |
| 1:1 | 3 | 15.0007 | 15.0032 | 155.78 | |
| 1:1 | 4 | 15.0075 | 15.0034 | 122.78 | |
| 1:1 | 5 | 15.0082 | 15.0020 | 170.50 | |
| 1:1 | Avg | | | 145.08 | |

Weighted Samples: James Maken Balance#: 135 Date: 9/5/14
 Tested Samples: M. Mardiga Timer ID: Fisher Scientific Date: 9/5/14
 Sample Dried? (YES) NO Dried: Oven # 31 @ 65°C
 Cellulose: Inorg# 34508 & 52038 Dried: Oven # 01 @ 105°C
 Variac Setting: 152 W

010023

SOUTHWEST RESEARCH INSTITUTE

CLIENT: Los Alamos National Laboratory

TASK ORDER: 140828-6

SRR: 53778

SDG: 560542

VTSR: 08.28.14

PROJECT #: 19869.01.00X

Certificates of Analysis

010025

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sigma-aldrich.com

3050 Spruce Street, Saint Louis, MO 63103, USA

Website: www.sigmaaldrich.com

Email USA: techserv@sial.com

Outside USA: eurtechserv@sial.com

SwRI Chem ID: 52035

Product Name:

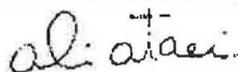
Certificate of Analysis

Potassium bromate – ACS reagent, ≥99.8%

Product Number: 309087
Batch Number: MKBR6937V
Brand: SIAL
CAS Number: 7758-01-2
MDL Number: MFCD00011359
Formula: BrKO3
Formula Weight: 167.00 g/mol
Quality Release Date: 09 APR 2014

KBrO₃

| Test | Specification | Result |
|--|-----------------------|--------------------|
| Appearance (Color) | White | White |
| Appearance (Form) | Crystalline Powder | Crystalline Powder |
| X-Ray Diffraction | Conforms to Structure | Conforms |
| Titration by Na ₂ S ₂ O ₃ | ≥ 99.8 % | 99.8 % |
| Insoluble matter | ≤ 0.005 % | 0.002 % |
| Bromides | Pass | Pass |
| Iron (Fe) | ≤ 0.002 % | < 0.001 % |
| Heavy Metals (as Lead) | ≤ 5 ppm | < 4 ppm |
| Sodium (Na) | ≤ 0.01 % | < 0.01 % |
| pH | 5.0 - 9.0 | 8.3 |
| C=5%, H ₂ O at 25 Degrees Celsius | | |
| Sulfate (SO ₄) | ≤ 0.005 % | < 0.005 % |
| Meets ACS Requirements 10th Edition | Meets Requirements | Meets Requirements |



Ali Ataei, Manager
 Quality Control
 Milwaukee, WI US

SwRI Chem ID: 52035

Sigma-Aldrich warrants, that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current Specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.

SwRI Chem ID: 52035

Attachment 2



Associate Director for ESH
Environment, Safety, and Health
P.O. Box 1663, MS K491
Los Alamos, New Mexico 87545
505-667-4218/Fax 505-665-3811

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87545
(505) 667-5794/Fax (505) 667-5948

Date: **AUG 13 2014**
Ref: ADESH-14-041

J. R. Stroble, Acting Assistant Manager
Office of Program Management
Carlsbad Field Office
U. S. Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Dear Mr. Stroble,

Subject: Written Concurrence for Correction of Waste Manifests

The purpose of this letter is to follow up our recent conversation regarding a discrepancy on manifests for containers (see attachment) that were shipped from the Los Alamos National Laboratory (LANL) to the Waste Isolation Pilot Plant (WIPP). The containers were received at the WIPP facility between August 8, 2013, and January 29, 2014, in shipments associated with 49 separate manifests (see attachment). WIPP accepted the shipments for disposal, and the manifests were returned to LANL without any discrepancies identified. Due to recent events at WIPP, and re-evaluation of Acceptable Knowledge information, the Carlsbad Field Office (CBFO) notified LANL that there was a manifest discrepancy based on WIPP's determination that nitrate salt-bearing waste containers required application of the EPA Hazardous Waste Number D001 and DOT subsidiary Hazard Division 5.1. Further, CBFO requested concurrence from LANL that the manifests can be corrected pursuant to Section C-5b(1) of the WIPP Waste Analysis Plan (the WAP) which provides that errors on a manifest can be corrected by WIPP with a verbal (followed by a mandatory written) concurrence by the generator/storage site technical contact. This letter provides that written concurrence.

At the time LANL shipped the containers to WIPP, the manifests identified the hazardous waste numbers and hazard class determined to be appropriate at that time based on acceptable knowledge. Due to the recent events at WIPP, LANL has been re-evaluating the characterization of the waste stream. On July 30, 2014, the Department of Energy, National Nuclear Administration (DOE/NNSA) and Los Alamos National Security, LLC (LANS) notified the New Mexico Environment Department that LANL had decided to provisionally apply EPA Hazardous Waste

PO Box 1663, MS A100, Los Alamos, NM 87545
505-667-5101 / FAX 505-665-2679

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National Nuclear Security Administration of the U.S. Department of Energy

Number D001 for the characteristic of ignitability to certain nitrate salt-bearing waste containers stored at LANL.

We are continuing to re-evaluate the waste characterization information concerning these nitrate salt waste streams, and will keep you updated as to new relevant information. If you have questions please contact Michael Brandt (LANS) at (505) 667-4218, or Pete Maggiore (DOE) at (505) 665-5025.

Sincerely,



Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC



Peter Maggiore
Assistant Manager
Environmental Projects Office
Los Alamos Field Office

Enclosures: (1) List of Manifests Requiring Correction

Cy: Kimberly Davis Lebak, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Kirsten M. Laskey, NA-LA, (E-File)
Eric L. Trujillo, NA-LA, (E-File)
Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
Michael T. Brandt, ADESH, (E-File)
Raeanna R. Sharp-Geiger, ADESH, (E-File)
Alison M. Dorries, ENV-DO, (E-File)
Jeffery D. Mousseau, ADEP, (E-File)
Daniel R. Cox, ADEP, (E-File)
Victoria A. George, REG-DO, (E-File)
Anthony R. Grieggs, ENV-CP, (E-File)
Deborah K. Woitte, LC-ESH, (E-File)
Debra Nevergold, LTP, (E-File)
Mark P. Haagenstad, ENV-CP, (E-File)
Luciana Vigil-Holterman, ENV-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
locatetesteam@lanl.gov, (E-File)

**List of applicable manifest numbers, shipment numbers, dates of receipt and container numbers
from
Waste Stream LA-MIN02-V.001**

| Manifest Number | Shipment Number | Received | Container Number | Container Count |
|------------------------|------------------------|-----------------|-------------------------|------------------------|
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000062547 | 1 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063116 | 2 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063198 | 3 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063497 | 4 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064665 | 5 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064863 | 6 |
| 001600826GBF | IN130186 | 8-Sep-13 | LAS822714 | 7 |
| | | | | |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092217 | 8 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092237 | 9 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092347 | 10 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092555 | 11 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093588 | 12 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093589 | 13 |
| | | | | |
| 010784179JJK | LA130128 | 3-Sep-13 | LA00000092220 | 14 |
| | | | | |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092140 | 15 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092219 | 16 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092235 | 17 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092495 | 18 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000093597 | 19 |
| | | | | |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092246 | 20 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092249 | 21 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092252 | 22 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093593 | 23 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093598 | 24 |
| | | | | |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092211 | 25 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092239 | 26 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092251 | 27 |
| | | | | |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000063182 | 28 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000064627 | 29 |
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| 010784261JJK | LA140011 | 17-Jan-14 | LA00000068626 | 330 |
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| 010784261JJK | LA140011 | 17-Jan-14 | LA00000068659 | 335 |
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| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068510 | 344 |
| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068511 | 345 |
| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068512 | 346 |
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| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068578 | 350 |
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| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068647 | 353 |
| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068669 | 354 |
| 010784264JJK | LA140014 | 23-Jan-14 | LA00000068680 | 355 |
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| 010784265JJK | LA140015 | 28-Jan-14 | LA00000068649 | 358 |
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| 010784266JJK | LA140016 | 29-Jan-14 | LA00000068667 | 360 |
| 010784266JJK | LA140016 | 29-Jan-14 | LA00000068668 | 361 |
| 010784266JJK | LA140016 | 29-Jan-14 | LA00000068687 | 362 |
| 010784266JJK | LA140016 | 29-Jan-14 | LA00000094152 | 363 |

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|--------------|----------|-----------|---------------|-----|
| 010784268JJK | LA140017 | 29-Jan-14 | LA00000068333 | 364 |
| 010784268JJK | LA140017 | 29-Jan-14 | LA00000068607 | 365 |
| 010784268JJK | LA140017 | 29-Jan-14 | LA00000068630 | 366 |
| 010784268JJK | LA140017 | 29-Jan-14 | LA00000068660 | 367 |
| 010784268JJK | LA140017 | 29-Jan-14 | LA00000068670 | 368 |

From: Haagenstad, Mark P
Sent: Wednesday, August 13, 2014 11:29 AM
To: Kieling, John, NMENV; Pullen, Steve, NMENV; Hall, Timothy, NMENV
Cc: Brandt, Michael Thomas; Sharp-Geiger, Raeanna Racine; Dorries, Alison Marie; Grieggs, Tony; Mousseau, Jeffrey David; Torres, Enrique; George, Victoria A; Turner, Gene E; Maggiore, Peter; Nickless, David J; Vigil-Holterman, Luciana R; Schumann, Paul B; Bacigalupa, Gian A; Diaz, Tammy; Martinez, Angela M; Thorp, Donald Thomas; McMichael, Susan Lynn; Cummings, Lisa K; Woitte, Deborah Kay
Subject: RE: Notification of Waste Profile Discrepancy Application of EPA Haz Waste Number D001
Attachments: ADESH-14-041-J R Stroble Written Concurrence for Correction of Waste Manifests.pdf

[See attachment.](#)

From: Haagenstad, Mark P
Sent: Wednesday, August 13, 2014 11:28 AM
To: Kieling, John, NMENV; 'Pullen, Steve, NMENV'; Hall, Timothy, NMENV
Cc: Brandt, Michael Thomas; Sharp-Geiger, Raeanna Racine; Dorries, Alison Marie; Grieggs, Tony; Mousseau, Jeffrey David; Torres, Enrique; George, Victoria A; 'Turner, Gene E.'; 'Maggiore, Peter'; Nickless, David J; Vigil-Holterman, Luciana R; Schumann, Paul B; Bacigalupa, Gian A; Diaz, Tammy; Martinez, Angela M; Thorp, Donald Thomas; McMichael, Susan Lynn; 'Cummings, Lisa'; Woitte, Deborah Kay
Subject: Notification of Waste Profile Discrepancy Application of EPA Haz Waste Number D001

Dear Mr. Kieling:

Subject: Notification of Waste Profile Discrepancy Regarding Application of EPA Hazardous Waste Number D001 to Nitrate-Salt-Bearing Waste Containers Shipped Off-Site From Los Alamos National Laboratory

The purpose of this email is to notify the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) of a waste characterization discrepancy as required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (Permit). Section 2.4.7, Waste Characterization Review, of the Permit states that the Permittees shall "... (4) [R]echaracterize a hazardous waste stream whenever the Permittees are notified by a receiving off-site facility that the characterization of a hazardous waste they obtained from the Permittees' Facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittees shall notify the Department in writing within three days of their receipt of the notice of the discrepancy from a receiving facility."

The Department of Energy and Los Alamos National Security, LLC (DOE/LANS) (the Permittees) shipped nitrate-salt-bearing waste containers to the Waste Isolation Pilot Plant (WIPP) since 2011. Additional shipments of this waste stream were made to Waste Control Specialists (WCS) in Andrews, Texas, and the Idaho National Laboratory.

Since that time, the LANL and WIPP Permittees have each made the decision to add the Environmental Protection Agency (EPA) Hazardous Waste Number D001 for ignitability to the LANL nitrate-salt-bearing waste containers at their respective facilities. As a result, the characterization of the containers WIPP received from LANL no longer matches the pre-approved waste analysis certifications that accompanied the waste manifests and shipping papers associated with the original off-site shipments.

Based on the DOE/LANS' written concurrence allowing WIPP to correct the original manifests (see attached notification), the Permittees are hereby notifying the Department of the newly-identified discrepancy, in accordance with Permit Section 2.4.7(4). This email constitutes notification with respect to the wastes associated with the referenced manifests.

If you have comments or questions regarding this notification, please contact Gene E. Turner (DOE) at (505) 667-5794 or me at (505) 665-2014.

Mark Haagenstad
Environmental Protection Division
RCRA Permitting and Compliance Team Leader
Los Alamos National Security
Los Alamos National Laboratory
Office: (505) 665-2014
Mobile: (505) 699-1733



Associate Director for ESH
Environment, Safety, and Health
P.O. Box 1663, MS K491
Los Alamos, New Mexico 87545
505-667-4218/Fax 505-665-3811

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87545
(505) 667-5794/Fax (505) 667-5948

Date: **AUG 13 2014**
Ref: ADESH-14-041

J. R. Stroble, Acting Assistant Manager
Office of Program Management
Carlsbad Field Office
U. S. Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Dear Mr. Stroble,

Subject: Written Concurrence for Correction of Waste Manifests

The purpose of this letter is to follow up our recent conversation regarding a discrepancy on manifests for containers (see attachment) that were shipped from the Los Alamos National Laboratory (LANL) to the Waste Isolation Pilot Plant (WIPP). The containers were received at the WIPP facility between August 8, 2013, and January 29, 2014, in shipments associated with 49 separate manifests (see attachment). WIPP accepted the shipments for disposal, and the manifests were returned to LANL without any discrepancies identified. Due to recent events at WIPP, and re-evaluation of Acceptable Knowledge information, the Carlsbad Field Office (CBFO) notified LANL that there was a manifest discrepancy based on WIPP's determination that nitrate salt-bearing waste containers required application of the EPA Hazardous Waste Number D001 and DOT subsidiary Hazard Division 5.1. Further, CBFO requested concurrence from LANL that the manifests can be corrected pursuant to Section C-5b(1) of the WIPP Waste Analysis Plan (the WAP) which provides that errors on a manifest can be corrected by WIPP with a verbal (followed by a mandatory written) concurrence by the generator/storage site technical contact. This letter provides that written concurrence.

At the time LANL shipped the containers to WIPP, the manifests identified the hazardous waste numbers and hazard class determined to be appropriate at that time based on acceptable knowledge. Due to the recent events at WIPP, LANL has been re-evaluating the characterization of the waste stream. On July 30, 2014, the Department of Energy, National Nuclear Administration (DOE/NNSA) and Los Alamos National Security, LLC (LANS) notified the New Mexico Environment Department that LANL had decided to provisionally apply EPA Hazardous Waste

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National Nuclear Security Administration of the U.S. Department of Energy

Number D001 for the characteristic of ignitability to certain nitrate salt-bearing waste containers stored at LANL.

We are continuing to re-evaluate the waste characterization information concerning these nitrate salt waste streams, and will keep you updated as to new relevant information. If you have questions please contact Michael Brandt (LANS) at (505) 667-4218, or Pete Maggiore (DOE) at (505) 665-5025.

Sincerely,



Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC



Peter Maggiore
Assistant Manager
Environmental Projects Office
Los Alamos Field Office

Enclosures: (1) List of Manifests Requiring Correction

Cy: Kimberly Davis Lebak, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Kirsten M. Laskey, NA-LA, (E-File)
Eric L. Trujillo, NA-LA, (E-File)
Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
Michael T. Brandt, ADESH, (E-File)
Raeanna R. Sharp-Geiger, ADESH, (E-File)
Alison M. Dorries, ENV-DO, (E-File)
Jeffery D. Mousseau, ADEP, (E-File)
Daniel R. Cox, ADEP, (E-File)
Victoria A. George, REG-DO, (E-File)
Anthony R. Grieggs, ENV-CP, (E-File)
Deborah K. Woitte, LC-ESH, (E-File)
Debra Nevergold, LTP, (E-File)
Mark P. Haagenstad, ENV-CP, (E-File)
Luciana Vigil-Holterman, ENV-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
locatetesteam@lanl.gov, (E-File)

**List of applicable manifest numbers, shipment numbers, dates of receipt and container numbers
from
Waste Stream LA-MIN02-V.001**

| Manifest Number | Shipment Number | Received | Container Number | Container Count |
|------------------------|------------------------|-----------------|-------------------------|------------------------|
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000062547 | 1 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063116 | 2 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063198 | 3 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063497 | 4 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064665 | 5 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064863 | 6 |
| 001600826GBF | IN130186 | 8-Sep-13 | LAS822714 | 7 |
| | | | | |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092217 | 8 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092237 | 9 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092347 | 10 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092555 | 11 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093588 | 12 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093589 | 13 |
| | | | | |
| 010784179JJK | LA130128 | 3-Sep-13 | LA00000092220 | 14 |
| | | | | |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092140 | 15 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092219 | 16 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092235 | 17 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092495 | 18 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000093597 | 19 |
| | | | | |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092246 | 20 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092249 | 21 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092252 | 22 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093593 | 23 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093598 | 24 |
| | | | | |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092211 | 25 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092239 | 26 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092251 | 27 |
| | | | | |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000063182 | 28 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000064627 | 29 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000066376 | 30 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092134 | 31 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092145 | 32 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092496 | 33 |
| | | | | |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000062912 | 34 |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000063365 | 35 |

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| 010784184JJK | LA130133 | 11-Sep-13 | LA00000092136 | 36 |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000092152 | 37 |
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| 010784185JJK | LA130134 | 11-Sep-13 | LA00000092171 | 38 |
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| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092122 | 42 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092173 | 43 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092470 | 44 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092477 | 45 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092482 | 46 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092540 | 47 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092565 | 48 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092570 | 49 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092888 | 50 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092902 | 51 |
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| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092938 | 53 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092940 | 54 |
| | | | | |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000063401 | 55 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092156 | 56 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092557 | 57 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092572 | 58 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092684 | 59 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092905 | 60 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092907 | 61 |
| | | | | |
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| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092580 | 63 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092674 | 64 |
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| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092909 | 69 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092913 | 70 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092915 | 71 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092917 | 72 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092921 | 73 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092933 | 74 |
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| 010784193JJK | LA130140 | 19-Sep-13 | LA00000059301 | 75 |
| 010784193JJK | LA130140 | 19-Sep-13 | LA00000092574 | 76 |

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| 010784203JJK | LA130149 | 1-Oct-13 | LA00000093516 | 84 |
| 010784203JJK | LA130149 | 1-Oct-13 | LA00000093577 | 85 |
| | | | | |
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| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093581 | 88 |
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| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093603 | 90 |
| | | | | |
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| 010784205JJK | LA130151 | 3-Oct-13 | LA00000093515 | 93 |
| 010784205JJK | LA130151 | 3-Oct-13 | LA00000093571 | 94 |
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| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093602 | 115 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093606 | 116 |
| | | | | |

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| 010784212JJK | LA130157 | 24-Oct-13 | LA00000059415 | 117 |
| 010784214JJK | LA130159 | 29-Oct-13 | LA00000092233 | 118 |
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| 010784216JJK | LA130161 | 30-Oct-13 | LA00000092210 | 124 |
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| 010784225JJK | LA130167 | 7-Nov-13 | LA00000068312 | 137 |
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3747 West Jemez Road
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(505) 667-5794/Fax (505) 667-5948

Date: **AUG 14 2014**
Ref: ADESH-14-042

Ryan Williams
Vice President of Integrated Services
Waste Control Specialists LLC
Three Lincoln Centre
5430 LBJ Freeway, Ste. 1700
Dallas, Texas 75240

Dear Mr. Williams,

Subject: Written Concurrence for Correction of Waste Manifests for Waste Shipped to Waste Control Specialists Facility

The purpose of this letter is to follow up on our recent conversation regarding a discrepancy on manifests for containers (see attachment) that were shipped from the Los Alamos National Laboratory (LANL) to the Waste Control Specialists (WCS) facility in Andrews, Texas. The referenced containers were accepted by WCS for storage, and the manifests were returned to LANL without any discrepancies identified. At the time LANL shipped the containers to WCS, the manifests identified the hazardous waste numbers determined to be appropriate based on acceptable knowledge. Due to the recent events at WIPP, LANL has been re-evaluating the characterization of the waste stream. As we have discussed, it was determined, based on a review of Acceptable Knowledge information, that it would be prudent to conservatively add hazardous waste number (HWN) D001 for the 119 containers on the attached list. It is our understanding that WCS is required to amend the manifests associated with those containers. This letter provides LANL's concurrence with that decision.

We are continuing to re-evaluate the waste characterization information concerning these nitrate salt waste streams, and will keep you updated as to new relevant information. If you have questions please contact Michael Brandt (LANS) at (505) 667-4218, or Pete Maggiore (DOE) at (505) 665-5025.

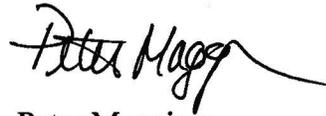
PO Box 1663, MS A100, Los Alamos, NM 87545
505-667-5101 / FAX 505-665-2679

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National Nuclear Security Administration of the U.S. Department of Energy

Sincerely,



Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC



Peter Maggiore
Assistant Manager
Environmental Projects Office
Los Alamos Field Office

Enclosures: (1) List of Manifests Requiring Correction

Cy: Kimberly Davis Lebak, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Kirsten M. Laskey, NA-LA, (E-File)
Eric L. Trujillo, NA-LA, (E-File)
Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
Michael T. Brandt, ADESH, (E-File)
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Alison M. Dorries, ENV-DO, (E-File)
Jeffery D. Mousseau, ADEP, (E-File)
Daniel R. Cox, ADEP, (E-File)
Victoria A. George, REG-DO, (E-File)
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locatsteam@lanl.gov, (E-File)
env-correspondence@lanl.gov (E-File)

| WCS Package ID (SWB) | INNERCONTAINER ID | Total MIN02 | NWP ID (SWB) | Manifest # |
|----------------------|-------------------|-------------|--------------|--------------|
| 14-108472 | 68509 | 3 | LASB50018 | 010784286JJK |
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| 14-108474 | 68342 | 3 | LASB50019 | 010784286JJK |
| | 69103 | | | |
| | 68584 | | | |
| 14-108493 | 69077 | 2 | LASB50032 | 010784288JJK |
| | 69195 | | | |
| 14-108527 | 68643 | 4 | SB10174 | 010784296JJK |
| | S870129 | | | |
| | S841295 | | | |
| | S824056 | | | |
| 14-108583 | 68350 | 1 | LASB50067 | 010784305JJK |
| 14-108424 | 68426 | 1 | LASB02166 | 010784277JJK |
| 14-108615 | 68428 | 1 | LASB50028 | 010784317JJK |
| 14-108495 | 68543 | 1 | LASB50031 | 010784288JJK |
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| 14-108442 | 68315 | 2 | LASB02204 | 010784279JJK |
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| 14-108547 | 68325 | 3 | LASB50045 | 010784299JJK |
| | 69422 | | | |
| | 69105 | | | |
| 14-108470 | 68341 | 2 | LASB50020 | 010784286JJK |
| | 69187 | | | |
| 14-108484 | 68347 | 2 | LASB50026 | 010784287JJK |
| | 93935 | | | |
| 14-108558 | 68425 | 1 | LASB50036 | 010784300JJK |
| 14-108465 | 68429 | 2 | LASB50017 | 010784284JJK |
| | 68433 | | | |
| 14-108518 | 68431 | 2 | LASB50048 | 010784292JJK |
| | 69102 | | | |
| 14-108491 | 68432 | 3 | LASB50037 | 010784288JJK |
| | 69182 | | | |
| | 68583 | | | |
| 14-108606 | 68449 | 1 | LASB50072 | 010784315JJK |

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|-----------|---------|---|-----------|--------------|
| 14-108551 | 68508 | 1 | LASB50094 | 010784298JJK |
| 14-108505 | 68580 | 2 | LASB50025 | 010784290JJK |
| | 69179 | | | |
| 14-108559 | 68617 | 3 | LASB50039 | 010784300JJK |
| | 69177 | | | |
| | 69043 | | | |
| 14-108603 | 68619 | 1 | LASB50079 | 010784314JJK |
| 14-108498 | 68620 | 2 | LASB50002 | 010784289JJK |
| | 69191 | | | |
| 14-108463 | 68625 | 2 | LASB50013 | 010784284JJK |
| | 68632 | | | |
| 14-108550 | 68628 | 2 | LASB50082 | 010784298JJK |
| | 69210 | | | |
| 14-108515 | 68661 | 2 | LASB50046 | 010784291JJK |
| | 69196 | | | |
| 14-108587 | 68679 | 3 | LASB50102 | 010784305JJK |
| | 69233 | | | |
| | 69180 | | | |
| 14-108579 | 68686 | 3 | LASB50062 | 010784303JJK |
| | 69091 | | | |
| | 69073 | | | |
| 14-108556 | 69014 | 1 | LASB50095 | 010784300JJK |
| 14-108534 | 69033 | 2 | LASB50063 | 010784297JJK |
| | 69097 | | | |
| 14-108513 | 69034 | 1 | LASB50027 | 010784291JJK |
| 14-108574 | 69041 | 2 | LASB50104 | 010784304JJK |
| | 69226 | | | |
| 14-108554 | 69045 | 1 | LASB50071 | 010784298JJK |
| 14-108582 | 69060 | 3 | LASB50100 | 010784303JJK |
| | 69413 | | | |
| | 69080 | | | |
| 14-108522 | 69061 | 2 | LASB50035 | 010784294JJK |
| | 69161 | | | |
| 14-108599 | 69063 | 1 | LASB50107 | 010784313JJK |
| 14-108538 | 69066 | 2 | LASB50033 | 010784297JJK |
| | 69181 | | | |
| 14-108619 | 69074 | 2 | LASB50087 | 010784318JJK |
| | 69212 | | | |
| 14-108566 | 69081 | 1 | LASB50052 | 010784302JJK |
| 14-108571 | 69083 | 1 | LASB50098 | 010784301JJK |
| 14-108634 | 69094 | 2 | LASB50424 | 010784322JJK |
| | 69555 | | | |
| 14-108629 | 69099 | 2 | LASB50432 | 010784319JJK |
| | S802985 | | | |
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| 14-108601 | 69159 | 1 | LASB50074 | 010784313JJK |
| 14-108529 | 69162 | 2 | LASB50066 | 010784296JJK |
| | 69237 | | | |
| 14-108577 | 69163 | 3 | LASB50057 | 010784303JJK |
| | 69216 | | | |
| | 69402 | | | |
| 14-108617 | 69185 | 2 | LASB50043 | 010784318JJK |

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|-----------|-------|---|-----------|--------------|
| | 69492 | | | |
| 14-108595 | 69189 | 1 | LASB50108 | 010784312JJK |
| 14-108590 | 69192 | 1 | LASB50105 | 010784306JJK |
| 14-108511 | 69193 | 1 | LASB50041 | 010784291JJK |
| 14-108597 | 69194 | 1 | LASB50088 | 010784312JJK |
| 14-108461 | 69217 | 1 | LASB50014 | 010784284JJK |
| 14-108572 | 69234 | 2 | LASB50034 | 010784301JJK |
| | 69430 | | | |
| 14-108628 | 69279 | 2 | LASB50421 | 010784319JJK |
| | 69428 | | | |
| 14-108608 | 69282 | 1 | LASB50064 | 010784315JJK |
| 14-108609 | 69313 | 2 | LASB50103 | 010784315JJK |
| | 69236 | | | |
| 14-108607 | 69493 | 1 | LASB50081 | 010784315JJK |
| 14-108630 | 69565 | 1 | LASB50414 | 010784319JJK |
| 14-108581 | 69691 | 2 | LASB50058 | 010784303JJK |
| | 69069 | | | |
| 14-108697 | 69285 | 1 | LASB50416 | 010784321JJK |



Environmental Protection Division
Environmental Compliance Programs (ENV-CP)
PO Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87545
(505) 667-5794/Fax (505) 667-5948

Date: **AUG 21 2014**
Symbol: ENV-DO-14-0219
LAUR: 14-26308
Locates Action No.: N/A

Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

Subject: Notification of Waste Characterization Discrepancy Regarding Application of EPA Hazardous Waste Number D001 to Nitrate-Salt-Bearing Waste Containers Shipped Off-Site From Los Alamos National Laboratory

The purpose of this letter is to notify the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) of a waste characterization discrepancy as required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (Permit). Section 2.4.7, *Waste Characterization Review*, of the Permit states that the Permittees shall "... (4) Recharacterize a hazardous waste stream whenever the Permittees are notified by a receiving off-site facility that the characterization of a hazardous waste they obtained from the Permittees' Facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittees shall notify the Department in writing within three days of their receipt of the notice of the discrepancy from a receiving facility." This letter is provided in follow-up to an August 13, 2014, electronic mail from Mark Haagenstad, Los Alamos National Security, LLC (LANS), to John Kieling, NMED-HWB, on the same subject.

The Department of Energy (DOE) and LANS (the Permittees) shipped nitrate-salt-bearing waste containers to the Waste Isolation Pilot Plant (WIPP) between August 8, 2013, and January 29, 2014, in shipments associated with 49 separate manifests. Additional shipments of this waste stream were made to Waste Control Specialists (WCS) in Andrews, Texas, and the Idaho National Laboratory. A list of the LANL manifest numbers for the referenced WIPP shipments is provided in Enclosure 1.

Since that time, the LANL and WIPP Permittees have each made the decision to add the Environmental Protection Agency (EPA) Hazardous Waste Number D001 for ignitability to the LANL nitrate-salt-bearing waste containers at their respective facilities. As a result, the characterization of the containers WIPP received from LANL no longer matches the pre-approved waste analysis certifications that accompanied the waste manifests and shipping papers associated with the original off-site shipments.

Based on the DOE/LANS' written concurrence that WIPP may correct the 49 original manifests (Enclosure 1), the Permittees are hereby notifying the Department of the newly-identified discrepancy, in accordance with Permit Section 2.4.7(4). This letter constitutes notification with respect to the wastes associated with the 49 referenced manifests.

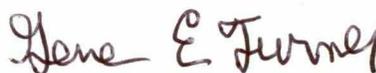
If you have comments or questions regarding this notification, please contact Gene E. Turner (DOE) at (505) 667-5794 or Mark P. Haagenstad (LANS) at (505) 665-2014.

Sincerely,



Alison M. Dorries
Division Leader
Environmental Protection Division
Los Alamos National Security LLC

Sincerely,



Gene E. Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Field Office
U.S. Department of Energy

AMD:GET:TAD/lm

Enclosure: August 13, 2014 LANL Concurrence Letter to WIPP

Cy: Ryan Flynn, NMED, Santa Fe, NM, (E-File)
Tom Blaine, NMED, Santa Fe, NM, (E-File)
Steve Pullen, NMED/HWB, Santa Fe, NM, (E-File)
Timothy Hall, NMED/HWB, Santa Fe, NM, (E-File)
Trais Kliphuis, NMED, Santa Fe, NM, (E-File)
Peter Maggiore, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Eric L. Trujillo, NA-LA, (E-File)
Kirsten Laskey, NA-LA, (E-File)
Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
Michael T. Brandt, ADESH, (E-File)
Raeanna Sharp-Geiger, ADESH, (E-File)
Alison M. Dorries, ENV-DO, (E-File)
Jeffery D. Mousseau, ADEP, (E-File)
Daniel R. Cox, ADEP, (E-File)
Victoria A. George, REG-DO, (E-File)

Mr. John E. Kieling
ENV-DO-14-0219

- 3 -

Cy (Continued):

Kenneth M. Hargis, LTP-PTS, (E-File)

Mark P. Haagenstad, ENV-CP, (E-File)

Luciana Vigil-Holterman, ENV-CP, (E-File)

Paul Schumann, ENV-CP, (E-File)

Deborah K. Woitte, LC-ESH, (E-File)

lasomailbox@nnsa.doe.gov, (E-File)

locatsteam@lanl.gov, (E-File)

env-correspondence@lanl.gov, (E-File)

ENCLOSURE 1

August 13, 2014, LANL Concurrence Letter to WIPP

ENV-DO-14-0219

LAUR-14-26308

Date: AUG 21 2014



Associate Director for ESH
Environment, Safety, and Health
P.O. Box 1663, MS K491
Los Alamos, New Mexico 87545
505-667-4218/Fax 505-665-3811

National Nuclear Security Administration
Los Alamos Field Office, A316
3747 West Jemez Road
Los Alamos, New Mexico, 87545
(505) 667-5794/Fax (505) 667-5948

Date: **AUG 13 2014**
Ref: ADESH-14-041

J. R. Stroble, Acting Assistant Manager
Office of Program Management
Carlsbad Field Office
U. S. Department of Energy
P.O. Box 3090
Carlsbad, New Mexico 88221-3090

Dear Mr. Stroble,

Subject: Written Concurrence for Correction of Waste Manifests

The purpose of this letter is to follow up our recent conversation regarding a discrepancy on manifests for containers (see attachment) that were shipped from the Los Alamos National Laboratory (LANL) to the Waste Isolation Pilot Plant (WIPP). The containers were received at the WIPP facility between August 8, 2013, and January 29, 2014, in shipments associated with 49 separate manifests (see attachment). WIPP accepted the shipments for disposal, and the manifests were returned to LANL without any discrepancies identified. Due to recent events at WIPP, and re-evaluation of Acceptable Knowledge information, the Carlsbad Field Office (CBFO) notified LANL that there was a manifest discrepancy based on WIPP's determination that nitrate salt-bearing waste containers required application of the EPA Hazardous Waste Number D001 and DOT subsidiary Hazard Division 5.1. Further, CBFO requested concurrence from LANL that the manifests can be corrected pursuant to Section C-5b(1) of the WIPP Waste Analysis Plan (the WAP) which provides that errors on a manifest can be corrected by WIPP with a verbal (followed by a mandatory written) concurrence by the generator/storage site technical contact. This letter provides that written concurrence.

At the time LANL shipped the containers to WIPP, the manifests identified the hazardous waste numbers and hazard class determined to be appropriate at that time based on acceptable knowledge. Due to the recent events at WIPP, LANL has been re-evaluating the characterization of the waste stream. On July 30, 2014, the Department of Energy, National Nuclear Administration (DOE/NNSA) and Los Alamos National Security, LLC (LANS) notified the New Mexico Environment Department that LANL had decided to provisionally apply EPA Hazardous Waste

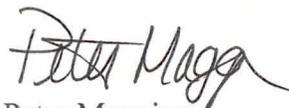
Number D001 for the characteristic of ignitability to certain nitrate salt-bearing waste containers stored at LANL.

We are continuing to re-evaluate the waste characterization information concerning these nitrate salt waste streams, and will keep you updated as to new relevant information. If you have questions please contact Michael Brandt (LANS) at (505) 667-4218, or Pete Maggiore (DOE) at (505) 665-5025.

Sincerely,



Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC



Peter Maggiore
Assistant Manager
Environmental Projects Office
Los Alamos Field Office

Enclosures: (1) List of Manifests Requiring Correction

Cy: Kimberly Davis Lebak, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Kirsten M. Laskey, NA-LA, (E-File)
Eric L. Trujillo, NA-LA, (E-File)
Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
Michael T. Brandt, ADESH, (E-File)
Raeanna R. Sharp-Geiger, ADESH, (E-File)
Alison M. Dorries, ENV-DO, (E-File)
Jeffery D. Mousseau, ADEP, (E-File)
Daniel R. Cox, ADEP, (E-File)
Victoria A. George, REG-DO, (E-File)
Anthony R. Grieggs, ENV-CP, (E-File)
Deborah K. Woitte, LC-ESH, (E-File)
Debra Nevergold, LTP, (E-File)
Mark P. Haagenstad, ENV-CP, (E-File)
Luciana Vigil-Holterman, ENV-CP, (E-File)
lasomailbox@nnsa.doe.gov, (E-File)
locatsteam@lanl.gov, (E-File)

**List of applicable manifest numbers, shipment numbers, dates of receipt and container numbers
from
Waste Stream LA-MIN02-V.001**

| Manifest Number | Shipment Number | Received | Container Number | Container Count |
|------------------------|------------------------|-----------------|-------------------------|------------------------|
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000062547 | 1 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063116 | 2 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063198 | 3 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000063497 | 4 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064665 | 5 |
| 001600826GBF | IN130186 | 8-Sep-13 | LA00000064863 | 6 |
| 001600826GBF | IN130186 | 8-Sep-13 | LAS822714 | 7 |
| | | | | |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092217 | 8 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092237 | 9 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092347 | 10 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000092555 | 11 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093588 | 12 |
| 010784176JJK | LA130125 | 29-Aug-13 | LA00000093589 | 13 |
| | | | | |
| 010784179JJK | LA130128 | 3-Sep-13 | LA00000092220 | 14 |
| | | | | |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092140 | 15 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092219 | 16 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092235 | 17 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000092495 | 18 |
| 010784180JJK | LA130129 | 4-Sep-13 | LA00000093597 | 19 |
| | | | | |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092246 | 20 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092249 | 21 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000092252 | 22 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093593 | 23 |
| 010784181JJK | LA130130 | 6-Sep-13 | LA00000093598 | 24 |
| | | | | |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092211 | 25 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092239 | 26 |
| 010784182JJK | LA130131 | 6-Sep-13 | LA00000092251 | 27 |
| | | | | |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000063182 | 28 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000064627 | 29 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000066376 | 30 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092134 | 31 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092145 | 32 |
| 010784183JJK | LA130132 | 9-Sep-13 | LA00000092496 | 33 |
| | | | | |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000062912 | 34 |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000063365 | 35 |

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|--------------|----------|-----------|---------------|----|
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000092136 | 36 |
| 010784184JJK | LA130133 | 11-Sep-13 | LA00000092152 | 37 |
| | | | | |
| 010784185JJK | LA130134 | 11-Sep-13 | LA00000092171 | 38 |
| 010784185JJK | LA130134 | 11-Sep-13 | LA00000092213 | 39 |
| 010784185JJK | LA130134 | 11-Sep-13 | LA00000092215 | 40 |
| 010784185JJK | LA130134 | 11-Sep-13 | LA00000092216 | 41 |
| | | | | |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092122 | 42 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092173 | 43 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092470 | 44 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092477 | 45 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092482 | 46 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092540 | 47 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092565 | 48 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092570 | 49 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092888 | 50 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092902 | 51 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092937 | 52 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092938 | 53 |
| 010784189JJK | LA130135 | 13-Sep-13 | LA00000092940 | 54 |
| | | | | |
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| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092156 | 56 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092557 | 57 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092572 | 58 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092684 | 59 |
| 010784188JJK | LA130136 | 14-Sep-13 | LA00000092905 | 60 |
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| | | | | |
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| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092898 | 68 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092909 | 69 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092913 | 70 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092915 | 71 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092917 | 72 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092921 | 73 |
| 010784190JJK | LA130137 | 17-Sep-13 | LA00000092933 | 74 |
| | | | | |
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| 010784193JJK | LA130140 | 19-Sep-13 | LA00000092574 | 76 |

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| | | | | |
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| 010784203JJK | LA130149 | 1-Oct-13 | LA00000093487 | 83 |
| 010784203JJK | LA130149 | 1-Oct-13 | LA00000093516 | 84 |
| 010784203JJK | LA130149 | 1-Oct-13 | LA00000093577 | 85 |
| | | | | |
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| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093573 | 87 |
| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093581 | 88 |
| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093601 | 89 |
| 010784204JJK | LA130150 | 2-Oct-13 | LA00000093603 | 90 |
| | | | | |
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| 010784205JJK | LA130151 | 3-Oct-13 | LA00000093576 | 95 |
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| 010784205JJK | LA130151 | 3-Oct-13 | LA00000093610 | 97 |
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| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093088 | 107 |
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| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093154 | 109 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093155 | 110 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093574 | 111 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093590 | 112 |
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| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093599 | 114 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093602 | 115 |
| 010784208JJK | LA130155 | 9-Oct-13 | LA00000093606 | 116 |
| | | | | |

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|--------------|----------|-----------|---------------|-----|
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| | | | | |
| 010784214JJK | LA130159 | 29-Oct-13 | LA00000092233 | 118 |
| | | | | |
| 010784216JJK | LA130161 | 30-Oct-13 | LA00000068309 | 119 |
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Date: **SEP 03 2014**
Symbol: ENV-DO-14-0238
LAUR: Not Applicable
Locates Action No.: Not Applicable

Mr. John E. Kieling
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

Dear Mr. Kieling:

Subject: Notification of Waste Profile Discrepancy Regarding Nitrate-Salt-Bearing Waste Containers Shipped to Waste Control Specialists (WCS) From Los Alamos National Laboratory

The purpose of this letter is to notify the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) of a waste characterization discrepancy as required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (Permit). The discrepancy is related to manifests for 119 nitrate-salt-bearing waste containers that were shipped by the Department of Energy and Los Alamos National Security, LLC (DOE/LANS) (the Permittees) to the Waste Control Specialists facility in Andrews, Texas. This letter is provided as a follow-up to the August 14, 2014, electronic mail from Mark Haagenstad, Los Alamos National Security, LLC (LANS), to John Kieling, NMED-HWB, on the same subject.

Since the 119 containers were shipped to WCS, WCS and the LANL Permittees have each made the decision to add the Environmental Protection Agency (EPA) Hazardous Waste Number D001 for ignitability to the LANL nitrate-salt-bearing waste containers at their respective facilities. As a result, the characterization of the containers WCS received from LANL no longer match the pre-approved waste analysis certifications that accompanied the waste manifests and shipping papers associated with the original off-site shipments.

Based on the DOE/LANS written concurrence allowing WCS to correct the original manifests, the Permittees are hereby notifying the Department of this discrepancy, in accordance with Permit Section 2.4.7(4) which states that the Permittees shall "Recharacterize a hazardous waste stream whenever the Permittees are notified by a receiving off-site facility that the characterization of a hazardous waste they

obtained from the Permittees' Facility does not match a pre-approved waste analysis certification or accompanying waste manifest or shipping paper. The Permittees shall notify the Department in writing within three days of their receipt of the notice of the discrepancy from a receiving facility."

This letter constitutes notification with respect to the wastes associated with the referenced manifests. While the list included with the concurrence letter (Enclosure 1) includes the manifests identified by WCS as discrepancies, the Permittees continue to work with WCS personnel to ensure that all potential discrepancies have been identified. Follow-up on the progress of these efforts may be required.

If you have comments or questions regarding this notification, please contact Gene E. Turner (DOE) at (505) 667-5794 or Mark P. Haagenstad (LANS) at (505) 665-2014.

Sincerely,



Alison M. Dorries
Division Leader
Environmental Protection Division
Los Alamos National Security LLC

Sincerely,



Gene E. Turner
Environmental Permitting Manager
Environmental Projects Office
Los Alamos Field Office
U.S. Department of Energy

AMD:GET:LVH/ms

Enclosure: August 14, 2014 LANL Concurrence Letter to Waste Control Specialists Facility

Cy: Ryan Flynn, NMED, Santa Fe, NM, (E-File)
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Raeanna Sharp-Geiger, ADESH, (E-File)
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Mr. John E. Kieling
ENV-DO-14-0238

- 3 -

Cy (Continued):

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Symbol: ENV-DO-14-0238
LAUR: Not Applicable
Locates Action No.: Not Applicable

Mr. John E. Kieling
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RECEIVED

SEP 4 2014

NMED
Hazardous Waste Bureau

Dear Mr. Kieling:

Subject: Notification of Waste Profile Discrepancy Regarding Nitrate-Salt-Bearing Waste Containers Shipped to Waste Control Specialists (WCS) From Los Alamos National Laboratory

The purpose of this letter is to notify the New Mexico Environment Department Hazardous Waste Bureau (NMED-HWB) of a waste characterization discrepancy as required by the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit (Permit). The discrepancy is related to manifests for 119 nitrate-salt-bearing waste containers that were shipped by the Department of Energy and Los Alamos National Security, LLC (DOE/LANS) (the Permittees) to the Waste Control Specialists facility in Andrews, Texas. This letter is provided as a follow-up to the August 14, 2014, electronic mail from Mark Haagenstad, Los Alamos National Security, LLC (LANS), to John Kieling, NMED-HWB, on the same subject.

Since the 119 containers were shipped to WCS, WCS and the LANL Permittees have each made the decision to add the Environmental Protection Agency (EPA) Hazardous Waste Number D001 for ignitability to the LANL nitrate-salt-bearing waste containers at their respective facilities. As a result, the characterization of the containers WCS received from LANL no longer match the pre-approved waste analysis certifications that accompanied the waste manifests and shipping papers associated with the original off-site shipments.

Based on the DOE/LANS written concurrence allowing WCS to correct the original manifests, the Permittees are hereby notifying the Department of this discrepancy, in accordance with Permit Section 2.4.7(4) which states that the Permittees shall "Recharacterize a hazardous waste stream whenever the Permittees are notified by a receiving off-site facility that the characterization of a hazardous waste they



ENCLOSURE 1

August 14, 2014 LANL Concurrence Letter to Waste
Control Specialists Facility

ENV-DO-14-0238

Date: SEP 03 2014



Associate Director for ESH
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Date: **AUG 14 2014**
 Ref: ADESH-14-042

Ryan Williams
 Vice President of Integrated Services
 Waste Control Specialists LLC
 Three Lincoln Centre
 5430 LBJ Freeway, Ste. 1700
 Dallas, Texas 75240

Dear Mr. Williams,

Subject: Written Concurrence for Correction of Waste Manifests for Waste Shipped to Waste Control Specialists Facility

The purpose of this letter is to follow up on our recent conversation regarding a discrepancy on manifests for containers (see attachment) that were shipped from the Los Alamos National Laboratory (LANL) to the Waste Control Specialists (WCS) facility in Andrews, Texas. The referenced containers were accepted by WCS for storage, and the manifests were returned to LANL without any discrepancies identified. At the time LANL shipped the containers to WCS, the manifests identified the hazardous waste numbers determined to be appropriate based on acceptable knowledge. Due to the recent events at WIPP, LANL has been re-evaluating the characterization of the waste stream. As we have discussed, it was determined, based on a review of Acceptable Knowledge information, that it would be prudent to conservatively add hazardous waste number (HWN) D001 for the 119 containers on the attached list. It is our understanding that WCS is required to amend the manifests associated with those containers. This letter provides LANL's concurrence with that decision.

We are continuing to re-evaluate the waste characterization information concerning these nitrate salt waste streams, and will keep you updated as to new relevant information. If you have questions please contact Michael Brandt (LANS) at (505) 667-4218, or Pete Maggiore (DOE) at (505) 665-5025.

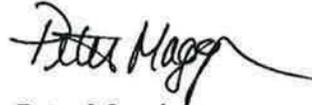
PO Box 1663, MS A100, Los Alamos, NM 87545
 505-667-5101 / FAX 505-665-2679

An Equal Opportunity Employer / Operated by Los Alamos National Security, LLC for the
 National Nuclear Security Administration of the U.S. Department of Energy

Sincerely,



Michael T. Brandt, DrPH, CIH
Associate Director
Environment, Safety, and Health
Los Alamos National Security, LLC



Peter Maggiore
Assistant Manager
Environmental Projects Office
Los Alamos Field Office

Enclosures: (1) List of Manifests Requiring Correction

Cy: Kimberly Davis Lebak, NA-LA, (E-File)
Lisa Cummings, NA-LA, (E-File)
Gene E. Turner, NA-LA, (E-File)
Kirsten M. Laskey, NA-LA, (E-File)
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Carl A. Beard, PADOPS, (E-File to aosburn@lanl.gov)
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| WCS Package ID (SWB) | INNERCONTAINER ID | Total MIN02 | NWP ID (SWB) | Manifest # |
|----------------------|-------------------|-------------|--------------|--------------|
| 14-108472 | 68509 | 3 | LASB50018 | 010784286JJK |
| | 69087 | | | |
| | 69188 | | | |
| 14-108474 | 68342 | 3 | LASB50019 | 010784286JJK |
| | 69103 | | | |
| | 68584 | | | |
| 14-108493 | 69077 | 2 | LASB50032 | 010784288JJK |
| | 69195 | | | |
| 14-108527 | 68643 | 4 | SB10174 | 010784296JJK |
| | S870129 | | | |
| | S841295 | | | |
| | S824056 | | | |
| 14-108583 | 68350 | 1 | LASB50067 | 010784305JJK |
| 14-108424 | 68426 | 1 | LASB02166 | 010784277JJK |
| 14-108615 | 68428 | 1 | LASB50028 | 010784317JJK |
| 14-108495 | 68543 | 1 | LASB50031 | 010784288JJK |
| 14-108549 | 68546 | 1 | LASB50083 | 010784299JJK |
| 14-108585 | 68627 | 1 | LASB50059 | 010784305JJK |
| 14-108440 | 68656 | 1 | LASB02206 | 010784279JJK |
| 14-108500 | 68676 | 1 | LASB50005 | 010784289JJK |
| 14-108546 | 69064 | 1 | LASB50089 | 010784299JJK |
| 14-108532 | 69067 | 1 | LASB50015 | 010784296JJK |
| 14-108486 | 69085 | 1 | LASB50021 | 010784287JJK |
| 14-108578 | 69154 | 1 | LASB50061 | 010784303JJK |
| 14-108457 | 69209 | 1 | LASB50010 | 010784285JJK |
| 14-108524 | 69295 | 1 | LASB50040 | 010784294JJK |
| 14-108613 | 93953 | 1 | LASB50060 | 010784317JJK |
| 14-108631 | 63130 | 1 | LASB50410 | 010784319JJK |
| 14-108589 | 68311 | 1 | LASB50086 | 010784306JJK |
| 14-108548 | 68314 | 2 | LASB50012 | 010784299JJK |
| | 69068 | | | |
| 14-108442 | 68315 | 2 | LASB02204 | 010784279JJK |
| | S832485 | | | |
| 14-108547 | 68325 | 3 | LASB50045 | 010784299JJK |
| | 69422 | | | |
| | 69105 | | | |
| 14-108470 | 68341 | 2 | LASB50020 | 010784286JJK |
| | 69187 | | | |
| 14-108484 | 68347 | 2 | LASB50026 | 010784287JJK |
| | 93935 | | | |
| 14-108558 | 68425 | 1 | LASB50036 | 010784300JJK |
| 14-108465 | 68429 | 2 | LASB50017 | 010784284JJK |
| | 68433 | | | |
| 14-108518 | 68431 | 2 | LASB50048 | 010784292JJK |
| | 69102 | | | |
| 14-108491 | 68432 | 3 | LASB50037 | 010784288JJK |
| | 69182 | | | |
| | 68583 | | | |
| 14-108606 | 68449 | 1 | LASB50072 | 010784315JJK |

| | | | | |
|-----------|---------|---|-----------|--------------|
| 14-108551 | 68508 | 1 | LASB50094 | 010784298JJK |
| 14-108505 | 68580 | 2 | LASB50025 | 010784290JJK |
| | 69179 | | | |
| 14-108559 | 68617 | 3 | LASB50039 | 010784300JJK |
| | 69177 | | | |
| | 69043 | | | |
| 14-108603 | 68619 | 1 | LASB50079 | 010784314JJK |
| 14-108498 | 68620 | 2 | LASB50002 | 010784289JJK |
| | 69191 | | | |
| 14-108463 | 68625 | 2 | LASB50013 | 010784284JJK |
| | 68632 | | | |
| 14-108550 | 68628 | 2 | LASB50082 | 010784298JJK |
| | 69210 | | | |
| 14-108515 | 68661 | 2 | LASB50046 | 010784291JJK |
| | 69196 | | | |
| 14-108587 | 68679 | 3 | LASB50102 | 010784305JJK |
| | 69233 | | | |
| | 69180 | | | |
| 14-108579 | 68686 | 3 | LASB50062 | 010784303JJK |
| | 69091 | | | |
| | 69073 | | | |
| 14-108556 | 69014 | 1 | LASB50095 | 010784300JJK |
| 14-108534 | 69033 | 2 | LASB50063 | 010784297JJK |
| | 69097 | | | |
| 14-108513 | 69034 | 1 | LASB50027 | 010784291JJK |
| 14-108574 | 69041 | 2 | LASB50104 | 010784304JJK |
| | 69226 | | | |
| 14-108554 | 69045 | 1 | LASB50071 | 010784298JJK |
| 14-108582 | 69060 | 3 | LASB50100 | 010784303JJK |
| | 69413 | | | |
| | 69080 | | | |
| 14-108522 | 69061 | 2 | LASB50035 | 010784294JJK |
| | 69161 | | | |
| 14-108599 | 69063 | 1 | LASB50107 | 010784313JJK |
| 14-108538 | 69066 | 2 | LASB50033 | 010784297JJK |
| | 69181 | | | |
| 14-108619 | 69074 | 2 | LASB50087 | 010784318JJK |
| | 69212 | | | |
| 14-108566 | 69081 | 1 | LASB50052 | 010784302JJK |
| 14-108571 | 69083 | 1 | LASB50098 | 010784301JJK |
| 14-108634 | 69094 | 2 | LASB50424 | 010784322JJK |
| | 69555 | | | |
| 14-108629 | 69099 | 2 | LASB50432 | 010784319JJK |
| | S802985 | | | |
| 14-108570 | 69158 | 1 | LASB50055 | 010784301JJK |
| 14-108601 | 69159 | 1 | LASB50074 | 010784313JJK |
| 14-108529 | 69162 | 2 | LASB50066 | 010784296JJK |
| | 69237 | | | |
| 14-108577 | 69163 | 3 | LASB50057 | 010784303JJK |
| | 69216 | | | |
| | 69402 | | | |
| 14-108617 | 69185 | 2 | LASB50043 | 010784318JJK |

| | | | | |
|-----------|-------|---|-----------|--------------|
| | 69492 | | | |
| 14-108595 | 69189 | 1 | LASB50108 | 010784312JJK |
| 14-108590 | 69192 | 1 | LASB50105 | 010784306JJK |
| 14-108511 | 69193 | 1 | LASB50041 | 010784291JJK |
| 14-108597 | 69194 | 1 | LASB50088 | 010784312JJK |
| 14-108461 | 69217 | 1 | LASB50014 | 010784284JJK |
| 14-108572 | 69234 | 2 | LASB50034 | 010784301JJK |
| | 69430 | | | |
| 14-108628 | 69279 | 2 | LASB50421 | 010784319JJK |
| | 69428 | | | |
| 14-108608 | 69282 | 1 | LASB50064 | 010784315JJK |
| 14-108609 | 69313 | 2 | LASB50103 | 010784315JJK |
| | 69236 | | | |
| 14-108607 | 69493 | 1 | LASB50081 | 010784315JJK |
| 14-108630 | 69565 | 1 | LASB50414 | 010784319JJK |
| 14-108581 | 69691 | 2 | LASB50058 | 010784303JJK |
| | 69069 | | | |
| 14-108697 | 69285 | 1 | LASB50416 | 010784321JJK |

Attachment 3

LA-UR-14-23807
May 29, 2014

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

Prepared by the Environmental Programs Directorate

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BACKGROUND

Los Alamos National Laboratory (LANL) staff along with the Planning and Technical Solutions (PTS) team within the LANL TRU Waste Program (LTP) evaluated generator data to identify unconsolidated nitrate salts in the aboveground transuranic (TRU) waste container population. The evaluation was conducted from January to May 2012 to identify Technical Area 55 (TA-55) TRU waste containers that were consistent with the Central Characterization Project (CCP) Nonconformance Report (NCR) (NCR-LANL-0509-09) issued for drums with uncemented nitrate salts that originated from the TA-55 evaporator operations. Forty-eight (48) containers were identified in the NCR that may have required a waste stream reassignment consistent with homogeneous solids.

In addition, in May 2012, the LANL Carlsbad Office Difficult Waste Team authored a white paper (Amount of Zeolite Required to Meet the Constraints Established by the EMRTC Report RF 10-13: Application to LANL Evaporator Nitrate Salts, May 08, 2012) that established the remediation requirements for the Waste Isolation Pilot Plant (WIPP) to affirm that the final mixture of LANL nitrate salts meets WIPP acceptance criteria. The nitrate salt evaluation was conducted to identify the population of active aboveground containers that required management as unconsolidated nitrate salts in accordance with the newly identified requirements. Containers that had been, dispositioned, or belowground were considered beyond the scope of the evaluation.

EVALUATION METHODS

- Extracted all containers with LANL generator Waste Codes A25 (Leached Process Residues), A26 (Evaporator Bottom/Salts), A27 (Nitrate Salts), and A28 (Chloride Salts) that had originated from TA-55. These waste codes had been in use since 1971.
- Initially identified 2,568 containers across all solution packages and waste streams.
- Containers with generator Waste Code A28 were eliminated after initial review indicated all containers with A28 Waste Code were indeed from TA-55 chloride operations and not nitrate operations.
- Dates of generation of interest were from 1979 to 1991 because these dates spanned the period between the start-up of TA-55 nitrate evaporator operations in 1979 and full implementation of new evaporator and cement fixation operations in 1991. The latter eliminated the generation of unconsolidated nitrate salt wastes but allowed the generation of individual cemented cans on a case-by-case basis.
- The mid-1980s represent a time period when unconsolidated and cemented nitrate salts were generated concurrently, but the same generator Waste Codes were applied.
- Over 1,700 active aboveground containers were evaluated for the presence of unconsolidated nitrate salt in bags with attached generator Waste Codes of A25, A26, and A27.
- Reviewed and summarized TA-55 nitrate operational procedures to establish criteria for presence of unconsolidated nitrate salts.
- Identified processes that generated nitrate salts and eliminated those that did not, such as chloride salt operations.
- Examined waste generator records including discardable waste forms and logs that contained itemized descriptions of waste items that were not part of radioactive solid waste disposal forms and database comment fields.

- Discussed nitrate solution evaporation and cement fixation processes with TA-55 personnel (some since retired) to confirm timing of cementation process changes.

RESULTS OF INITIAL NITRATE SALT EVALUATION JUNE 2012

- Identified two hundred and sixty-five (265) nitrate salt or suspect original parent containers based on review of generator data. These had been independently assigned by CCP personnel to TA-55 waste streams LA-MHD01.001 and LA-CIN01.001-Cans (Table 1).
- All other containers in TA-55 waste streams LA-MHD01.001 and LA-CIN01.001-Cans not listed in Table 1 were considered to contain other waste forms, such as debris or cemented materials, and not nitrate or suspect nitrate salts.
- No nitrate or suspect nitrate salt containers were identified in TA-55 homogeneous waste streams (e.g., LA-MIN02-V.001 or LA-MIN04-S.001 or from other TAs).
- Assigned the following salt types to active TRU waste containers:
 - ❖ **Nitrate** salt, based on generator records that indicated unconsolidated nitrate salt or process room number or glovebox number associated with nitrate operations evaporator or waste management operations, because not all of the legacy records included waste or process descriptions.
 - ❖ **Suspect** nitrate salt, based on generator records that indicated nitrate salt or process room number or glovebox number, but the container was assigned to a cemented waste stream and additional information was thought necessary for proper assignment (e.g., real-time radiography [RTR] or evidence of cementation such as presence of cans during remediation or visual examination).
 - ❖ **Miscellaneous**, based on generator records that indicated homogeneous solids were generated from operations other than TA-55 nitrate operations.
- Established Salt Type as data field in Container Management tracking spreadsheet.
- Containers that did not explicitly receive salt type designations were assigned *Not Applicable* because they are not nitrate salts.

No TA-21 (TA-55 predecessor facility) nitrate salts were identified because the TA-21 nitrate solutions were cemented.

Table 1
Summary of Initial Nitrate Salt Assignments
to Original, Parent, TRU Waste Containers

| Salt Type and Waste Stream | Count of Containers |
|----------------------------|---------------------|
| Nitrate | 189 |
| LA-CIN01.001-Cans | 25 |
| SP 36 | 7 |
| SP 37 | 18 |
| LA-MHD01.001 | 164 |
| SP 72 | 163 |
| SP 78 | 1 |

| | |
|--------------------------|------------|
| Suspect | 76 |
| LA-CIN01.001-Cans | 76 |
| SP 36 | 1 |
| SP 57 | 44 |
| SP 72 | 31 |
| Grand Total | 265 |

PROGRESSION OF NITRATE SALT CONTAINERS FROM AUGUST 2012 TO APRIL 2014

As of May 2012, 376 containers existed because thirty-three (33) parent drums had been processed through the Waste Characterization, Reduction and Repackaging Facility (WCRRF) that resulted in a moderate population of active remediation daughters. Table 2 summarizes the population of nitrate and suspect nitrate salt containers as of July 31, 2012, and includes the Solution Package (SP) assignments. This date captures the assignment of salt types after the initial evaluation, but before additional nitrate salt drum processing had occurred.

Remediated daughter containers, created as part of the waste sorting and repackaging operations at WCRRF, were initially assigned to the homogeneous waste stream LA-MIN04-S.001.

Table 2
Summary of Nitrate and Suspect Nitrate
Salt Containers, Including Waste Stream and
Solution Package Codes (Data as of July 31, 2012)

| Salt Type, Waste Stream, and Container Type | Count of Containers |
|--|----------------------------|
| Nitrate | 300 |
| Original | 156 |
| LA-CIN01.001-Cans | 25 |
| SP 36 | 7 |
| SP 37 | 18 |
| LA-MHD01.001 | 131 |
| SP 72 | 130 |
| SP 78 | 1 |
| Remediation Daughter | 144 |
| LA-MHD01.001 | 128 |
| SP 72 | 128 |
| LA-MIN04-S.001 | 16 |
| SP 72 | 16 |
| Suspect | 76 |
| Original | 76 |
| LA-CIN01.001-Cans | 76 |
| SP 36 | 1 |
| SP 57 | 44 |
| SP 72 | 31 |
| Grand Total | 376 |

The nitrate salt container remediation process, including waste sorting, neutralization, and absorption of liquids according to the revised requirements, started in October 2012 and continued through March 2014 at WCRFF. Table 3 summarizes the population of nitrate and suspect nitrate salt containers as of May 8, 2014. This date captures the progression of the two hundred and sixty-five (265) initially identified nitrate and suspect nitrate salt drums through remediation and disposition operations largely conducted as part of the 3,706 Waste Campaign. Table 3 includes containers identified as "Original" that were not remediated as part of the 3,706 Waste Campaign and retained their original inner package configurations, as received from the TA-55 generator. These original containers were staged at LANL and had not yet been remediated at WCRFF, but may have been placed in compliant overpacks such as an 85-gal. drum or a standard waste box.

Table 3
Summary of Nitrate and Suspect Nitrate
Salt Containers, Including Container Types
and Waste Streams (Data as of May 8, 2014)

| Salt Type, Waste Stream and Container Type | Count of Containers |
|---|----------------------------|
| Nitrate | 549 |
| LA-CIN01.001-Cans | 26 |
| Original in overpack | 1 |
| Original | 24 |
| Remediation Daughter | 1 |
| LA-MHD01.001 | 84 |
| Remediation Daughter | 84 |
| LA-MIN02-V.001 | 436 |
| Remediation Daughter | 436 |
| LA-MIN04-S.001 | 3 |
| Remediation Daughter | 3 |
| Suspect | 154 |
| LA-CIN01.001-Cans | 89 |
| Original | 7 |
| Remediation Daughter | 82 |
| LA-MHD01.001 | 4 |
| Remediation Daughter | 4 |
| LA-MIN02-V.001 | 61 |
| Original in overpack | 3 |
| Remediation Daughter | 58 |
| Grand Total | 703 |

As a result of radiological release at WIPP, a subsequent review of the 2012 nitrate salt evaluation was performed. This review of containers with nitrate, suspect nitrate salt, or miscellaneous salt types included review of remediation records and RTR data reports and videos. This review resulted in the identification of two (2) original containers (S855943 and S824181) that were not assigned as unconsolidated nitrate salts in July 2012. The assignment of nitrate salt type to the two (2) parent containers results in the assignment of nitrate salt type to four (4) remediation daughters. These four (4) containers were remediated and managed as nitrate salts. Table 4 summarizes the population of nitrate and suspect nitrate containers as of May 21, 2014, and their locations. This date captures the progression of the 265 originally identified nitrate and suspect nitrate salt drums in 2012, the expansion of the population through creation of remediation daughter, and their disposition, including the two (2) newly identified parents and their daughters. Table 4 summarizes the population of nitrate and suspect nitrate salt containers by waste stream and location, as of May 21, 2014.

The creation of remediation daughter drums during waste sorting, neutralization, absorption of liquids, and repackaging resulted in the redistribution of wastes from the parent to the daughters and subsequent reassignment of waste stream designations. For example, the parent container may have been assigned

to waste stream LA-MHD-01.001, a remediation daughter that contained more than 50% by volume homogeneous solids, and was reassigned to MIN02-V.001 by CCP. The majority of nitrate salt remediation daughters were reassigned to homogeneous solid waste stream LA-MIN02-V.001, including the four (4) remediation daughters discussed in the previous paragraph. A few were assigned to the homogeneous LA-MIN04-S.001 waste stream if they appeared to contain little nitrate salt material. Some remediation daughters may have retained the LA-MHD-01.001 or LA-CIN01.001 waste stream assignment if they contained more than 50% debris by volume or if the waste appeared to be cemented, respectively.

**Table 4
Summary of Nitrate and Suspect Nitrate Salt Containers,
Including Waste Streams, Container Types and Locations (Data as of May 21, 2014)**

| Location | Container Type | Salt Type | Waste Stream | Count of Containers |
|---------------------------|----------------------|-----------|-------------------|---------------------|
| LANL | Original | Nitrate | LA-CIN01.001-Cans | 24 |
| | | Suspect | LA-CIN01.001-Cans | 1 |
| | Remediation Daughter | Nitrate | LA-MHD01.001 | 9 |
| | | | LA-MIN02-V.001 | 21 |
| | | Suspect | LA-CIN01.001-Cans | 1 |
| | | | LA-MHD01.001 | 2 |
| | | | LA-MIN02-V.001 | 24 |
| | Original in overpack | Nitrate | LA-CIN01.001-Cans | 1 |
| | | Suspect | LA-MIN02-V.001 | 3 |
| LANL Total | | | | 86 |
| WCS | Original | Suspect | LA-CIN01.001-Cans | 1 |
| | Remediation Daughter | Nitrate | LA-CIN01.001-Cans | 1 |
| | | | LA-MHD01.001 | 2 |
| | | | LA-MIN02-V.001 | 100 |
| | | Suspect | LA-CIN01.001-Cans | 2 |
| | | | LA-MIN02-V.001 | 7 |
| WCS Total | | | | 113 |
| WIPP | Original | Suspect | LA-CIN01.001-Cans | 5 |
| | Remediation Daughter | Nitrate | LA-MHD01.001 | 73 |
| | | | LA-MIN02-V.001 | 270 |
| | | | LA-MIN04-S.001 | 3 |
| | | Suspect | LA-CIN01.001-Cans | 79 |
| | | | LA-MHD01.001 | 2 |
| | | | LA-MIN02-V.001 | 21 |
| WIPP Total | | | | 453 |
| WIPP Panel 7 | Remediation Daughter | Nitrate | LA-MIN02-V.001 | 49 |
| | | Suspect | LA-MIN02-V.001 | 6 |
| WIPP Panel 7 Total | | | | 55 |
| Total | | | | 707 |

DISCUSSION OF IDENTIFICATION OF NITRATE SALT CONTAINERS

This report summarizes the evaluations conducted to identify nitrate and suspect salts in the aboveground TRU inventory. The evaluation started in January 2012 with the identification of forty-eight (48) containers in NCR-LANL-0509-09. The evaluation focused on Waste Codes A25, A26, A27 and A28 that were a required part of the generator documentation. Containers that had been dispositioned or were belowground were not included in the evaluation. The initial evaluation in 2012 identified two hundred and sixty-five (265) nitrate salt or suspect nitrate salt original parent containers based on review of generator data. Forty (40) of the containers in the NCR were confirmed to be unconsolidated nitrate salts. The eight (8) other containers were identified as other salt or waste types. Two (2) additional nitrate salt containers were recently identified that brought the count of original parent containers to two hundred and sixty-seven (267). The processes of waste sorting, neutralization, absorption of liquids, and waste repackaging created remediation daughters that expanded the population nitrate or suspected nitrate salts to seven hundred and seven (707) containers, as summarized in Table 4.

The nitrate salt evaluation focused on the generation processes that created the nitrate salt wastes from TA-55 nitrate operations. The population of nitrate and suspect nitrate salt waste containers were identified and tracked through remediation, characterization, and disposition. The waste stream assignments were independently determined by CCP and were not considered an essential part of the assignment of nitrate or suspect nitrate salt type to specific containers. Thus, nitrate and suspect nitrate salt wastes were initially identified to exist in both LA-MHD01.001 and LA-CIN01.001-Cans waste streams. The salt type Suspect was assigned to containers in waste stream LA-CIN01.001-Cans until other independent evidence, such as visual examination or RTR, was obtained. This was not generally available in 2012 but was available and used in the May 2014 review of these containers. As described, all of the other containers in TA-55 waste streams LA-MHD01.001 and LA-CIN01.001-Cans were considered to contain other waste forms, such as debris or cemented materials, and were not, and are not, considered to contain unconsolidated nitrate or suspect nitrate salts. The WCRRF remediation technicians noted that some of the bags of salts appeared to be physically cemented. These were apparently retained in the LA-CIN01.001 waste stream.

The rest of the TRU waste inventory at TA-54 Area G that was not part of the focused evaluation was determined not to contain unconsolidated nitrate salts. Table 5 summarizes all TA-55 waste generated before 1991 that do not contain unconsolidated nitrate salts. The year 1991 represents full implementation of the new TA-55 nitrate solution evaporator and cement fixation operations that completely eliminated the generation of unconsolidated nitrate salt wastes. The Cemented and Miscellaneous salt (e.g., chlorides and other salt residues) waste streams are benign based on their chemical and physical characteristics. The remaining combustible and noncombustible trash, equipment, scrap metal, glass, plastic, and absorbed liquids do not contain any salt residues and are considered safe for storage based on current packaging configurations.

Table 5
Summary of other Homogeneous Solid and Debris TRU Wastes Generated at TA-55
Prior to 1991 That Do Not Contain Unconsolidated Nitrate Salts (Data as of May 28, 2014)

| Waste Stream | Bldg Code | Waste Stream Description | Count of Containers |
|----------------|-----------|-----------------------------------|---------------------|
| LA-CIN01.001 | TA-55 | Cemented | 431 |
| | | Miscellaneous | 81 |
| LA-MHD01.001 | TA-55 | Cemented | 1 |
| | | Miscellaneous | 10 |
| | | Combustible Decontamination Waste | 3 |
| | | Scrap Metal | 16 |
| | | Other Combustibles | 19 |
| | | Combustible Lab trash | 12 |
| | | Non-Combustible Lab Trash | 18 |
| | | Non-Property Numbered Equip. | 1 |
| | | Property Number Equip. | 3 |
| | | Non-Combustible Filter Media | 3 |
| | | Glass | 3 |
| | | Plastics | 2 |
| | | Combustible Trash | 1 |
| LA-MIN02-V.001 | TA-55 | Silicon Base Oil on Vermiculite | 1 |
| LA-MIN04-S.001 | TA-55 | Miscellaneous | 1 |
| Total | | | 606 |

ATTACHMENTS

Attachment 1 Summary of Legacy Nitrate Salt Timeline from 2012 Evaluation

| Activities | 1984 - (7/6/84 Approval Date) MST-12 Procedure – Procedure: 485-REC-R00 Treatment of Evaporator "Bottoms" | 1987 - (2/18/87 Approval Date) MST-12 Standard Operating Procedure – Procedure: 485-REC-R01 Treatment of Evaporator Bottoms | 1989 - (2/9/89 Approval Date) MST-12 Standard Operating Procedure – Procedure: 485-REC-R02 Treatment of Evaporator Bottoms | 1991 - 9/22/91 (Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R01 Computer Operated Nitric Acid Volume Reduction and Treatment of Evaporator Bottoms | 1995 - (8/31/95 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R03 Computer Operated Nitric Acid Volume Reduction and Treatment of Evaporator Bottoms | 1996 - (11/20/96 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R04 Nitric Acid Process Evaporator | 1997 - (9/9/97 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R05 Nitric Acid Process Evaporator (EV) | 2002 - (4/23/2002 Approval Date) NMT-2 Work Instruction – Procedure: NMT2-WI-002-REC-485 Nitric Acid Process Evaporator (Supersedes procedure NMT2-SOP-REC-485-R06) |
|---|---|---|--|---|---|--|---|---|
| | No Location Specified in the Procedure | Location: | Location: | Location: (Computer Operated Evaporators) | Location: (Computer Operated Evaporators) | No Location Specified in the Procedure | No Location Specified in the Procedure | Location: |
| Salts vacuum dried | Salts are vacuum dried | Salts are vacuum dried for at least 15 minutes | | | | | | |
| Salts packaged in double bags | Salts are packaged in double bags | Salts are place in plastic bags/taped (salt is bagged as soon as it looks dry enough) | | | | | | |
| Salts bagged out for disposal | Salts are placed in a 55-gal drum | Salts are discarded and bagged out | Salts are bagged out or given additional washing if not discardable | | | | | |
| Salts transferred to cement fixation (CF) | | | | Salts are redissolved and added to the bottoms and filtered; otherwise, are transferred to CF in 5-L ss cans. Bottoms are transferred to CF | Filtrates and salts are transferred to CF if they meet discard limit per PFD | Bottoms is sent to CF; otherwise, to IX if above discard limit | Filtrate is sent to CF per PFD | Residue and salt are removed from the EV and sent to CF if it meets the discard limit; otherwise, to ion exchange |

| Activities | 1984 - (7/6/84 Approval Date) MST-12 Procedure – Procedure: 485-REC-R00 Treatment of Evaporator "Bottoms" | 1987 - (2/18/87 Approval Date) MST-12 Standard Operating Procedure – Procedure: 485-REC-R01 Treatment of Evaporator Bottoms | 1989 - (2/9/89 Approval Date) MST-12 Standard Operating Procedure – Procedure: 485-REC-R02 Treatment of Evaporator Bottoms | 1991 - 9/22/91 (Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R01 Computer Operated Nitric Acid Volume Reduction and Treatment of Evaporator Bottoms | 1995 - (8/31/95 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R03 Computer Operated Nitric Acid Volume Reduction and Treatment of Evaporator Bottoms | 1996 - (11/20/96 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R04 Nitric Acid Process Evaporator | 1997 - (9/9/97 Approval Date) NMT-2 Safe Operating Procedure – Procedure: 485-REC-R05 Nitric Acid Process Evaporator (EV) | 2002 - (4/23/2002 Approval Date) NMT-2 Work Instruction – Procedure: NMT2-WI-002-REC-485 Nitric Acid Process Evaporator (Supersedes procedure NMT2-SOP-REC-485-R06) |
|---|--|--|---|--|--|---|--|--|
| | No Location Specified in the Procedure | Location: | Location: | Location: (Computer Operated Evaporators) | Location: (Computer Operated Evaporators) | No Location Specified in the Procedure | No Location Specified in the Procedure | Location: |
| Solution (supernatant transferred to CF) | Supernatant solution is transferred to CF if it contains the ff: Pu-242 and Uranium | Reduced solution goes to CF (Solutions are transferred to CF) | Bottoms are filtered and the solutions goes to CF | Distillate is transferred to TA-50 | | Distillate is transferred to TA-50 per PFD | Distillates to TA-50 if they meet discard limit per PFD | Distillate is transferred to TA-50 if it meets the discard limit; otherwise, it is redistilled |
| | Filteraid was used to absorb any moisture | If salts are not discardable, they are washed with 7 M HNO ₃ | | Bottoms are filtered and sent back to ion ex. for reprocessing if discard limit is exceeded | Distillate is transferred to TA-50; otherwise, transferred it's reprocessed through EV | Bottoms are filtered and salts remain in the filter is washed with water | | Bottoms are filtered and washed with water to further dissolve and send to CF or ion ex. for reprocessing per PFD |
| | Supernatant solution containing no salts or Pu is recycled/ reprocessed | Chemicals use: 15.9 M HNO ₃ | Solution goes back to ion ex. for reprocessing | Salt is transferred to CF if it meets the discard limit and bagged out per PFD | | | | |
| | Drums have lead lined and poly liner | | | | | | | |

Attachment 2 Itemized List of 265 Original, Nitrate, and Suspect Nitrate Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|-----------------------|---------|-----------|-------------------|----------|------|--------------|
| S793450 | S793450 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S793724 | S793724 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S794448 | S794448 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S801676 | S801676 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S802641 | S802641 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S802701 | S802701 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S802739 | S802739 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S802833 | S802833 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S802853 | S802853 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S802959 | S802959 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S803078 | S803078 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S803613 | S803613 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S804948 | S804948 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S804989 | S804989 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S804995 | S804995 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S805051 | S805051 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S805289 | S805289 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S811613 | S811613 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S811692 | S811692 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S811734 | S811734 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S811812 | S811812 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S811834 | S811834 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S811872 | S811872 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813223 | S813223 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813385 | S813385 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S813389 | S813389 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S813471 | S813471 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S813475 | S813475 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813545 | S813545 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S813562 | S813562 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813601 | S813601 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813620 | S813620 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S813676 | S813676 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S814859 | S814859 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S815176 | S815176 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816304 | S816304 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816305 | S816305 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code ' | Dataset Date |
|------------------------------|---------------|------------------|---------------------|-------------|---------------|---------------------|
| S816342 | S816342 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816357 | S816357 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816374 | S816374 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816394 | S816394 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816434 | S816434 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S816440 | S816440 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816469 | S816469 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816664 | S816664 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816667 | S816667 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816692 | S816692 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S816768 | S816768 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S816773 | S816773 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816810 | S816810 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S816828 | S816828 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816837 | S816837 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S816890 | S816890 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S816900 | S816900 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S816915 | S816915 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S818255 | S818255 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S818354 | S818354 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S818370 | S818370 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S818382 | S818382 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S818412 | S818412 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S818435 | S818435 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S818449 | S818449 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S821203 | S821203 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S822541 | S822541 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S822542 | S822542 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S822599 | S822599 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S822679 | S822679 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S822713 | S822713 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S822838 | S822838 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S822844 | S822844 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S822876 | S822876 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S822952 | S822952 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823004 | S823004 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823016 | S823016 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S823124 | S823124 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S823125 | S823125 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|-----------------------|---------|-----------|-------------------|----------|------|--------------|
| S823126 | S823126 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S823127 | S823127 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S823153 | S823153 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S823166 | S823166 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823184 | S823184 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S823187 | S823187 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823194 | S823194 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823221 | S823221 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823229 | S823229 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S823276 | S823276 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824184 | S824184 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824187 | S824187 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824188 | S824188 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824208 | S824208 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824468 | S824468 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S824508 | S824508 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824541 | S824541 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824551 | S824551 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824660 | S824660 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S824967 | S824967 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825020 | S825020 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825021 | S825021 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825639 | S825639 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825664 | S825664 | Nitrate | LA-MHD01.001 | Original | 78 | 7/31/2012 |
| S825730 | S825730 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825810 | S825810 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S825878 | S825878 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S825879 | S825879 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S825902 | S825902 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832040 | S832040 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832140 | S832140 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832141 | S832141 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832143 | S832143 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832144 | S832144 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832145 | S832145 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832146 | S832146 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S832147 | S832147 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832148 | S832148 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832149 | S832149 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|------------------------------|---------------|------------------|---------------------|-------------|-------------|---------------------|
| S832150 | S832150 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832155 | S832155 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832156 | S832156 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832241 | S832241 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832320 | S832320 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832340 | S832340 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832448 | S832448 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832464 | S832464 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S832499 | S832499 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S833037 | S833037 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S833261 | S833261 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S833409 | S833409 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S833481 | S833481 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S833846 | S833846 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S833937 | S833937 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S834406 | S834406 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S834539 | S834539 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S834633 | S834633 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S835283 | S835283 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S835372 | S835372 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S835376 | S835376 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S841239 | S841239 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841240 | S841240 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841251 | S841251 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841292 | S841292 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841314 | S841314 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841320 | S841320 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S841627 | S841627 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S842181 | S842181 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S842213 | S842213 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S842234 | S842234 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S842446 | S842446 | Suspect | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S842463 | S842463 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S842526 | S842526 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S842528 | S842528 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S843528 | S843528 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S843593 | S843593 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S843594 | S843594 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S843672 | S843672 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|-----------------------|---------|-----------|-------------------|----------|------|--------------|
| S843673 | S843673 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S843962 | S843962 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844213 | S844213 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844215 | S844215 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844253 | S844253 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844573 | S844573 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844602 | S844602 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S844684 | S844684 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S844689 | S844689 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S845031 | S845031 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S845072 | S845072 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S845104 | S845104 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S845201 | S845201 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846088 | S846088 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846096 | S846096 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846107 | S846107 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846132 | S846132 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S845338 | S845338 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846037 | S846037 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846055 | S846055 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S846168 | S846168 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846172 | S846172 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846195 | S846195 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S846660 | S846660 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851415 | S851415 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S851416 | S851416 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S851418 | S851418 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S851426 | S851426 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851432 | S851432 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851436 | S851436 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851506 | S851506 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851682 | S851682 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851739 | S851739 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851752 | S851752 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851764 | S851764 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851772 | S851772 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S851852 | S851852 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S852513 | S852513 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852530 | S852530 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|-----------------------|---------|-----------|-------------------|----------|------|--------------|
| S852588 | S852588 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S852590 | S852590 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852592 | S852592 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852593 | S852593 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852883 | S852883 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852895 | S852895 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852923 | S852923 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852931 | S852931 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S852952 | S852952 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S853006 | S853006 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853279 | S853279 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853326 | S853326 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853482 | S853482 | Suspect | LA-CIN01.001-Cans | Original | 57 | 7/31/2012 |
| S853492 | S853492 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853641 | S853641 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853714 | S853714 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S853771 | S853771 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853898 | S853898 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S853899 | S853899 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S854616 | S854616 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855126 | S855126 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855139 | S855139 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855216 | S855216 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855240 | S855240 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855290 | S855290 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855566 | S855566 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S855677 | S855677 | Suspect | LA-CIN01.001-Cans | Original | 72 | 7/31/2012 |
| S855793 | S855793 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S860014 | S860014 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S860093 | S860093 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S860095 | S860095 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S860096 | S860096 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S861975 | S861975 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S861976 | S861976 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S861980 | S861980 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S861995 | S861995 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S862241 | S862241 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S862255 | S862255 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S862411 | S862411 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |

Summary of Evaluation and Identification of LANL Nitrate Salt Containers

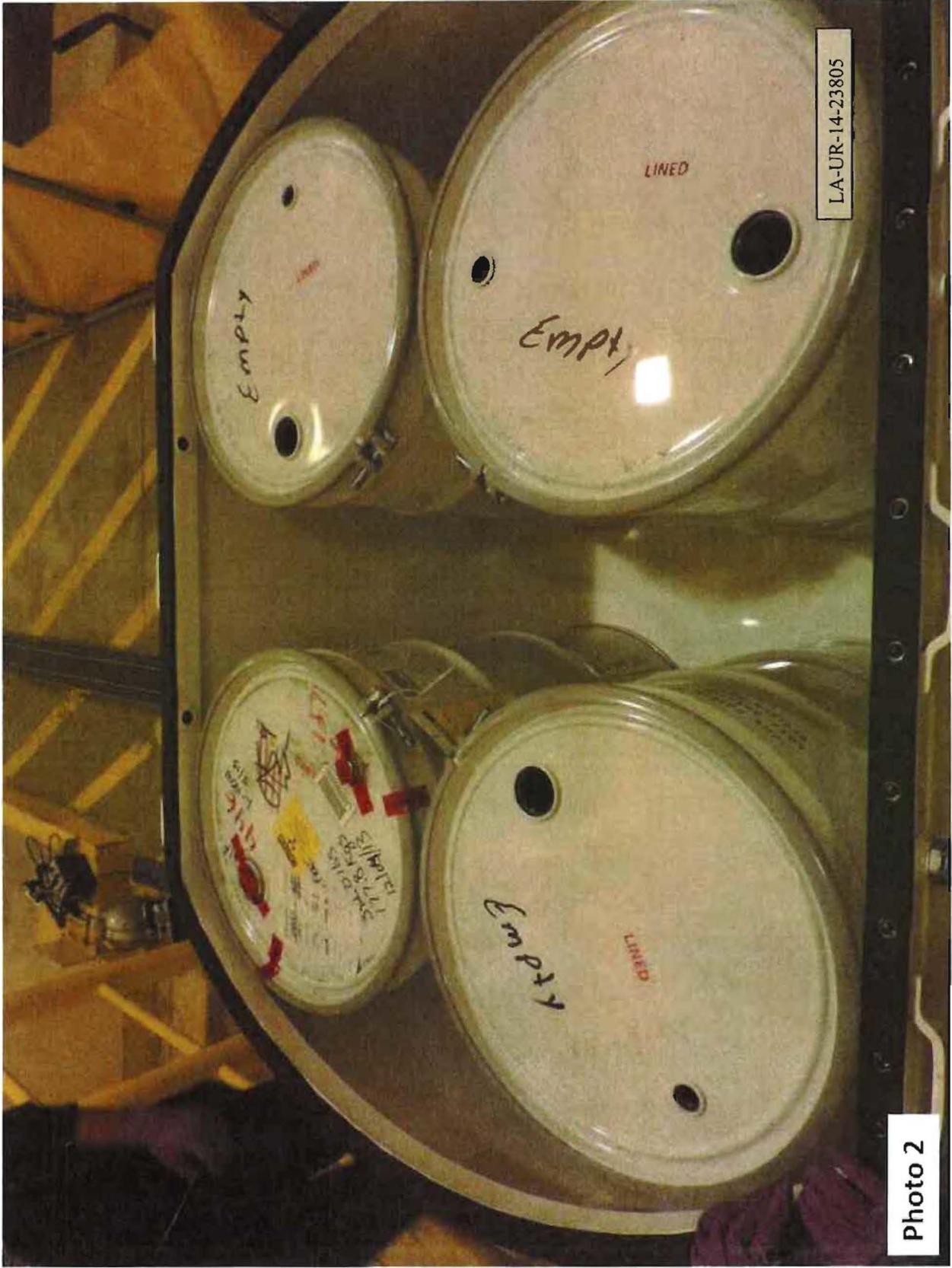
| Original Container ID | PKG_ID | Salt Type | Waste Stream | Type | Code | Dataset Date |
|-----------------------|---------|-----------|-------------------|----------|------|--------------|
| S862888 | S862888 | Nitrate | LA-CIN01.001-Cans | Original | 37 | 7/31/2012 |
| S863696 | S863696 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S863787 | S863787 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S863788 | S863788 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S863789 | S863789 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S864213 | S864213 | Nitrate | LA-CIN01.001-Cans | Original | 36 | 7/31/2012 |
| S864662 | S864662 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S864663 | S864663 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S864694 | S864694 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870065 | S870065 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870213 | S870213 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870338 | S870338 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870381 | S870381 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870475 | S870475 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S870478 | S870478 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S871844 | S871844 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S873554 | S873554 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881562 | S881562 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881563 | S881563 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881569 | S881569 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881570 | S881570 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881607 | S881607 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S881608 | S881608 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S883130 | S883130 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S891279 | S891279 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S891387 | S891387 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S891513 | S891513 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S892963 | S892963 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S900215 | S900215 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S901114 | S901114 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S910170 | S910170 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S910171 | S910171 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |
| S910172 | S910172 | Nitrate | LA-MHD01.001 | Original | 72 | 7/31/2012 |

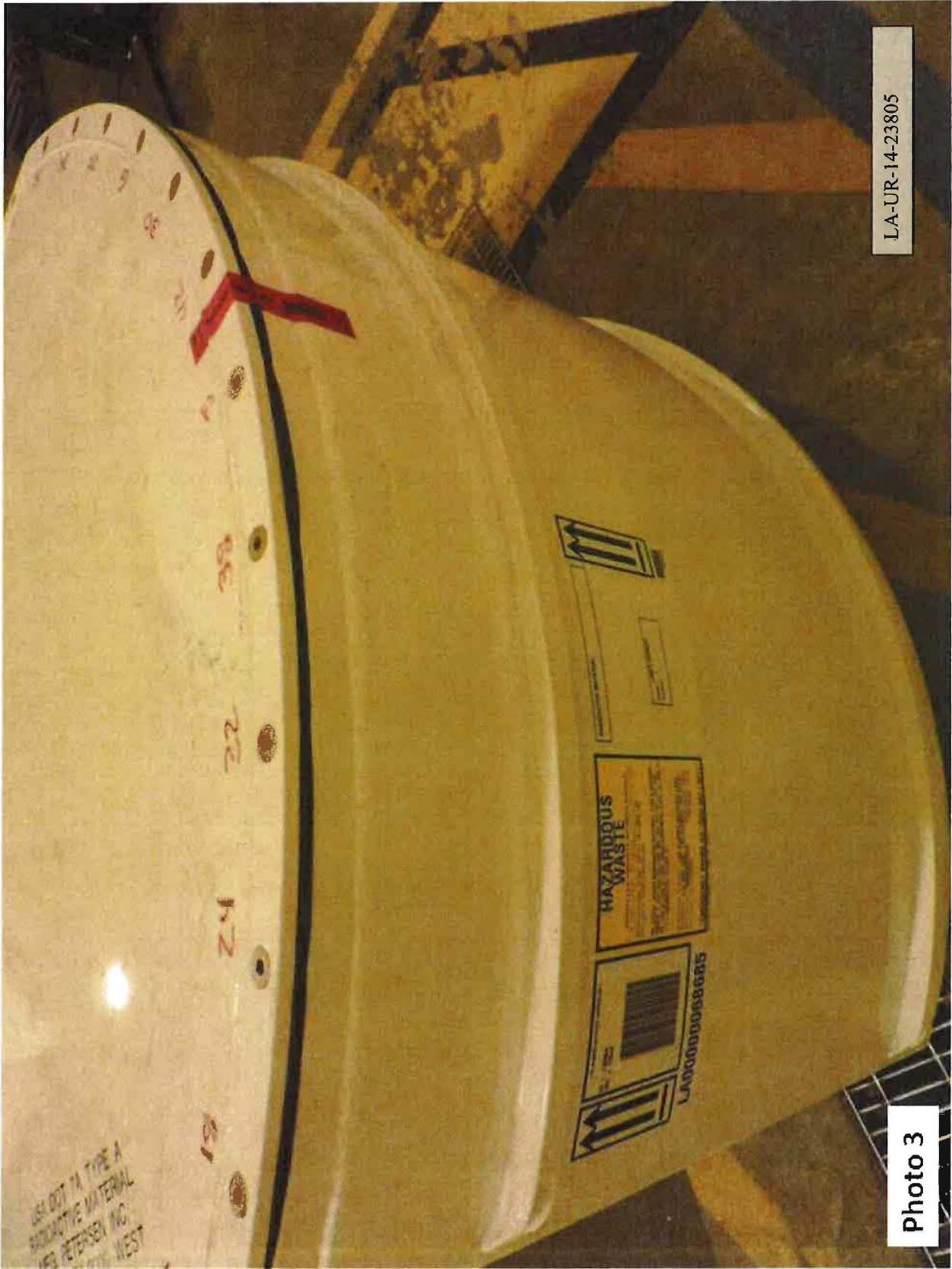
Attachment 4



LA-UR-14-23805

Photo 1





LA-UR-14-23805

Photo 3

Attachment 5

| | | |
|---|--------------------------------------|--|
|  <p>Los Alamos NATIONAL LABORATORY</p> <p>Nuclear Material Control & Accountability Program</p> <p>Functional Work Instruction</p> | <p>TID User Manual</p> | <p>Operating Procedure Number: NMCA-TID-FWI-002</p> |
| | | <p>Revision: 1</p> |
| | | <p>Effective Date: 3/14/2014</p> |
| | | <p>Review Date: 3/14/2016</p> |
| | <p>Preparer: Dana Sandoval</p> | <p>Date: 2/10/2014</p> |
| | <p>Team Leader: Carol Slaughter</p> | <p>Date: 2/24/2014</p> |
| | <p>Group Leader: Michael Kaufman</p> | <p>Date: 3/14/2014</p> |

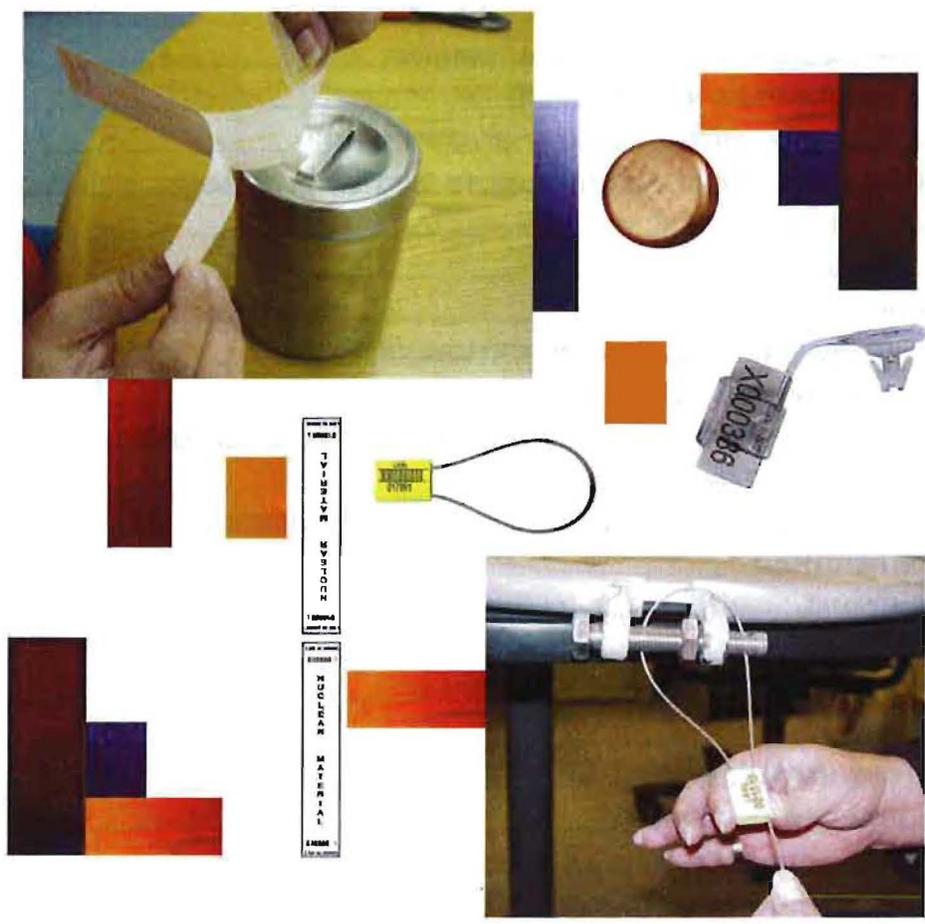


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History of Revisions

| Revision | Effective Date | Action | Pages Revised | Description |
|----------|----------------|---|--------------------|---|
| 000 | 9/11/13 | <input checked="" type="checkbox"/> New <input type="checkbox"/> Major revision <input type="checkbox"/> Minor revision <input type="checkbox"/> Reviewed, no change | | |
| 1 | 2/11/14 | <input type="checkbox"/> New <input type="checkbox"/> Major revision <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Reviewed, no change | 5 7, 19, 59 | Changed reference to DOE O 474.2. TID Inventory form change. |

1.0 PURPOSE

This User Manual sets forth the characteristics and requirements of the Laboratory Tamper Indicating Device (TID) Program. A TID is a device, such as a seal, that is applied to a container, door or object. The TID indicates tampering or entry has occurred. This program has been designed to enhance the control and protection of special nuclear material (NM) held by Los Alamos National Laboratory (LANL). The TID program is intended to complement existing Nuclear Material Control and Accountability (MC&A) programs. TIDs alert knowledgeable personnel of unauthorized tampering with a container, door, or object to which a TID has been affixed. TIDs are only considered a reliable safeguard when they are used in conjunction with an effective material surveillance program.

LANL's policy is to comply with Department of Energy (DOE) manual requirements for use of TIDs consistent with the graded safeguards described in DOE O 474.2, "*Nuclear Material Control and Accountability*." TIDs are administered by the Material Control and Accountability Group (SAFE-4) Nuclear Material Control Team.

TID personnel must have adequate training before applying, removing, voiding, or verifying TIDs. TIDs are a benefit only if they have been properly applied to readily indicate when they have been compromised.

2.0 SCOPE

2.1 WHEN TIDS ARE USED

TIDs are used before an accountability measurement, when the special nuclear material (SNM) transferred between material balance areas (MBA) is 50 grams (fissile) or more, when transporting NM from one material access area (MAA) to another or for external transfers containing accountable quantities of SNM.

2.2 BENEFITS OF USING TIDS

TIDs are only a benefit if they have been properly applied or have an intrinsic seal so that it is easy to detect when a container has been compromised. Improperly applied TIDs negate the benefits they provide under the graded safeguards requirements.

LANL acknowledges the validity of TIDs on items and shipping containers applied by other sites in the DOE complex.

3.0 PROCEDURE

3.1 RESPONSIBILITIES

3.1.1 TID ADMINISTRATOR

SAFE-4, TID Administrator in the Security, Safeguards, and Emergency Response Division is responsible for the TID Program, written procedures, procurement, storage, oversight of the RoboCrib, oversight of LANL TID training, for the TID program and other TID related activities.

3.1.2 RESPONSIBLE LINE MANAGERS

- Request the establishment of a TID account.
- Appoint a TID custodian and one or more designated TID alternates by completing form MCA-F201 (see Attachment 4).
- Appoint TID users by completing form MCA-F202 (see Attachment 5).
- Appoint TID users to utilize RoboCrib by completing form MCA-F233 (see Attachment 20).
- Ensure the designated TID custodians, designated TID alternates and TID users attend all required TID training. Ensure, with the assistance of the TID custodian, the TID training for all group personnel is current.
- Ensure group compliance with the TID Program.

NOTE: TID custodians and alternates may be assigned as the TID custodian or alternate to ONLY one TID account. The TID custodian and alternate can be designated as a TID user in multiple accounts.

3.1.3 TID CUSTODIANS/ALTERNATES

- May perform custodial functions in only one account.
- TID custodians/alternates assigned to the specific account are the ONLY individuals to have access to the TID repository, and TID records.
- Request TIDs, as needed, from the TID Administrator.
- Provide locked repository for TIDs and associated records.
- Ensure TIDs are issued sequentially to designated TID users assigned to their account.
- Ensure appropriate type of TID is issued for the intended use.

- Ensure appropriate application/removal forms are correctly filled out. TID records must be maintained for all TIDs, both applied and removed from item.
- All forms and documentation associated with the TID program must be kept in a TID Log Book, which includes:
 - TID Access Record (MCA-F219, see Attachment 17)
 - TID Application Forms (see Attachments)
 - TID Removal Forms (see Attachments)
 - TID Inventory Form (MCA-F217, see Attachment 16)
 - Discrepancy File
 - TID Users List (MCA-F200, see Attachment 3 or MCA-F205, see Attachment 6)
 - Intrinsically Tamper Indicating Item Forms (MCA-F208, see Attachment 8)
 - TID User Manual
- Records are kept INDEFINITELY. The records can be taken to the TID Administrator for archiving. (see Change of Documentation Custody)
- Maintain TID documentation and training records of TID users.
- Conduct biannual TID inventories on un-used TIDs and document the results of the inventory on the TID Inventory Form (MCA-F217, see Attachment 16).
- Participate in annual TID audit by the TID Administrator.
- Serve as the verifier as needed when TIDs are applied or removed within their TID account.
- Ensures TID's are updated on the nuclear material accountability system database.

NOTE: TID custodians and alternates may be assigned as the TID custodian or alternate to ONLY one TID account. The TID custodian and alternate can be designated as a TID user in multiple accounts.

NOTE: TIDs MUST NOT be left unattended.

3.1.4 TID USERS

- Ensure appropriate type of TID is issued for the intended use and is applied correctly.
- Ensure TID training is completed.
- Serve as the TID applicator, remover, or verifier when applying or removing TIDs. TID users may be authorized to conduct TID-related activities in more than one account.
- Ensure proper application, removal, verification, voidance, destruction and/or disposal of TIDs.
- Have knowledge of container contents.
- Complete and sign appropriate forms and return to the TID custodian/alternate.
- After the application of a TID, ensure that the correct TID serial number is entered into the nuclear material accountability system database.

NOTE: If using RoboCrib, please see TID User Responsibilities for RoboCrib.

NOTE: TIDs MUST NOT be left unattended.

3.2 PERSONNEL AUTHORIZED TO APPLY, REMOVE, VERIFY, AND DISPOSE OF TIDS

- The TID custodian/alternate CANNOT apply or remove TIDs in the TID account in which they are designated as a TID custodian or alternate. The TID custodian and alternate can however, verify TID application or removal of a TID within their TID account.

NOTE: A TID custodian or alternate that is designated as a TID user in another TID account may perform TID user functions (apply/remove/verify) within that TID account.

- Qualified TID users are authorized to perform the TID application/removal/verification function provided they are assigned to that designated TID account.
- The TID Administrator may be called out to apply/remove/verify TIDs in any TID account.

NOTE: Two-person rule applies to all TID activities.

NOTE: If using RoboCrib, please see TID User Responsibilities for RoboCrib.

3.3 CHANGE OF TID RESPONSIBILITIES

3.2.1 CHANGE WITHIN THE TID ACCOUNT

When a change occurs within a TID Account, the following actions are required:

1. Form (MCA-F200 or MCA-F205) must be sent to the TID custodian by the TID Administrator.

NOTE: MCA-F200, Verification of TID Account (see Attachment 3), is a form that contains signatures from the Responsible Line Manager (RLM), TID custodian, TID alternate, and MBA custodian, verifying the TID users in a specific TID account.

NOTE: MCA-F205 is a form sent to the TID custodian when any type of change has been made to their TID account.

2. The TID custodian must verify the TID users in their specific TID account.
3. When the TID users are verified, form MCA-F200 must be completed, signed, and sent to the TID Administrator.

3.2.2 REMOVING TID USERS WITHIN A TID ACCOUNT

When TID custodians/alternates/users request removal from a TID account, the following actions are required:

1. Form MCA-F207 must be completed, signed and sent to the TID Administrator.
2. A signed copy must be retained in the TID Log Book.
3. The TID Administrator must notify the TID custodian and TID user of the change.
4. The TID Administrator will send an updated form MCA-F205 to the TID custodian with the current listing of authorized personnel for the TID account.

3.2.3 CHANGE OF TID CUSTODIAN/ALTERNATE

When a change of TID custodian/alternate is required, the following actions are required:

1. The existing TID custodian notifies the TID Administrator.
2. The incoming TID custodian/alternate must be appointed by the RLM. Form MCA-F201 must be completed, signed and sent to the TID Administrator.
3. The incoming and outgoing TID custodian/alternate must perform a 100% inventory of all TID holdings within the TID account.
4. The TID repository combinations/keys MUST be changed.

NOTE: If the outgoing TID custodian will remain as the TID alternate, a change of lock combinations/keys is not required:

5. When the inventory and the change of the repository combination/keys are complete, both incoming and outgoing TID custodian/alternate must note the inventory on the TID Inventory Form (MCA-F217, see Attachment 16) and sign. The form MCA-F201 is sent to the TID Administrator.
6. Changes are considered effective upon receiving notification from the TID Administrator.
7. The TID Administrator must send an updated form MCA-F205 to the TID custodian with the current listing of the TID account.

NOTE: The designated TID custodian/alternate/user must be qualified. If the requested TID user is new to the TID Program he or she must take the initial TID training.

3.2.4 DESIGNATING A NEW TID USER

When a TID user is requested, the following actions are required:

1. The incoming TID user must be appointed by the RLM. Form MCA-F202 must be completed, signed and sent to the TID Administrator.

NOTE: The designated TID custodian/alternate/user must be qualified. If the requested TID user is new to the TID Program, he or she must take initial TID training.

2. Changes are considered effective upon receiving notification from the TID Administrator.

3.4 FREQUENCY AND METHOD OF TID VERIFICATION

TIDs require verification in a number of instances and under a variety of conditions.

TIDs must always be verified in the following instances:

- immediately before and after TID application,
- prior to removing, breaking, or voiding a TID,
- prior to receiving a container into a MBA,
- prior to shipping a container from an MBA,
- when selected (randomly or otherwise) during a physical inventory,
- as required during any occurrence investigation, and
- when a TID discrepancy has been reported.

NOTE: Receiver is not required to accept a shipment if a TID discrepancy exists.

NOTE: The verifier MUST be familiar with the contents of the container.

NOTE: If using RoboCrib, please see RoboCrib Verification.

3.5 NUCLEAR MATERIAL ACCOUNTABILITY SYSTEM DATABASE

Following application of a TID, the TID custodian/alternate must ensure that the TID serial number is entered into the nuclear material accountability system database.

Following removal of a TID, the TID custodian/alternate must ensure that the TID serial number is removed from the nuclear material accountability system database.

NOTE: The TID custodian/alternate/user assigned to the specific TID account and who is a nuclear material accountability system user is authorized to update the TID field on the nuclear material accountability system.

NOTE: If using RoboCrib, please see the TID User Responsibilities for RoboCrib.

3.6 CONDITIONAL VARIANCES

A conditional variance is any deviation from TID program requirements and may be granted in special cases. All requests for such variances must be forwarded to the TID Administrator and must include documentation justifying the request. The TID Administrator reviews and forwards the request to the NM Control and Performance Assurance Team Leader and SAFE-4 Group Leader for final approval.

NOTE: All conditional variances must be evaluated by the TID Administrator, NM Control and Performance Assurance Team Leader, and SAFE-4 Group Leader to

ensure no other graded safeguards requirements are diminished in any way and in order to maintain compliance with DOE Orders. Each variance must have an expiration date and must be in effect only until that date, unless a formal extension is requested and granted, prior to the expiration.

3.7 STORAGE

TIDs are not classified, however they are strictly controlled. The TID Administrator distributes TIDs to TID custodians/alternates, who are responsible for locked containment of the TIDs until they are to be applied. An approved safe is not a requirement for TID storage but at a minimum, a locked repository with controlled key or combination access must be provided to ensure detection should malevolent entry occur.



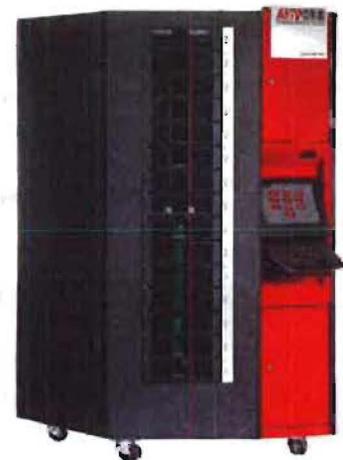
NOTE: Access to the locked repository is limited to TID Custodians/Alternates ONLY.

NOTE: All TID logbook documentation must be maintained and controlled by the TID custodian/alternate. The TID Log Book is stored in the locked repository along with assigned TIDs.

The TID custodian/alternates must maintain the TID Access Record form (MCA-F219, see Attachment 17), recording all access to the locked repository.

3.8 ROBOCRIB

The RoboCrib program allows only assigned personnel to use the RoboCrib to dispense TIDs. The Request for RoboCrib TID User form (MCA-F233, see Attachment 20), must be completed and submitted to the TID Administrator prior to attending the TID RoboCrib Initial training. All TID users using RoboCrib MUST have access to the nuclear material accountability system before they are allowed to dispense TIDs from RoboCrib. The TID user must maintain an active red crypto card, which will allow them to conduct activity within the nuclear material accountability system. Once the TID user successfully completes the RoboCrib Initial training the TID Administrator will notify the TID users that approval to use the RoboCrib has been granted.



3.8.1 TID USER RESPONSIBILITIES FOR ROBOCRIB

TID users are responsible for:

- **TID Use:** ensure appropriate type of TID issued for the intended use and is applied correctly.

NOTE: TID users CANNOT return unused TIDs. All unused TIDs MUST be physically destroyed and voided from the nuclear material accountability system.

- **TID Training:** ensure that TID training, RoboCrib Initial training and LANMAS/LAMCAS user training is complete. RoboCrib will only issue TIDs to qualified TID users whom have completed all training requirements.
- **TID Application, Removal, or Verification:** serve as the TID applicator, remover, or verifier when applying or removing TIDs. TID users may be authorized to conduct TID-related activities within TA-55 ONLY.

NOTE: The user who dispenses the TID MUST be the applicator of the TID.

- **Proper Procedural Operations:** ensure proper application, removal, voidance, destruction and/or disposal of TIDs.

NOTE: TID MUST be applied or voided as soon as possible, within the same working day.

- **Container Contents:** have knowledge of container contents.

NOTE: All TIDs MUST be accounted for within the nuclear material accountability system.

- **Intrinsically Tamper Indicating Items:** Have physical characteristics that, upon visual inspection, will immediately indicate tampering and violation of their integrity. When these items are created, the TID user will be responsible for providing the TID Administrator with the Intrinsically Tamper Indicating Item Form (MCA-F208). On the form, the TID user is required to complete the LOT ID, MBA #, Date, SNM, MT, Description of Item, Storage Location, Application Signature, Verifier Signature and the Derivative Classifier review. When the INTR item is altered the TID user is responsible for entering the removal into the nuclear material accountability system.

NOTE: TID users MAY NOT use any type of gloves when dispensing TIDs.

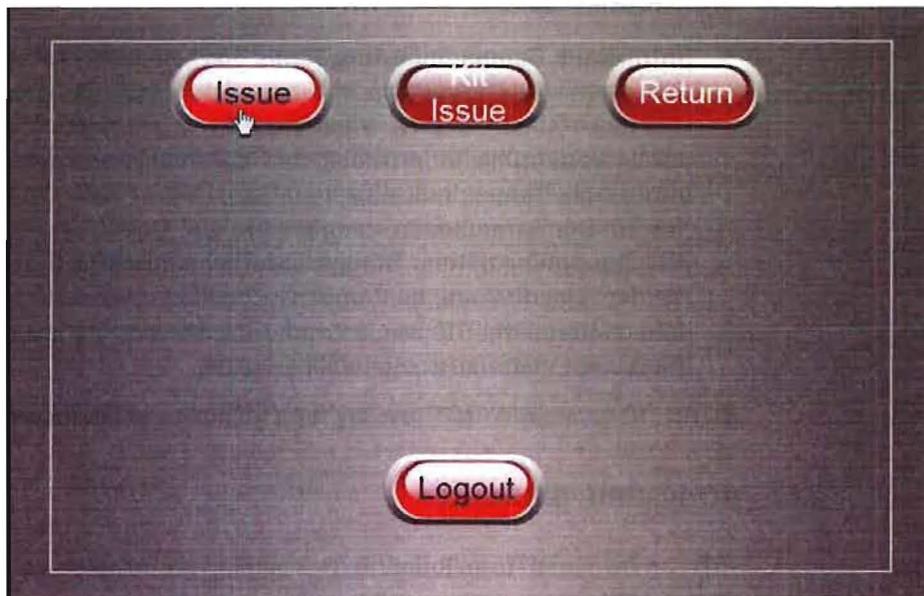
3.8.2 ROBOCRIB ISSUANCE

TIDs can be issued from RoboCrib by scanning the TID users badge on the badge reader.

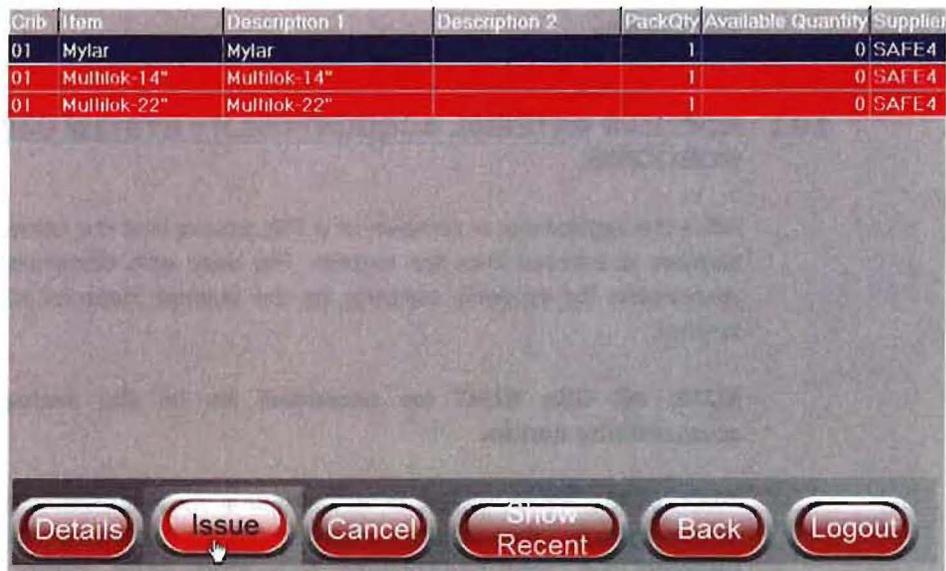
The z # will display and then the TID user can click on the “Login” button.



The TID user will need to click on the “Issue” button.



The TID user can select the type of TID (selected TID type will be highlighted). The TID user can click the "Issue" button.



Once this step has been completed the RoboCrib door will open and the TID user can retrieve the TID requested. Once the transaction is completed the login screen will display.



Transactions must be made one at a time.

NOTE: Multiple TIDs cannot be dispensed in a single transaction.

NOTE: TIDs must be applied or voided as soon as possible, within the same working day.

3.8.3 NUCLEAR MATERIAL ACCOUNTABILITY SYSTEM USING ROBOCRIB

After the application or removal of a TID, ensure that the correct TID serial number is entered into the system. The user who dispenses the TID is responsible for properly entering on the nuclear material accountability system.

NOTE: All TIDs MUST be accounted for in the nuclear material accountability system.

When a TID is being applied or removed to a container/material that is not on the nuclear material accountability system the transaction **MUST** be recorded. (i.e., applying/removing from pencil drops, empty containers, hoods, etc.)

When a TID has been voided the transaction **MUST** be recorded on the nuclear material accountability system as a void.

NOTE: A detailed description as to why the TID was voided MUST be entered.

If the TID user has a TID that has been dispensed from RoboCrib and is not being used, the TID user needs to physically destroy the TID and document it on the nuclear material accountability system as a "Void" with a detailed description as to why it was voided.

3.8.4 ROBOCRIB VERIFICATION

The TID Administrator will verify activities conducted through RoboCrib in conjunction with the nuclear material accountability system.

Verification of all activities will happen on a regular basis to ensure the TID users are entering the information accurately. If the TID users are not entering the nuclear material accountability system transactions accurately, further actions must be taken.

3.8.5 ROBOCRIB DISCREPANCY NOTIFICATION DOCUMENTATION

When a reportable TID discrepancy is discovered, the TID user is required to report the discrepancy to the RLM. Stop processing activities and segregate the discrepancy item.

The documentation of the investigation is forwarded to the TID Administrator.

If the TID discrepancy is not resolved within two hours from the time it was discovered then the TID user MUST notify the TID Administrator to initiate further investigation.

3.8 DISTRIBUTION

The TID Administrator distributes the TIDs to the TID custodian/alternates assigned to a specific TID account. The TID Administrator issues the TIDs to the TID account, the TID custodian/alternate verifies TID's that are being issued then signs the TID Administrator's TID Log Book.

It is the responsibility of the TID custodian/alternate to secure the TIDs in a locked repository and log the receipt of the SAFE-4 TIDs in the TID Log Book.

The TID custodian/alternate must complete the following steps when a TID user requests a TID:

1. The TID custodian/alternate must complete the TID Access Record Form (MCA-F219, see Attachment 17), indicating the date and time the repository is accessed.
2. The TID custodian/alternate must check the form (MCA-F200 or MCA-F205) to acknowledge the TID user and TID verifier are qualified and assigned to the specific TID account.
3. The TID custodian/alternate issues the appropriate type of TID in sequential order.
4. The TID user must sign the application form under the "Issued to" section next to the TID they are being issued. The TID verifier witnessing the issue must sign the "Issued Verifier" section. The TID custodian/alternate provides the TID user with the appropriate TID Application Form.
5. When the TID is applied and the application form is completed the TID user must return the form to the TID custodian/alternate.

NOTE: Once the TID user obtains the TID they must apply it, or maintain control of the un-used TID. If the TID is not applied it must be returned to the TID custodian/alternate.

NOTE: The TID Log Book must be kept in a locked repository along with the TIDs.

NOTE: TIDs may not be issued from one TID custodian's account to another TID custodian's account.

3.9 ABNORMAL EVENTS

If an abnormal event occurs during working hours please contact the TID Administrator.

If an abnormal event occurs outside normal working hours, the event must be documented and the TID Administrator must be notified the next business day. Unclassified documentation of the event must be provided to the TID Administrator via E-mail.

3.10 TID AUDITS

The TID Administrator audits the records and TID holdings of each TID custodian/alternate annually.

A schedule must be coordinated with the TID custodian/alternate and other affected personnel. Once a schedule is finalized, the TID Administrator provides the audit schedule to the TID custodian/alternate and the RLM.

The TID custodian will be audited on the following items:

- TID Access Record (MCA-F219), TID Application Forms (see Attachments),
- TID Removal Forms (see Attachments),
- TID Inventory Form (MCA-F217, see Attachment 16),
- Discrepancy File,
- TID Users List (MCA-F200, see Attachment 3 or MCA-F205, see Attachment 6),
- Intrinsicly Tamper Indicating Item Forms (MCA-F208, see Attachment 8), and
- TID User Manual.

NOTE: A copy of 12 months of the above-listed TID records must be provided to the TID Administrator.

Upon completion of the TID audit, the TID administrator will send documentation to each RLM and TID custodian describing the results of the MC&A TID audit.

NOTE: If using RoboCrib, please see RoboCrib Verification.

3.11 TID INVENTORY

The TID custodian/alternate is required to conduct biannual TID inventories on unused TIDs and document the results of the inventory on the TID Inventory Form (MCA-F217, see Attachment 16).

NOTE: TID records are kept INDEFINITELY.

3.12 TID GRAM

A TID GRAM (Attachment 1) is used by the TID Administrator to notify all TID custodian/alternates/users and RLMs that a change has been made to the TID Program. TID GRAMs also emphasize a requirement when a trend of deficiencies has been noted.

3.13 TID DISCREPANCIES

TID verification specifically requires an examination of each TID, sufficient to ensure that none of the TID discrepancies listed below exist:

- TID number discrepancy (i.e., missing, unreadable)
- Unauthorized TID
- Broken, damaged or deteriorating TID
- TIDs missing from TID custodian/alternate's inventory
- TIDs missing from NM containers
- Intrinsic discrepancies, such as prying, disassembling, or cutting the item to the point of violating its intrinsic characteristics
- Improperly applied TID
 - Mylar applied over tape or label
 - Mylar applied over old "voids"
 - Mylar applied less than 1 inch below lid
 - Mylar pulled too tightly and does not adhere to top of container
 - Mylar not applied on opposite sides of lid
 - Old "voids" not cleaned off container
 - Cup-Wire (Type E) Seal, Quickseals, and Multi-loks applied too loosely
 - Cup-Wire (Type E) Seal and Quickseals with no "figure eight"
 - Cup-Wire (Type E) Seal, Quickseals, and Multi-loks, where wire did not go through hole in bolt
 - Cup-Wire (Type E) Seal, where sleeve is not crimped properly

NOTE: If a discrepancy occurs, stop ALL processing activities for the item(s) in question, and segregate the item(s) in question, if possible.

The following actions are required:

1. Immediately notify a TID custodian/alternate and RLM. Stop processing activities and segregate the discrepancy item.
2. If the TID discrepancy cannot be resolved within two hours from the time of discovery, the TID custodian/alternate notifies the TID Administrator to initiate further investigative action.
3. A TID discrepancy requires the TID custodian/alternate to provide documentation of the incident to the TID Administrator detailing the incident, how it was resolved, and what steps will be taken to prevent future incidents.
4. The TID custodian/alternate must forward the documentation from the investigation and resolution of the TID discrepancy to the TID Administrator.
5. All TID discrepancies documentation must be maintained in the TID custodian/alternate records.

3.14 CONTAINER AND DEVICES

The TID user who applies TIDs to containers and devices must use the proper hardware (i.e., bolts, nuts, wire, copper collar, etc.) associated with TID application. This hardware is designed so that any unauthorized attempt to access the NM will compromise the TID.

To meet the requirements, a container must be constructed so that all means of access will violate the TID or the integrity of the container.

The following Table shows authorized containers on which TIDs can be applied:

| Container Type | TID Type |
|-------------------------------------|--|
| Hagen Container | Multi-lok, Cup-Wire (Type E) Seal, Quickseal |
| 5 gallon Metal Bolt-Ring Containers | Mylar |
| 6M Shipping Drum | Multi-lok |
| DOT certified drums | Multi-lok, Cup-Wire (Type E) Seal, Quickseal |
| Pressure cooker | Multi-lok, Mylar |
| Solution bottles | Mylar |
| Doors | Mylar |
| Dressing jars | Mylar |
| Paint cans | Mylar |
| Glovebox doors | Mylar |
| Slip top containers | Mylar |
| Glass vials | Mylar |
| Nalgene bottles | Mylar |
| Waste drums | Multi-lok, Cup-Wire (Type E) Seal, Quickseal |

3.14 TID RECORDS/ FILES

The TID custodian/alternate must maintain the following records/files in the TID repository. All required records/files are subject to audit by SAFE-4, DOE/Los Alamos Field Office and other auditing agencies.

The following forms must be in the TID Log Book:

- TID Access Record (MCA-F219),
- TID Application Forms (see Attachments),
- TID Removal Forms (see Attachments),
- TID Inventory Forms (MCA-F217, see Attachment 16),
- Discrepancy File,
- Current TID Users List (MCA-F200 or MCA-F205),
- Intrinsically Tamper Indicating Item Forms (MCA-F208, see Attachment 8), and
- TID User Manual.

NOTE: TID Log Book documentation is kept INDEFINITELY, access records are required to be kept for one year.

NOTE: The TID custodian/alternate must take old TID documentation to the TID Administrator for storage.

3.15 CHANGE OF DOCUMENTATION CUSTODY

When the TID logs books reach capacity the TID custodian/alternate can hand carry or mail their TID documentation to the TID Administrator.

The TID custodian/alternate must handle documentation according to LANL procedures. The TID custodian/alternate needs to pay particular attention to ensuring that OUO/UCNI/CLASSIFIED information is not included without being properly marked.

- If the documentation is sent through the mail, Change of Documentation Custody form (MCA-F231, see Attachment 19), must be included.
- If the documentation is hand carried, the TID Administrator will have the TID custodian/alternate sign the Change of Documentation Custody form (MCA-F231, see Attachment 19), acknowledging that they are relinquishing the custody of their documentation to the TID Administrator.

3.16 TID FORMS

All forms are located on the LANL homepage under- Security- Nuclear Materials- Tamper Indicating Devices- TID forms- Tamper Indicating Device (TID) Form.

3.17 TYPES OF TIDS

TIDs that are authorized in the LANL TID program are explained below and are documented in Attachment 2.

3.17.1 TIDS PREVIOUSLY USED

The following TIDs are still valid and are grandfathered into the TID program.

3.17.1.1 MYLAR

A Verified Nuclear Material TID contains a green border. This type of TID was applied to an item/container upon completion of a verification of accountability measurement.



A Confirmed Nuclear Material TID contains a yellow border. This type of TID was applied to an item/container upon completion of a confirmation measurement.



A Nonverified Nuclear Material TID contains a red border. This type of TID was applied to an item/container upon completion of a measurement that had been determined to be non-defensible or if an item/container had received no measurement.



A Mylar TID is a pressure-sensitive adhesive TID. It is 1 ¼ X 13” inches, made of Mylar and has tamper indicating qualities when lifted or removed. Pressure-sensitive adhesive TIDs are uniquely serialized, color coded, and have specific usages. Mylar TIDs are color coded blue and are applied prior to any measurement.



3.17.1.2 QUICKSEAL

The Quickseal is a plastic mechanism that clasps with a self cut wire. It contains a unique serial number.



3.17.2 TIDS CURRENTLY IN USE

3.17.2.1 CUP-WIRE (TYPE E) SEAL

The Cup-Wire (Type E) Seal TID is made of 1 inch diameter copper that consists of two halves, with the same unique serial number on both halves.



3.17.2.2 MYLAR

Mylar TIDs are pressure-sensitive and are physically the same size as the previously used TIDs. When removal or attempted removal/defeat occurs, the Mylar TID shows a clear “VOID/OPEN” security message but does not leave a residue on the surface of the container. They also contain a barcode for inventory and tracking purposes. These TIDs are also uniquely serialized and contain six numerical digits followed by the letter “L.” These adhesive TIDs are red in color with the words “NUCLEAR MATERIAL” printed in black along the adhesive strip.



The QUARANTINE Mylar TIDs provides the same concept as the red Mylar TID shown above. These TIDs are to be applied by the MC&A team and cannot be removed. When removal or attempted removal/defeat occurs, the Mylar TID shows a clear “VOID/OPEN” security message but does not leave a residue on the surface of the container. They also contain a barcode for inventory and tracking purposes. These TIDs are also uniquely serialized and contain six numerical digits followed by the letter “Q.” These adhesive TIDs are blue in color with the words “QUARANTINE DO NOT TAMPER CONTACT MC&A” printed in white along the adhesive strip.



3.17.2.3 MULTI-LOK

The Multi-lok TID has a free end of twisted-wire cable. The cable is passed through a hasp on the container and then inserted into a hole in a metal box. The box has spring loaded balls which allow the wire to pass by when initially inserted but bind with attempts to retract the wire. The metal box contains a unique identifier, but the wire does not.



3.18 INTRINSICALLY SEALED ITEMS

The LANL TID Program defines intrinsically sealed items as items that have physical characteristics that upon visual inspection will immediately indicate tampering and violation of their integrity. The types of items that are considered to be intrinsically tamper indicating are:

- special form radioactive material, defined by 49 CFR,
- sealed sources, defined by Procedure (P)121, *Radiation Protection*,
- fuel elements/fuel rods,
- welded containers (e.g. 3013 container),
- weapon assemblies/subassemblies/artillery shells, and
- other sealed sources not defined by P121 (e.g. PuBe, AmBe).

3.18.1 DETERMINATION OF AN INTRINSICALLY SEALED ITEM

When an item is being considered for the determination "intrinsically sealed," the TID custodian/alternate/user will complete the Intrinsically Tamper Indicating Item Form (MCA-F208, see Attachment 8) and submit it to the TID Administrator. The TID Administrator or SAFE-4 Representative must visually inspect the item before making a determination. Once the item is determined to be intrinsically sealed, an "INTR####" will be assigned to the item on the nuclear material accountability system to identify the item as being intrinsically sealed.

If an intrinsically sealed item is altered (removed from a welded container, disassembled, and/or processed), the TID custodian/alternate/user must remove the INTR identifier from the seal field in the nuclear material accountability system.

NOTE: If using RoboCrib, please see the TID User Responsibilities for RoboCrib.

3.18.2 CONTAINERIZATION OF INTRINSICALLY SEALED ITEMS

Items identified as intrinsically sealed must be packaged in an outside container (if applicable), and can be containerized on the nuclear material accountability system with the approval of the TID Administrator. The outside packaging can have a conventional TID placed on it. Because intrinsically sealed items get the same safeguards credit as other items marked with conventional TIDs, this designation will aid SAFE-4 in selecting items to be inventoried during the physical inventories.



3.18.3 INTR FORM PROCEDURES

To submit an item to the TID Administrator for approval, the TID custodian/alternate/user must complete the portion indicated "To be filled out by TID custodian/alternate/user" on the Intrinsically Tamper Indicating Item Form (MCA-F208, see Attachment 8).

NOTE: The INTR form (MCA-F208) MUST be reviewed by a Derivative Classifier before it is submitted to the TID Administrator.

The TID custodian/alternate/user must complete the following sections of the form:

1. LOT ID -- Document the nuclear material accountability system LOTID
2. MBA #- The MBA/account where the item is currently located.
3. Date- The date of which the Intrinsically Tamper Indicating form is being completed.
4. SNM- Enter the element weight of the item.
5. Material Type (MT)- The item's material type(s)
6. Description of Item- Physical description of the item, what type of item it is (e.g., PuBe source, Rocky Flats pit, etc.), any other pertinent information that will aid in intrinsic determination.

7. Storage Location- Tech Area, building number, room and/or cabinet identifier.
8. TID Custodian/Alternate signature (if applicable)- The custodian/alternate requesting the designation or responsible for the item.
9. Applicator (signature) - The TID user that welded the item.
10. Verifier (signature) - The TID user that verified the weld.

When the TID custodian/alternate/user has completed the form (MCA-F208, see Attachment 8), the form must be sent to the TID Administrator for approval.

When the TID Administrator receives the Intrinsically Tamper Indicating Item form (MCA-F208, see Attachment 8), the TID Administrator or the SAFE-4 Representative shall contact the TID custodian/alternate/user to set up a time for the evaluation.

Once the item is approved the item will be assigned an "INTR####" by the TID Administrator.

If there are any questionable items that indicate INTR, the responsible TID custodian/alternate/user will be contacted to have the item investigated and/or validated.

3.19 NON-LANL TIDS

Items shipped from another facility with a Non-LANL TID are considered part of the LANL TID Program. Upon receiving the item, the receiving group must inspect the container and TID to verify that the container is sealed properly, to ensure the TID is not broken, damaged, or improperly applied, and to make sure the TID number corresponds to that provided by the shipper. The TID user must log the removal of the Non-LANL TID on the Non-LANL TID Removal Form (MCA-F220, see Attachment 18) and the TID verifier must verify the removal and destruction of the TID.



3.20 PROCEDURES FOR APPLICATION OF TIDS

3.20.1 CUP-WIRE (TYPE E) SEAL

When the Cup-Wire (Type E) Seal TID is attached to an object, it must be done in a manner that requires breaking the wire or destroying the TID to open the object.

Obtain the following equipment and material:

- Cup-Wire (Type E) Seal (top and bottom)
- Braided wire
- Crush-type sleeves/collars
- Pliers or a pair of wire cutters capable of crimping collars

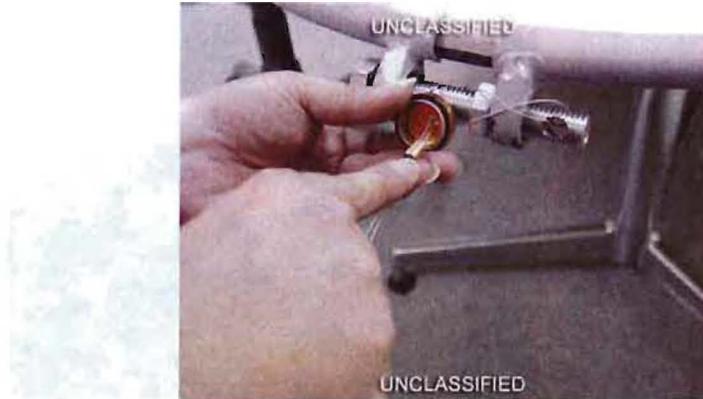
NOTE: An authorized TID applicator and a TID verifier must be present when TIDs are applied.

The TID verifier must witness the application of the TID, verifying the following procedure has been followed by the TID applicator:

1. Verify that serial number of the TID bottom and top cups are identical.
2. Find a strategic location on the container where you will apply the TID. The location must ensure that the container cannot be opened without destroying the TID's integrity.
3. Estimate the length of wire needed and cut that amount from the roll. (Exact length will depend on the container).
4. Run the wire ends through the fixture and bring the ends together equally. For drums, insert wire through the hole in the bolt, into the gap in the split lug of the ring, and across one half of the lug (see photo). Remove any slack in the wire by pulling it "finger-tight." Then pull the end of the wire around the half lug, through the gap, and around the other half lug in a "figure-8."



5. Slip the TID bottom cup down the wire until it is in position near the fixture.
6. Thread the wire ends through the crimping sleeve.



7. Slide the crimping sleeve along the wire until it is in position near the TID bottom cup.
8. Use the pliers to crimp the sleeve firmly on the wire.



9. Trim the wire ends, leaving approximately $\frac{1}{2}$ inch beyond the crimped sleeve end.
10. Loop the remaining ends of the wire into the inner cup area, then pull on the cup while pushing the wire and sleeve into the inner cup, ensuring that there will be no interference with closure of the TID.
11. Place the top cup over the bottom cup and apply firm pressure with fingers around the rim of the bottom cup to ensure full closure.



12. Tug on the applied cup seal to ensure that it has been applied correctly.

13. Inspect the Cup-Wire (Type E) Seal.

NOTE: If the wire was damaged during application or full closure was not achieved, cut the wire, remove the TID, and apply another Cup-Wire (Type E) Seal. The Cup-Wire (Type E) Seal that was removed must be voided and rendered unusable, and must be noted on the Cup-Wire (Type E) Seal TID Removal Form (MCA-F216, see Attachment 15) and removed from the nuclear material accountability system database.

14. The TID verifier must inspect the TID for proper application.

15. The TID applicator/verifier must complete the Cup-Wire (Type E) Seal TID Application Form (MCA-F212, see Attachment 11) and return the form to the TID custodian/alternate.

NOTE: Following application of a TID, the TID custodian/alternate must ensure the TID serial number is entered into the nuclear material accountability system database.

3.20.2 MYLAR

The Mylar TID consists of an adhesive strip that, when applied, acts as a seal on the item/container. It is applied in a manner that requires destroying the TID in order to open the object.

Obtain the following equipment and material:

- Mylar TID
- Scissors (if needed)

NOTE: An authorized TID applicator and a TID verifier must be present when TIDs are applied.

The TID verifier must witness the application of the TID, verifying the following procedure has been followed by the TID applicator:

NOTE: The container MUST be cleaned from any previous void markings before application.

1. Find a strategic location on the container where you will apply the TID. The location must ensure the container cannot be opened without destroying the TID's integrity.
2. Cut a Mylar TID in half for a large container if necessary. The Mylar TID must be located on the container so that it goes at least 1 inch down on each side and 1 inch across the top.

NOTE: If there is tape securing the container, be advised the Mylar TID must fit 1 inch below the tape down each side and 1 inch across the top.



3. If a Mylar TID is cut to fit on a large container, the ends must be placed on opposite sides of the container top from each other.
4. Inspect the Mylar TID.

NOTE: If the Mylar was damaged during application, remove the Mylar, and apply another Mylar. The Mylar that was removed must be voided and rendered un-usable, and must be noted in the Mylar TID Removal Form (MCA-F213, see Attachment 12) and removed from the nuclear material accountability system database.

5. The TID verifier must inspect the Mylar TID for proper application.
6. The TID applicator/verifier must complete the Mylar TID Application Form (MCA-F209, see Attachment 9) and return the form to the TID custodian/alternate.

NOTE: Following application of a TID, the TID custodian/alternate must ensure that the TID serial number is entered into the nuclear material accountability system database.

3.20.3 MULTI-LOK

The Multi-lok TID is a metal TID made of 1-inch clasps, a wire and a unique serial number. When the wire is inserted into the 1-inch clasp, it tightly secures the mechanism. The wire is sealed in a manner that requires breaking the wire or destroying the TID to open the object.

Obtain the following equipment and material:

- Multi-lok TID

NOTE: An authorized TID applicator and a TID verifier must be present when TIDs are applied. The TID verifier must witness the application of the TID, verifying the following procedure has been followed by the TID applicator.

1. Find a strategic location on the container where you will apply the TID. The location must ensure that the container cannot be opened without destroying the TID's integrity.
2. Run the loose wire end through the fixture on the container.
3. Insert the loose end of the wire into the clasp and pull the wire through the clasp to tighten.



NOTE: For drums, insert the wire through the hole in the bolt, into the gap in the split lug of the ring, and across one half of the lug, and then insert it into the clasp.

4. Tug on the Multi-lok to ensure that it has been applied accurately.



5. Inspect the TID and wire.

NOTE: If the Multi-lok was damaged during application or full closure was not achieved, remove the Multi-lok, and apply another Multi-lok. The Multi-lok that was removed must be voided and rendered unusable, and must be noted in the Multi-lok TID Removal Form (MCA-F214, see Attachment 13) and removed from the nuclear material accountability system database.

6. The TID verifier must inspect the TID for proper application.
7. The TID applicator/verifier must complete the Multi-lok TID Application Form (MCA-F210, see Attachment 10) and return the form to the TID custodian/alternate.

NOTE: Following application of a TID, the TID custodian/alternate must ensure that the TID serial number is entered into the nuclear material accountability system database.

3.21 PROCEDURES FOR REMOVAL, VOIDING AND DISPOSAL OF TIDS

3.21.1 CUP-WIRE (TYPE E) SEAL

When removing, voiding, and destroying a TID, the two-person rule applies. The TID user must destroy the TID and the TID verifier must verify the destruction. The Cup-Wire (Type E) Seal TID Removal Form (MCA-F216, see Attachment 15) must be completed and marked as a void.

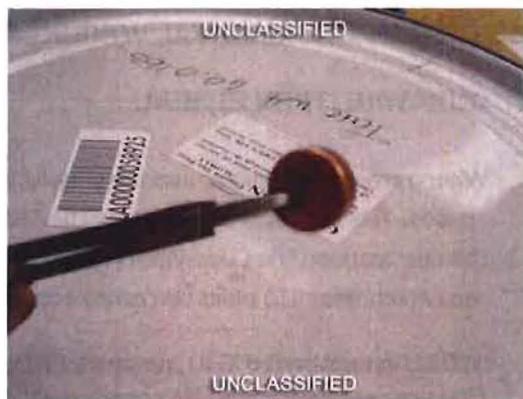
NOTE: An authorized TID user and a TID verifier must be present when TIDs are removed from NM containers.

Before a previously-applied Cup-Wire (Type E) Seal is removed, an authorized TID verifier inspects it as follows:

1. Verify that the serial number of the TID bottom and top cups are identical.
2. Verify the TID is not broken, damaged, or improperly applied.
3. Verify the TID serial number corresponds to the serial number recorded on the latest nuclear material accountability system listing, shipper back-up papers, or container label.
4. If the inspection fails to verify (1.) or (2.) above, the TID user notifies the TID custodian/alternate. The TID custodian/alternate immediately investigates and resolves the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.

Once the above four items are resolved, continue with the following:

5. Cut the wire at least two inches away from the TID (if possible) and remove the TID and wire from the container.
6. The TID verifier examines the TID to verify that both halves have the same serial number and that there is no evidence of tampering. If the numbers do not match or there is evidence of tampering, the TID user notifies the TID custodian/alternate. The TID custodian/alternate immediately investigates and resolves the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.



7. If everything is in order, the TID remover destroys the TID by poking holes in it and disposes of it as unclassified waste.



8. The TID remover and TID verifier complete and sign the Cup-Wire (Type E) Seal TID Removal Form (MCA-F216, see Attachment 15), and return the form to the TID custodian/alternate.

NOTE: Following the removal of a TID, the TID custodian/alternate ensures that the TID serial number is removed from the nuclear material accountability system database.

3.21.2 MYLAR

When removing, voiding, and destroying a TID, the two-person rule applies. The TID user must destroy the TID and the TID verifier must verify the destruction. The Mylar TID Removal Form (MCA-F213, see Attachment 12) must be completed and marked as a void.

NOTE: An authorized TID user and a TID verifier must be present when TIDs are removed from NM containers.

Before a previously applied Mylar TID is removed, an authorized TID verifier inspects it as follows:

1. Verify that the TID is not broken, damaged, or improperly applied.
2. Verify that the TID serial number corresponds to the serial number recorded on the latest nuclear material accountability system listing, shipper back-up papers, or container label.
3. If the inspection fails to verify (1.) or (2.) above, the TID user notifies the TID custodian/alternate. The TID custodian/alternate immediately

investigates and resolves the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.

Once the above three items are resolved, continue with the following:

4. The TID verifier examines the TID to verify that both halves have the same serial number and that there is no evidence of tampering. If the numbers do not match or there is evidence of tampering, the TID user notifies the TID custodian/alternate. The TID custodian/alternate must immediately investigate and resolve the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.



5. If the inspection verifies the integrity of the TID, it must be removed by peeling the Mylar from the container ("VOID" markings will appear).

NOTE: The Mylar TIDs that are currently being used does not leave a residue on the surface of the container.

6. To clean the "VOID" markings, use an approved solvent or eraser, or scrape them.
7. If everything is in order, the TID remover ensures that all removed/voided TIDs are rendered unsuitable for reuse by cutting them in small pieces and disposing them as unclassified waste or by shredding them in a paper shredder.
8. The designated TID remover and TID verifier complete and sign the Mylar TID Removal Form (MCA-F213, see Attachment 12), and return the form to the TID custodian/alternate.



NOTE: Following the removal of a TID, the TID custodian/alternate ensures that the TID serial number is removed from the nuclear material accountability system database.

3.21.3 MULTI-LOK

When removing, voiding, and destroying a TID, the two-person rule applies. The TID user must destroy the TID and the TID verifier must verify the destruction. The Multi-lok TID Removal Form (MCA-F214, see Attachment 13) must be completed and marked as a void.

NOTE: An authorized TID user and a TID verifier must be present when TIDs are removed from NM containers.

Before a previously-applied Multi-lok TID is removed, an authorized TID verifier inspects it as follows:

1. Verify that the TID is not broken, damaged, or improperly applied.
2. Verify that the TID serial number corresponds to the serial number recorded on the latest nuclear material accountability system listing, shipper back-up papers, or container label.
3. Verify that there is no evidence of tampering.
4. If the inspection fails to verify (1.), (2.), or (3.) above, the TID user notifies the TID custodian/alternate. The TID custodian/alternate immediately investigates and resolves the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.

Once the above four items are resolved, continue with the following:

5. Cut the wire at the base of the loop away from the TID (if possible) and remove the TID from the container.



6. If everything is in order, the TID remover renders the TID unsuitable for reuse by cutting the wire and disposes of it as unclassified waste.



7. The designated TID remover and TID verifier complete and sign the Multi-lok TID Removal Form (MCA-F214, see Attachment 13), and return the form to the TID custodian/alternate.

NOTE: Following the removal of a TID, the TID custodian/alternate ensures that the TID serial number is removed from the nuclear material accountability system database.

3.21.4 QUICKSEAL

Quickseal's have been phased out of the LANL TID Program and are no longer issued to TID accounts. However, they may still be on containers from previous applications. When removing, voiding or disposing of a TID,

the two-person rule applies. The TID user must destroy the TID and the TID verifier must verify the destruction. The Quickseal TID Removal Form (MCA-F215, see Attachment 14) must be completed and marked as a void.

NOTE: An authorized TID user and a TID verifier must be present when TIDs are removed from nuclear material containers.

Before a previously-applied Quickseal TID is removed, an authorized TID verifier inspects it as follows:

1. Verify that the TID is not broken, damaged, or improperly applied.
2. Verify that the TID serial number corresponds to the serial number recorded on the latest nuclear material accountability system listing, shipper back-up papers, or container label, whichever is appropriate.
3. Verify that there is no evidence of tampering.
4. If the inspection fails to verify (1.), (2.), or (3.) above, the TID user notifies the TID custodian/alternate. The TID custodian/alternate immediately investigates and resolves the TID discrepancy. TID discrepancies that cannot be resolved within two hours require immediate notification of the TID Administrator.

Once the above four items are resolved, continue with the following:

5. Cut the Quickseal on the loop, and remove the TID and wire from the container.



6. Destroy the Quickseal by slicing the numbers with pliers.



7. If everything is in order, the TID remover renders the TID unsuitable for reuse and disposes of it as unclassified waste.



8. The designated TID remover and TID verifier complete and sign the Quickseal TID Removal Form (MCA-F215, see Attachment 14), and return the form to the TID custodian/alternate.

NOTE: Following the removal of a TID, the TID custodian/alternate must ensure that the TID serial number is removed from the nuclear material accountability system database.

4.0 TRAINING

The level of training on this functional work instruction is determined by training analysis in accordance with P781-1, Conduct of Training Manual and recorded on the document action request form (DAR).

The TID Training Program is provided to ensure that TID custodians/alternates/ users are trained in regards to the TID program.

4.1 INITIAL TRAINING

Authorized personnel must attend an initial training and demonstrate proficiency in applying the information provided for TIDs.

4.2 RE-QUALIFICATION TRAINING

TID custodians/alternates/users are required to complete re-qualification training every two years to retain their work assignments for the TID Program.

4.3 ROBOCRIB INITIAL TRAINING

TID users identified to use RoboCrib must attend an initial training and demonstrate proficiency in distributing TIDs.

5.0 DEFINITIONS AND ACRONYMS

5.1 DEFINITIONS

See LANL [Definition of Terms](#) or the [Security Policy Resource](#).

Application Form: Forms required for documenting the application of TIDs. (MCA-F209, MCA-F210, MCA-F211, MCA-F212)

Controlled Conditions: Storage conditions that prevent access to controlled documents and TIDs by unauthorized individuals.

Deface: The act of altering the physical appearance of a TID so that re-use and acceptance as a valid TID is precluded.

Intrinsically Sealed: Items that have physical characteristics that visually indicate an attempt to remove material.

Knowledgeable Personnel: Persons familiar with the operational and nuclear materials activities being performed, who must be trained and qualified to the TID Program.

Locked Repository: A toolbox with a combination or key lock, a locked cabinet, or a locked safe.

MC&A: Material Control & Accountability

Nuclear Material Accountability System: The material accountability safeguards system is the hub of LANL's NM graded safeguards program. It is an essential element in detecting, verifying, and evaluating gains or losses in the Laboratory's

NM inventory. NM accounting and report generation are performed using the nuclear material accountability system.

Removal Forms: Forms required for documenting the removal, or voiding of TIDs. (MCA-F213, MCA-F214, MCA-F215, MCA-F216)

Responsible Line Manager (RLM): An individual with management responsibility for a TID account.

RoboCrib: A machine that dispenses TIDs to qualified TID users.

Tamper Indicating Device (TID): A device that may be used on items such as containers and doors, which because of its uniqueness in design or structure, reveals violations of containment integrity (devices that indicate, upon inspection, whether tampering or entry has occurred).

TID Administrator: SAFE-4 staff member assigned the responsibility for procuring, controlling, distributing, inventorying, and destroying TIDs.

TID Custodian/Alternate: Authorized individual who maintains and issues TIDs to authorized TID users assigned to the specific TID account.

TID Discrepancy: Any condition that is a deviation from the normal control or use of TIDs.

TID GRAM: Documentation issued from the TID Administrator to TID custodians/alternate/users and RLMs, informing them of any changes in the TID program and also used to pass along useful information.

TID Inventory Form: Used by TID custodians/alternates when TIDs are received from the TID Administrator or are being inventoried. (MCA-F217, see Attachment 17)

TID Log Book: A binder or folder that contains TID information maintained by the TID custodian/alternate.

TID User: Qualified individual who can apply/remove/verify TIDs in an assigned TID account. The TID user must have knowledge of container content.

5.2 ACRONYMS

See LANL [Acronym Master List](#) or the [Security Policy Resource](#)

| Acronym | Definition |
|---------|-------------------------------------|
| DOE | Department of Energy |
| INTR | Intrinsically Sealed |
| LANL | Los Alamos National Laboratory |
| MAA | Material Access Area |
| MBA | Material Balance Area |
| MC&A | Material Control and Accountability |
| MT | Material Type |
| NM | Nuclear Material |
| P | Procedure |
| RLM | Responsible Line Manager |
| SNM | Special Nuclear Material |
| TID | Tamper Indicating Device |

6.0 REFERENCES

1. DOE 474.2 Chg 2, Attachment 1 CRD, *Nuclear Material Control and Accountability* LANL Nuclear Material Control & Accountability (MC&A) Plan
2. 49 CFR
3. P121, *Radiation Protection*

7.0 ATTACHMENTS

Attachment 1- TID GRAM (sample)



Subject: Change of TID Custodian/Alternate Responsibilities

There has been a change to the TID custodian/alternate responsibilities. TID custodians and alternates can no longer apply or remove TIDs in the TID account in which they are designated as a TID custodian or alternate. The TID custodian and alternate can however, verify TID application or removal in their TID account.

A TID custodian or alternate that is designated as a TID user in another TID account may perform TID user functions (apply/remove/verify) in that account.

An initial TID user course will be held on May 19th. To designate other TID users please, fill out the TID user form and sign up on the following link:

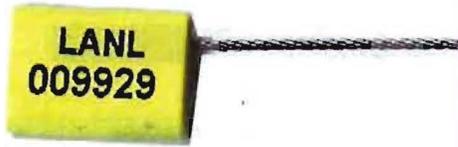
http://www.hr.lanl.gov/tiocourses/coursesearch.aspx?CourseNo=7273&scope=here&category_path=%252FOrganization%2523Operations%252FTraining%2523Education

Dana Sandoval
SAFE-4 Material Control & Accountability
Los Alamos National Laboratory
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Email: danam@lanl.gov

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Authorized LANL TIDs

Nuclear Material Multi-lok



Nuclear Material Quickseal



Nuclear Material Cup-Wire
(Type E) Seal



Nuclear Material Mylar





Verification of TID Account

Date _____ TID Account # _____

TID Custodian _____

Please verify the following personnel are on your TID account

| Account # | Z# | First Name | Last Name | Group | TID | Expiration Date |
|-----------|----|------------|-----------|-------|-----|-----------------|
|-----------|----|------------|-----------|-------|-----|-----------------|

Signatures

TID Custodian _____ Date _____

TID Alternate Custodian _____ Date _____

MBA Custodian _____ Date _____

Responsible Line Manager _____ Date _____

WHEN FORM IS COMPLETED AND SIGNED, MAIL ORIGINAL TO: TID ADMINISTRATOR, MS-G735, SAFE-4
A copy must be kept in the TID Log Book for the TID Account



Request for New TID User

Date _____

Group _____

TID Custodian (Print Name) _____ Z# _____

TID Custodian Signature *Date*

Responsible Line Manager (Print Name) _____ Z# _____

Responsible Line Manager Signature *Date*

New TID User (Print Name) _____ Z# _____

TID Account User will be assigned to _____

New TID User Signature *Date*

WHEN FORM IS COMPLETED AND SIGNED, MAIL TO: TID ADMINISTRATOR, MS-G735, SAFE-4



TID Account

[Redacted]

Date _____ TID Account # _____

TID Custodian _____

[Redacted]

The following personnel are assigned to your TID account

| Z# | First Name | Last Name | Group | TID | Training Expiration |
|----|------------|-----------|-------|-----|---------------------|
|----|------------|-----------|-------|-----|---------------------|

A copy must be kept in the TID Log Book for the TID Account



TID User Removal Request

Date _____
Group _____

TID Custodian (Print Name) _____ Z# _____

TID Custodian Signature _____ *Date* _____

Responsible Line Manager (Print Name) _____ Z# _____

Responsible Line Manager Signature _____ *Date* _____

Remove TID User (Print Name) _____ Z# _____

TID Account User will be removed from account _____

Will the TID User be assigned to a TID account?

- Yes (TID user must complete form MCA-F202)
- No (TID user will be removed from the TID program)

To remain on the TID program you must be assigned to a specific TID account.

TID User Removal Signature _____ *Date* _____

WHEN FORM IS COMPLETED AND SIGNED, MAIL TO: TID ADMINISTRATOR, MS-G735, SAFE-4



Intrinsically Tamper Indicating Item Form

| LANMAS Entry | | | |
|---|----------------------------|--|-------|
| Date _____ | LANMAS Transaction # _____ | INTR ID _____ | |
| To be filled out by TID Custodian/Alternate/User | | | |
| LOT ID _____ | MBA # _____ | Date _____ | |
| SNM _____ | MT _____ | | |
| Description of Item _____ | | | |
| Storage Location (TA, Bldg, Room, Safe and/or Cabinet Identifier) _____ | | | |
| Signatures | | | |
| TID Custodian/Alternate Signature (if applicable) _____ | Z number _____ | Date _____ | |
| Applicator Signature _____ | Z number _____ | Date _____ | |
| Verifier Signature _____ | Z number _____ | Date _____ | |
| Derivative Classifier | | | |
| <input type="checkbox"/> Unclassified <input type="checkbox"/> Confidential <input type="checkbox"/> Secret <input type="checkbox"/> Official Use Only | | <input type="checkbox"/> Restricted Data <input type="checkbox"/> Formerly Restricted Data <input type="checkbox"/> National Security Information | |
| | | <input type="checkbox"/> Unclassified Controlled Nuclear Information Not for Public Dissemination. Unauthorized dissemination subject to civil and criminal Sanctions under section 148 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2168). Guidance Used: _____ | |
| DC Print Name/Z#: | Organization: | Signature: | Date: |
| | | | |
| SAFE-4 Evaluation (To be filled out by TID Administrator or SAFE-4 Representative) | | | |
| Evaluation and Comment _____ | | | |
| Approved <input type="checkbox"/> Yes <input type="checkbox"/> No (If no, explain in comment section reason for rejection) | | | |
| Signatures | | | |
| TID Administrator or SAFE-4 Representative Signature _____ | Z number _____ | Date _____ | |
| MCA-F208 | Rev. 0 | March 2013 | |

Attachment 9- MCA-F209 – Mylar TID Application Form

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MYLAR TID Application Form

TID Account # _____

| TID NUMBER | LOT ID | LOCATION | SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|----------|------------------------|-----|-------|------|---------------------|
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |

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NMControl Form MCA-F209

Attachment 10- MCA-F210 – Multi-lok TID Application Form



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MULTI-LOK TID Application Form

TID Account # _____

| TID NUMBER | LOT ID | LOCATION | SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|----------|------------------------|-----|-------|------|---------------------|
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |

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NMControl Form MCA-F210

Attachment 11- MCA-F212 – Cup-Wire (Type E) Seal TID Application Form

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Cup-Wire (Type E) Seal TID Application Form

TID Account # _____

| TID NUMBER | LOT ID | LOCATION | 1. APPLICATOR SIGNATURE 2. VERIFIER SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|----------|--|-----|-------|------|------------------------|
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |
| | | | <i>Issued to</i> | | | | N/A |
| | | | <i>Issued Verifier</i> | | | | |
| | | | <i>Applicator</i> | | | | |
| | | | <i>Verifier</i> | | | | |

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NMControl Form MCA-F212

Attachment 12- MCA-F213 – Mylar TID Removal Form



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MYLAR TID Removal Form

TID Account # _____

| TID NUMBER | LOT ID | REMOVE (R) VOID (V) | LOCATION | 1. REMOVER SIGNATURE 2. VERIFIER SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|------------------------|----------|---|-----|-------|------|------------------------|
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |

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NMControl Form MCA-F213

Attachment 13- MCA-F214 – Multi-Lok TID Removal Form

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MULTI-LOK TID Removal Form

TID Account # _____

| TID NUMBER | LOT ID | REMOVE (R) VOID (V) | LOCATION | 1. REMOVER SIGNATURE 2. VERIFIER SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|------------------------|----------|---|-----|-------|------|------------------------|
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |

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May 14, 2010

NMControl Form MCA-F214

Attachment 14- MCA-F215 – QUICKSEAL TID Removal Form



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QUICKSEAL TID Removal Form

TID Account # _____

| TID NUMBER | LOT ID | REMOVE (R) VOID (V) | LOCATION | 1. REMOVER SIGNATURE | Z # | GROUP | DATE | TRANS # MASS UPDATE |
|------------|--------|------------------------|----------|-----------------------|-----|-------|------|------------------------|
| | | | | 2. VERIFIER SIGNATURE | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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NMControl Form MCA-F215

Attachment 15- MCA-F216 – Cup-Wire (Type E) Seal TID Removal Form



UNCLASSIFIED

Cup-Wire (Type E) Seal TID Removal Form

TID Account # _____

| TID NUMBER | LOT ID | REMOVE (R) VOID (V) | LOCATION | 1. REMOVER SIGNATURE 2. VERIFIER SIGNATURE | Z # | GROUP | DATE | TRANS # MASS UPDATE |
|------------|--------|------------------------|----------|---|-----|-------|------|------------------------|
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |

UNCLASSIFIED

August 21, 2008

NMControl Form MCA-F216

Attachment 16- MCA-F217 – TID Inventory Form



UNCLASSIFIED

TID Inventory Form

TID Account # _____

| DATE | TID _s RECEIVED FROM SAFE-4 | UNAPPLIED TID _s INVENTORIED | SIGNATURE | Z # | VERIFIER SIGNATURE | Z# |
|------|---------------------------------------|--|-----------|-----|--------------------|----|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

INVENTORIES ON THE TID_s MUST BE PERFORMED BIANNUALLY.

UNCLASSIFIED

February 10, 2014 _____

Attachment 18- MCA-F220 – Non-LANL TID Removal Form



UNCLASSIFIED

Non-LANL TID Removal Form

TID Account # _____

| TID NUMBER | LOT ID | REMOVE (R) VOID (V) | LOCATION | 1. REMOVER SIGNATURE 2. VERIFIER SIGNATURE | Z # | GROUP | DATE | TRANS.# MASS UPDATE |
|------------|--------|------------------------|----------|---|-----|-------|------|------------------------|
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |
| | | | | 1. 2. | | | | |

UNCLASSIFIED

August 28, 2008

NMControl Form MCA-F220



Change of Documentation Custody Form

LANMAS Entry

Date _____ TID Account _____ Group _____

I (TID custodian/alternate) acknowledge that I am giving the LANL TID Administrator the documentation from my TID Log Book. I am acknowledging that it does not contain ANY classified documentation. If classified documentation needs to be transmitted to the LANL TID Administrator, I will follow the LANL Policy on transmitted classified documentation.

Signatures

TID Custodian/Alternate Signature _____ Z Number _____ Date _____

Derivative Classifier

| | | | |
|---|---|--|-------------|
| <input type="checkbox"/> Unclassified <input type="checkbox"/> Confidential <input type="checkbox"/> Secret <input type="checkbox"/> Official Use Only | <input type="checkbox"/> Restricted Data <input type="checkbox"/> Formerly Restricted Data <input type="checkbox"/> National Security Information | <input type="checkbox"/> Unclassified Controlled Nuclear Information Not for Public Dissemination Unauthorized dissemination subject to civil and criminal Sanctions under section 148 of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2168) Guidance Used: _____ | |
| DC Print Name/Z# _____ | Organization: _____ | Signature: _____ | Date: _____ |



Request for RoboCrib TID User

Date

Group

Responsible Line Manager (Print Name) Z#

Responsible Line Manager Signature Date

Are the following courses completed:

TID curricula #1550 Yes No

LANMAS / LAMCAS curricula #10962 Yes No

Do you have an active red crypto card? Yes No

To enroll in the TID RoboCrib course you must have all curricula's above completed. You MUST maintain a red crypto card which, allows you to conduct TID activity within LANMAS.

TID User (Print Name) Z#

TID User Signature Date

WHEN FORM IS COMPLETED AND SIGNED, SEND TO: TID ADMINISTRATOR, MS-G735, SAFE-4

To be filled out by SAFE-4

TID Administrator Date

Attachment 6

TA-54 Area G Nitrate-Salt Waste Container Response Instructions

Effective Date: 01/30/15

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:

EWMO Engineering
LANL TRU Programs – Shipping and Safe Storage Disposition
LANL TRU Programs – Drum Disposition Project
LANL TRU Programs – Oversized Container Disposition Project
Subject Matter Expert
EWMO Environmental, Safety, and Health Manager
Emergency Response
Emergency Management
Environmental Compliance Programs

Responsible Manager, EWMO Facility Operations Director

Rick Alexander / 114624 / /s/ Rick Alexander / 01/14/15
Name (print) Z# Signature Date

Classification Review: N/A Unclassified UCNi Classified _____

Teri Tingey / 200975 / /s/ Teri Tingey / 01/12/15
Name (print) Z# Signature Date

Working Copy / Information Only (circle one)

Initials / Date: _____ / _____

This document fully satisfies the requirements of P300, Integrated Work Management, in order to systematically describe the work activity, the associated hazards, and the controls that **MUST** be employed to mitigate the risks.

REVISION HISTORY

| Document No./Revision No. | Issue Date | Action | Description |
|---------------------------|------------------|----------------|--|
| EP-AREAG-PLAN-1248, R.0 | May 28, 2014 | New Document | |
| EWMO-AREAG-PLAN-1248, R.1 | January 30, 2015 | Minor Revision | Revise document to incorporate new PermaCon drawings and make editorial corrections as necessary such as changing document number from "EP" to "EWMO". This revision does not introduce any new hazards. |
| | | | |
| | | | |

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1. PURPOSE

The purpose of this plan is to provide pre-planning and initial entry requirements for potential release scenarios from the nitrate salt-bearing waste containers. This plan is intended to minimize the consequences to personnel and the environment from a potential incident.

2. HISTORY

On February 14, 2014 there was a radiological release in the underground at the Waste Isolation Pilot Plant (WIPP). It was postulated that an energetic chemical reaction occurred. On May 15, 2014 WIPP released photographs which showed a Los Alamos National Laboratory (LANL) drum containing remediated nitrate salt-bearing waste had breached in Panel 7, Room 7. The cause of the breach and other potentially impacted drums is currently unknown, but is being actively investigated.

The current inventory of nitrate salt-bearing waste containers fall into 3 categories: 1) remediated, 2) un-remediated, and 3) cemented. Only the remediated containers have been “treated” and therefore are suspected of possible reactions. The remediated drums have all been placed in standard waste boxes (SWBs) and are located in a HEPA-ventilated, temperature-controlled PermaCon with a fire suppression system. The un-remediated drums have all been placed in 85-gal overpacks and will be transferred to a HEPA-ventilated, temperature-controlled PermaCon with a fire suppression system. The layouts of the TA-54-231 and TA-54-375 fire suppression systems within the PermaCons are illustrated on Appendix 1, TA-54-231 PermaCon Fire Protection System, and Appendix 2, TA-54-375 PermaCon Fire Protection System.

All of the remediated drums in SWBs are located in the PermaCon in TA-54-375. Appendix 3, TA-54-375 SWB Storage Layout Plan, is a diagram of the SWB layout in TA-54-375. The un-remediated drums are located in TA-54-230 and will be moved into the TA-54-231 PermaCon.

The cemented waste containers are not considered to present any risk and are therefore not addressed here.

3. **SITE CONSIDERATIONS**

The drums and SWBs are spaced to satisfy the Resource Conservation and Recovery Act (RCRA) requirements, which require a minimum of two feet between containers. Until the final configuration for the un-remediated drums is achieved a list of drum locations will be kept and provided to Emergency Management (EM). EM is the central point of distribution and will provide appropriate information to responders, including Emergency Response (ER) and Los Alamos Fire Department (LAFD). When the final configuration is achieved, a diagram with drum locations within the TA-54-231 PermaCon will be produced, provided to EM, and posted in the TA-54 Operations Center. A preliminary walkdown of TA-54-230, TA-54-231, TA-54-375 and TA-54-412 has been completed with EM and ER. A walkdown with LAFD will be completed. Photos of the final configuration will be provided to EM.

Appendix 4, TA-54 Area G Structure Location Map, is a map showing the 100-meter initial standoff distance from all affected facilities and a copy of it will be posted in the TA-54 Operations Center and the Emergency Operations Center (EOC).

The primary access into Area G will be the west entrance adjacent to the TA-54 Operations Center. Due to wind conditions, response organizations may have to enter Area G through the east gate. That road is not paved, but is maintained and it will be regularly inspected by appropriate personnel, including Emergency Operations (EO) and LAFD, to ensure accessibility. The road is inspected in accordance with EWMO-AREAG-WO-DOP-1246, Nitrate Salt-Bearing TRU Waste Container Monitoring, and repaired after each significant rain event.

4. **BUILDING CONSIDERATIONS**

Domes TA-54-231 and TA-54-375 have PermaCons installed within them. PermaCons are stainless steel enclosures designed for contamination control. Each has high-efficiency particulate air (HEPA) filtration and has been tested to ensure adequate airflow through the PermaCon. Each has several Continuous Air Monitors (CAMs) to monitor for airborne radioactive contamination. Two remotely monitored CAMs are installed in the TA-54-375 PermaCon which provides notification when there is a significant airborne release. Each structure has HVAC for heating and cooling within the PermaCons. All combustibles and flammable liquids have been removed from the domes, and the PermaCons. There are no hazardous materials, other than those in the waste containers, within the domes or PermaCons. The domes are not routinely occupied although daily and hourly inspections are performed. Access to the PermaCons is restricted by EWMO-AREAG-SO-1247, TA-54 Area G Domes TA-54-231 and TA-54-375 PermaCon Access Restrictions.

Dome TA-54-230 is a fabric dome with fire suppression. It is considered short-term storage and all un-remediated drums will be moved to the TA-54-231 PermaCon the week of May 26.

5. VENTILATION STATUS

Because the HEPA ventilation is a key component of the contamination control within the PermaCon, if it were to be non-functional, the contamination control provided by the PermaCon would be compromised. Therefore, its status should be monitored and mitigative actions implemented if non-functional. EWMO-AREAG-FO-DOP-1246 performs hourly inspections of the containers contains a requirement to verify the HEPA ventilation is operating. Therefore any failure of the system would be known within an hour. If the ventilation system is found to be non-functional, the inspector will notify the Shift Operations Manager (SOM) who will coordinate with appropriate resources to repair the system as soon as possible. If the ventilation is non-functional for an extended period of time, the frequency of temperature measurements of the containers will be increased at the direction of the SOM.

6. LTP PERSONNEL

The TA-54 Operations Center is manned 5 x 12 (Monday - Friday). Core work hours are 0600 to 1800. All normal support personnel are available during those hours. The Abnormal Operating Procedures and Emergency Response Procedure (see references) rely on the TA-54 Operations Center personnel to make notifications, contact Subject Matter Experts (SMEs), and coordinate with response organizations. EWMO-AREAG-FO-DOP-1246 provides direction to personnel performing hourly inspections on the backshift and weekends since they will not have access to TA-54 Operations Center personnel.

To support a backshift or weekend response, the TA-54 Operations Center will maintain an on-call list with the following personnel:

- Facility Operations Director (FOD)
- Operations Manager (OM)
- SOM
- Shift Operations Supervisor (SOS)
- Radiological Control Technician (RCT) Foreman
- RCT (2)
- Industrial Hygiene (IH)
- Operations Center Operator (OCO)
- Nuclear Operator

In accordance with company procedure, on-call LTP personnel are required to be on site within two hours of notification. Radiation Protection (e.g., Radiological Control Technicians) respond within one hour.

7. RESPONSE ACTIONS

The following actions will initiate a response action requiring notification to LAFD via 911 and the Emergency Operations Support Center (EOSC) 667-6211:

1. Loss of container integrity such as evidence of leakage and/or lid or lid container gasket compromised
2. Bulging such as expansion of side walls or top
3. Chemical reaction such as smoke or release of internal contents to atmosphere
4. Evidence of fire or smoke
5. Blistering paint on a container
6. A container temperature measurement that is greater than 15 °F higher than the control temperature in accordance with EWMO-AREAG-FO-DOP-1246
7. A CAM alarm

Response personnel will initially mobilize to 100 meters from the affected facility as shown on the figure in Appendix 4. If specialized tools are identified (none have been to date), they will be staged in a central location more than 100 meters from any of the potential facilities. The forklift with blast protection will be staged between TA-54-231 and TA-54-375 as shown in Appendix 4. The Hazardous Material (HazMat) team will develop an incident specific response plan and safety plan per EO procedures (see references), which will be approved by the Incident Commander (IC) prior to any mitigation. LAFD, LTP SMEs, HazMat, and the Field Monitor Team (FMT) from Emergency Response will be involved in the planning for any mitigation and will be included in the pre-job briefing. In addition, the FMT has pre-planned the placement of additional monitoring equipment if it is needed. EO has personnel on call to support the IC including chemists, modelers, health physicists, samplers, etc.

8. REFERENCES

EP-DIV-BEP-20048, EWMO Division Building Emergency Plan (BEP)

EP-DIV-RM-AOP-20201, Discovery of an Airborne, Liquid and/or Solid Material Release or Spill

EP-DIV-RM-AOP-20204, Waste Container Questionable Integrity

EP-DIV-RM-ERP-20200, EWMO Area Emergency Response

EWMO-AREAG-FO-DOP-1246, Nitrate Salt-Bearing TRU Waste Container Monitoring

9. REFERENCES (continued)

EWMO-AREAG-SO-1247, TA-54 Area G Domes TA-54-231 and TA-54-375 PermaCon
Access Restrictions

EO-ER-600-005, EO-ER Emergency Response Plan

EO-ER-630-003, Hazmat Safety Officer Guidelines

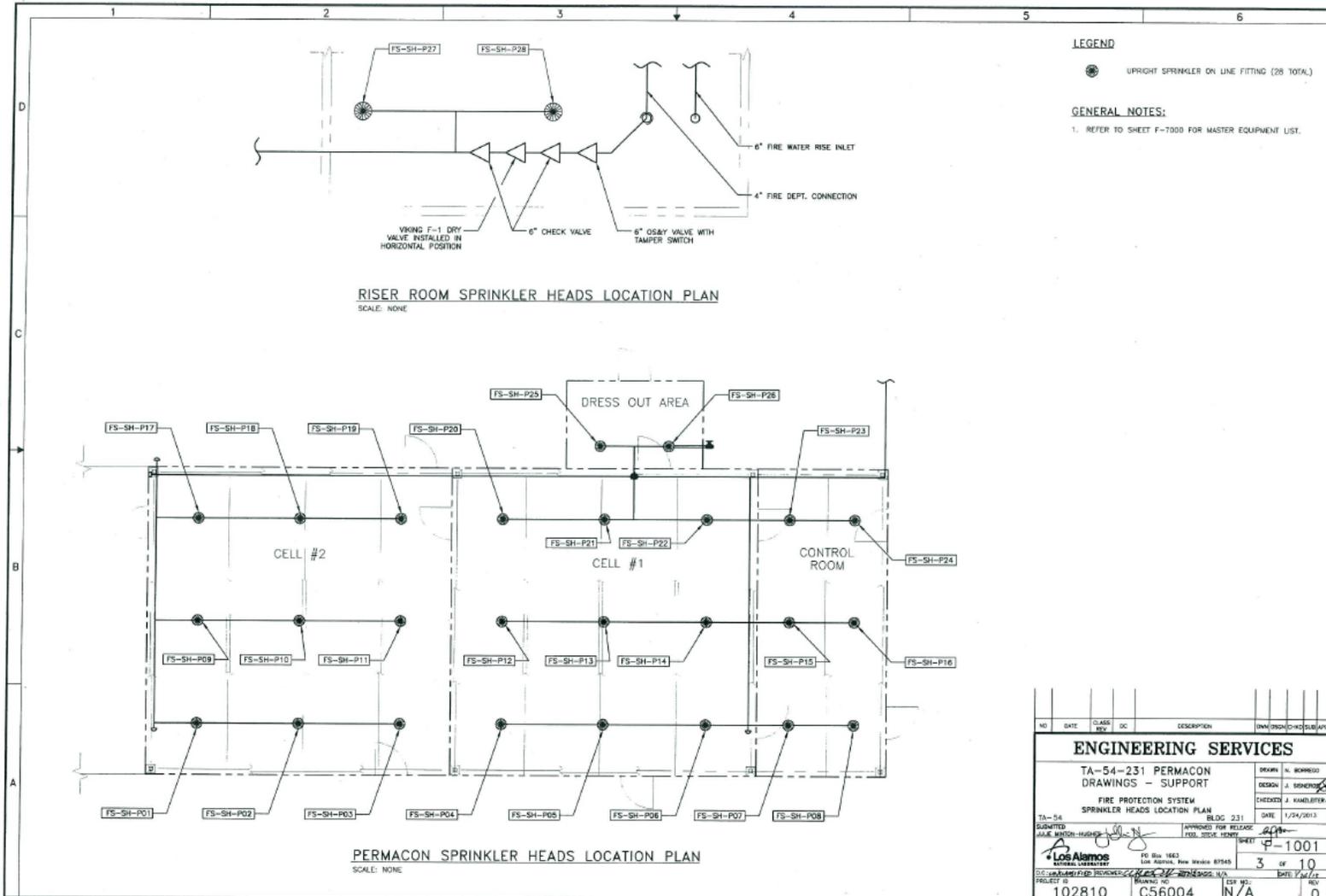
EO-ER-630-001, Hazmat Group Supervisor Guidelines

LANL Hazardous Waste Permit, Attachment D, Contingency Plan

APPENDIX 1

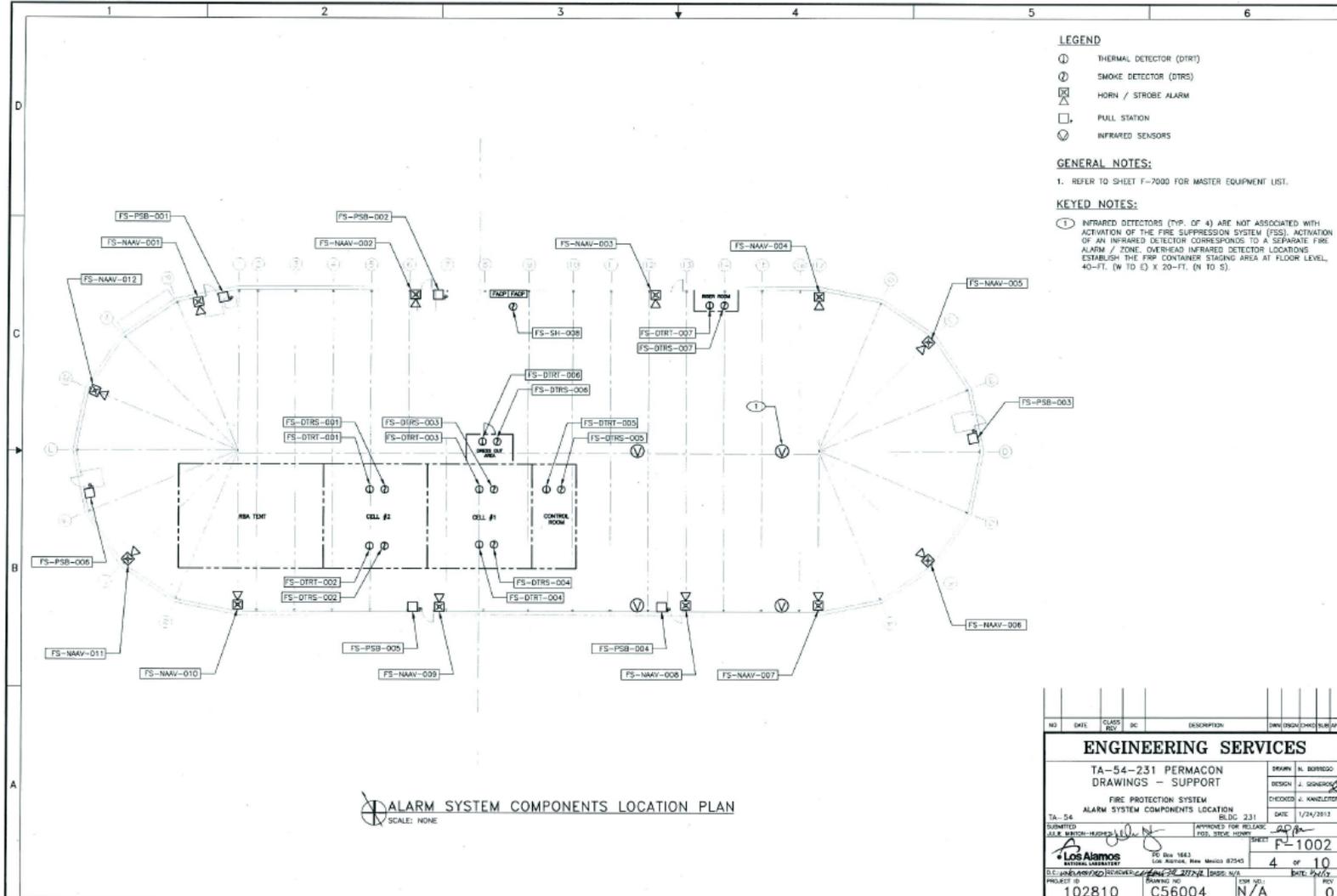
Page 1 of 2

TA-54-231 PERMACON FIRE PROTECTION SYSTEM



APPENDIX 1

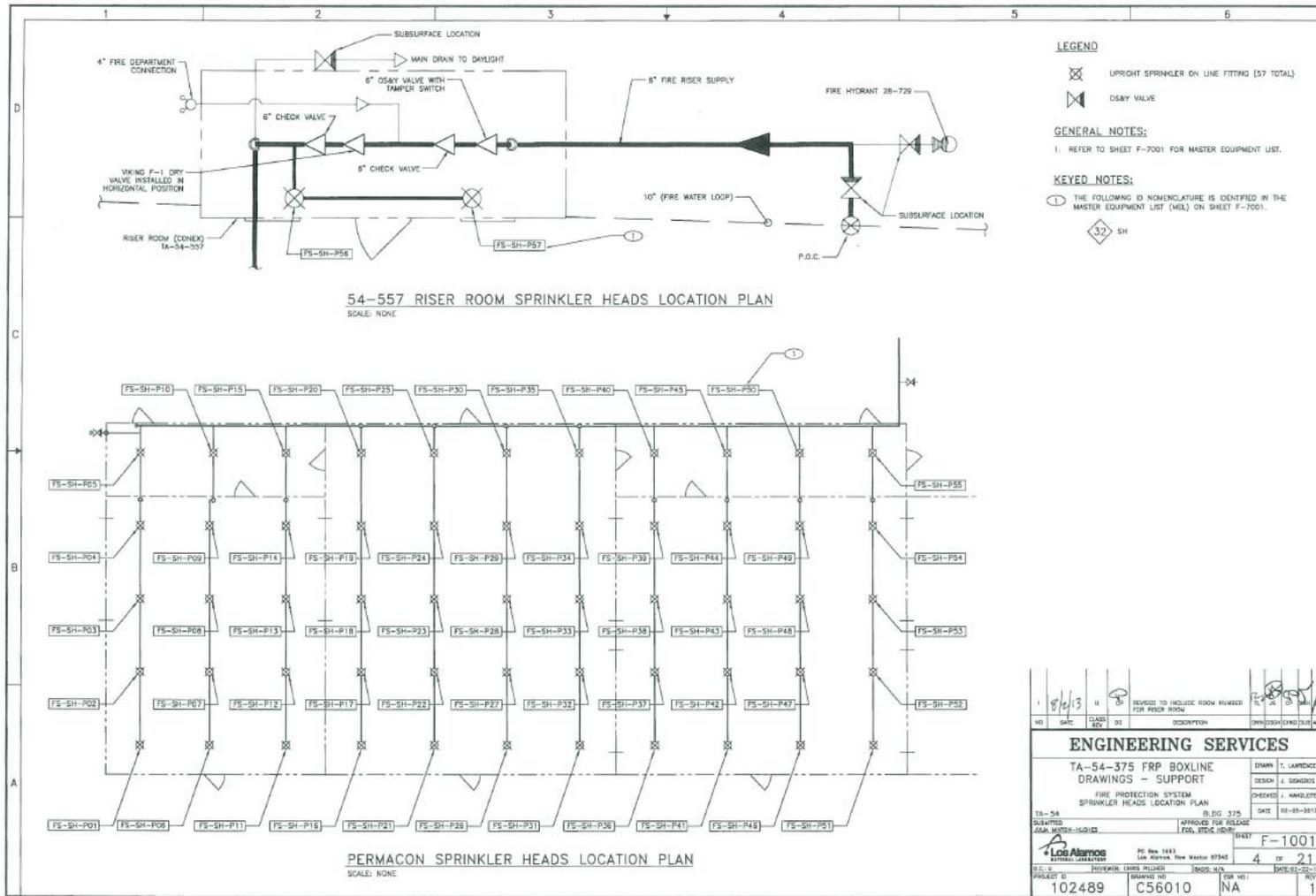
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APPENDIX 2

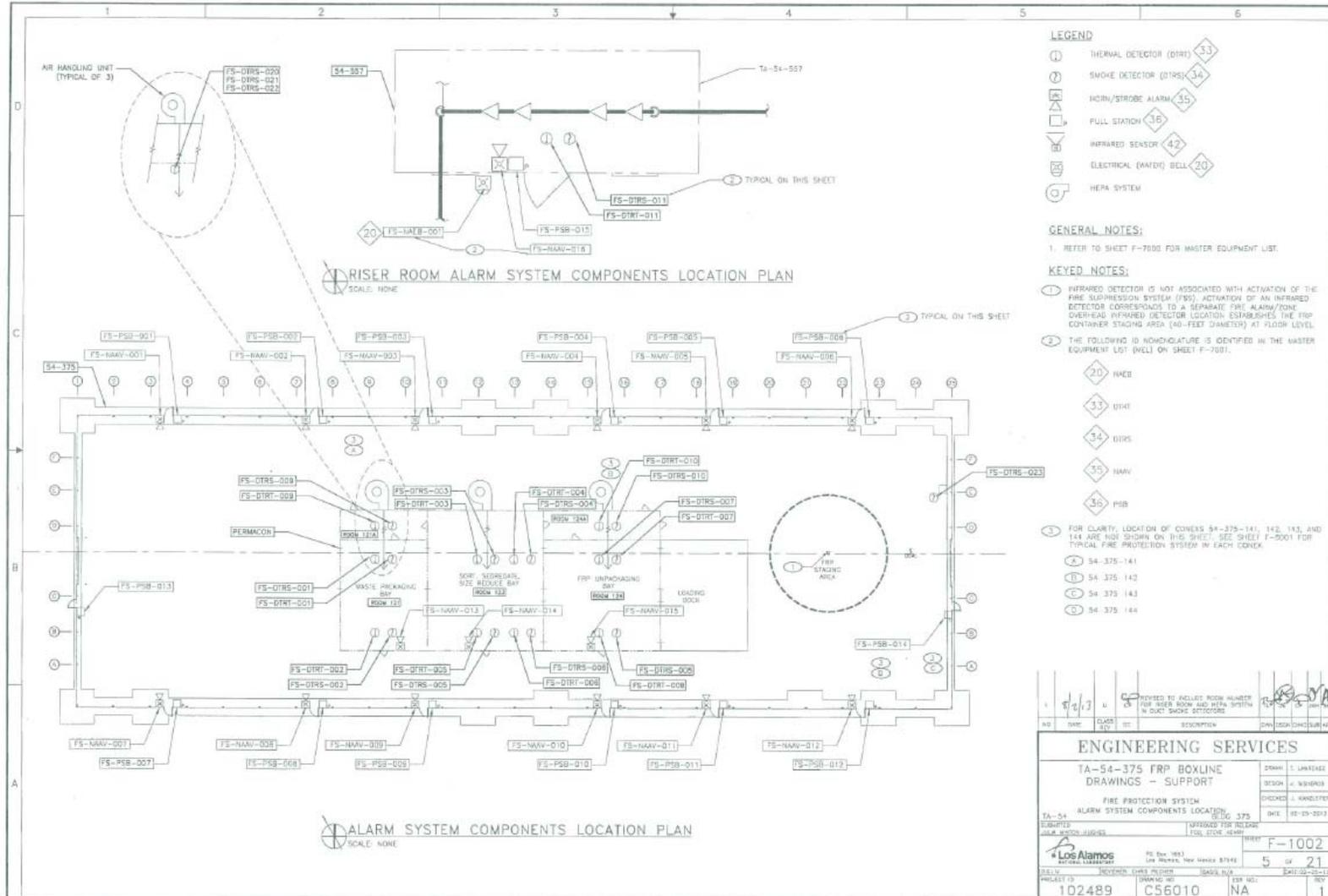
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TA-54-375 PERMACON FIRE PROTECTION SYSTEM



APPENDIX 2

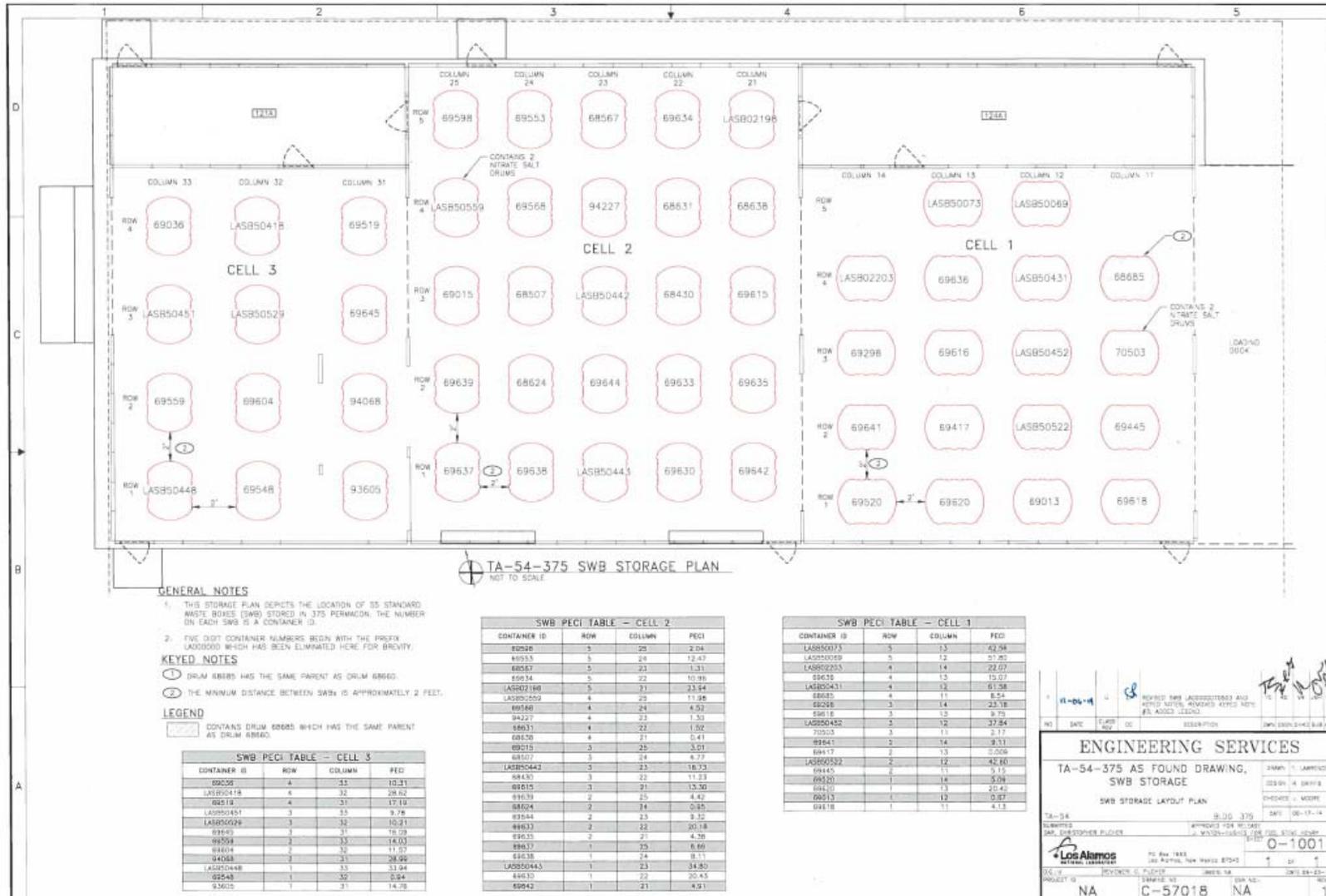
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| | | | | | | | |
|--|--|--------|--|--|--|--------------------|--|
| NO. 54-375-141 | | REV. 1 | | DATE 01/30/15 | | DRAWN BY J. LARSEN | |
| CHECKED BY J. WILSON APPROVED BY J. HANDELPER | | | | DESIGNED BY J. WILSON DATE 01-30-2015 | | | |
| PROJECT NO. 102489 | | | | DRAWING NO. C56010 | | | |
| SHEET NO. 5 | | | | OF 21 | | | |
| PROJECT ID 102489 | | | | SHEET NO. 5 OF 21 | | | |

APPENDIX 3
 Page 1 of 1

TA-54-375 SWB STORAGE LAYOUT PLAN



REVISIONS: 1

NO. DATE REVISION

DATE: 06-13-14

ENGINEERING SERVICES

TA-54-375 AS FOUND DRAWING, SWB STORAGE

SWB STORAGE LAYOUT PLAN

DATE: 06-13-14

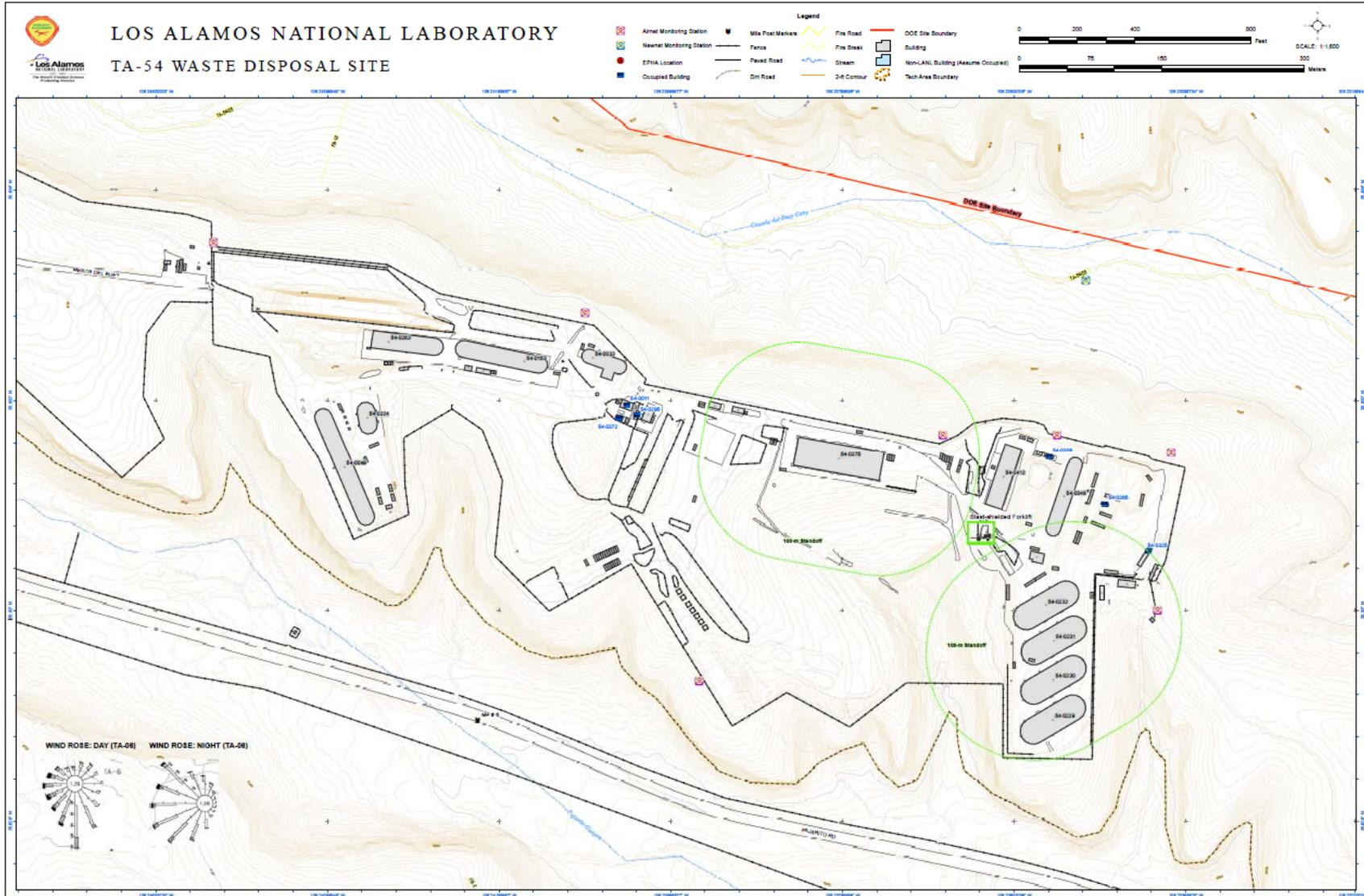
PROJECT: TA-54

NA C-57018 NA 1

APPENDIX 4

Page 1 of 1

TA-54 AREAG STRUCTURE LOCATION MAP



Attachment 7

Nitrate Salt-Bearing TRU Waste Container Monitoring

Effective Date: March 26, 2015

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 release as well as subsequent major revisions. Review documentation is contained in the Document History File:

- Environmental Compliance
- EWMO Criticality Safety
- EWMO Industrial Hygiene and Safety Professional
- EWMO Shift Operations Supervisor
- EWMO Quality Assurance
- EWMO Radiation Protection
- EWMO Shift Operations Manager
- LTP EWMO Engineering
- LTP-SSS Team Lead
- Safety Basis
- Subject-Matter Expert

Responsible Manager, LTP-SSS Operations Manager

David Frederici / 233890 / /s/ David Frederici / 03/25/15
 Name (print) Z# Signature Date

Classification Review: N/A Unclassified UCNi Classified _____

Chris Pilcher / 233242 / /s/ Chris Pilcher / 03/25/15
 Name (print) Z# Signature Date

Working Copy / Information Only (circle one)
 Initials / Date: _____ / _____

This document fully satisfies the requirements of P300, Integrated Work Management, in order to systematically describe the work activity, the associated hazards, and the controls that **MUST** be employed to mitigate the risks.

**Nitrate Salt-Bearing TRU Waste
Container Monitoring**

UET

Document No.: EWMO-AREAG-FO-DOP-1246
Revision: 6
Effective Date: 03/26/15
Page: 2 of 40

REVISION HISTORY

| Document No./Revision No. | Issue Date | Action | Description |
|-----------------------------|-----------------------|----------------|--|
| EP-AREAG-FO-DOP-1246, R.0 | May 29, 2014 | New Procedure | Generated to incorporate EP-AREAG-SO-1237, TA-54 Area G Temperature Readings of Remediated Nitrate Salt Containers, EP-AREAG-SO-1244, TA-54 Area G Nitrate Waste Container Inspection. A Job hazard analysis was developed and controls incorporated into the procedure through precautions, limitations, warnings, cautions and notes. |
| EP-AREAG-FO-DOP-1246, R.1 | Approved for Training | Major Revision | Revise procedure to incorporate container numbers into the procedure, checks, and actions for HVAC Low D/P and make editorial corrections as necessary. Section 6, added note to clarify Attachment 2 lists the container numbers. Correct step 5.[6] to revise word from smoking to smoke. Added Step 6.[8] to address container number discrepancies. This revision does not introduce any new hazards. |
| EP-AREAG-FO-DOP-1246, R.2 | July 15, 2014 | Major Revision | Revise procedure to incorporate ENV-CP comments and make editorial corrections as necessary. This revision does not introduce any new hazards. |
| EP-AREAG-FO-DOP-1246, R.3 | August 1, 2014 | Major Revision | Revise procedure to allow for performing the temperature measurements in TA-54-231 and TA-54-375 independent of each other. Allow for multiple infrared thermometers to be used. Delete control drum temperature readings throughout. Revise attachments to include a separate attachment for recording daily temperatures in each cell in TA-54-375. Make process improvement changes. Make editorial corrections as necessary. This revision does not introduce any new hazards. This revision is a total rewrite and revision bars have been omitted. |
| EWMO-AREAG-FO-DOP-1246, R.4 | September 11, 2014 | Major Revision | Revised procedure to change Procedure number from EP to EWMO. Deleted Step 6.[19] and the associated SOM initials for the daily review on Attachments 2 through 6. Moved Step 8.1[1] Operator signoff to the end of Sections 5 and 6. Deleted Step 8.1[1]. Delete SOM initials on attachments 2 through 6. Rev bars is in the left column display location of changes. No additional hazards were identified during this revision. |

**Nitrate Salt-Bearing TRU Waste
Container Monitoring**

UET

Document No.: EWMO-AREAG-FO-DOP-1246
Revision: 6
Effective Date: 03/26/15
Page: 3 of 40

REVISION HISTORY (continued)

| Document No./Revision No. | Issue Date | Action | Description |
|--------------------------------------|-------------------|----------------|---|
| EWMO-AREAG-FO-DOP-1246, R.5 | November 03, 2014 | Major Revision | Revise procedure to incorporate the ability to use remote temperature indication from thermocouples and to update waste container numbers. This revision is a total rewrite and revisions bars have been omitted. This revision does not introduce any new hazards. |
| EWMO-AREAG-FO-DOP-1246, R.5 IPC-1 | November 17, 2014 | IPC | Revise procedure to change the drums in SWB LA00000070503 from "68553 and 69445" to "68540 and 68553". This revision does not introduce any new hazards. |
| EWMO-AREAG-FO-DOP-1246, R.6 | March 26, 2015 | Major Revision | Revise procedure to implement Specific Administrative Controls for daily visual inspection and monthly overpack inspection provided in AREAG-ESS-14-002-R3. This revision does not introduce any new hazards. |

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1. PURPOSE

This procedure provides the instructions and directions for performing nitrate salt-bearing Transuranic (TRU) WASTE container monitoring.

2. SCOPE

Monitoring of nitrate salt-bearing waste performed within this procedure includes:

- Hourly visual inspections of waste containers in accordance with LANL Nitrate Salt-Bearing Waste Container Isolation Plan
- Daily visual inspections of waste containers in accordance with AREAG-ESS-14-002
- Daily and hourly temperature readings of waste containers in accordance with LANL Nitrate Salt-Bearing Waste Container Isolation Plan
- Monthly visual inspections of overpack closure in accordance with AREAG-ESS-14-002

This procedure applies to Los Alamos National Laboratory (LANL) Transuranic Programs (LTP) and Environmental and Waste Management Operations (EWMO) personnel who will be monitoring the nitrate salt TRU WASTE containers. Activities associated with the nitrate salt-bearing TRU WASTE containers and the associated storage locations other than identified in this procedure will require prior approval from the EWMO-Facility Operations Director (EWMO FOD) and the Associate Director of Environmental Programs.

Inspections required by Attachment E, Inspection Plan, of the LANL Hazardous Waste Permit are performed in accordance with EWMO-DOP-20215, EWMO RCRA Inspections and Notifications.

3. PRECAUTIONS AND LIMITATIONS

- Procedure steps marked with the (\$) symbol implement key requirements associated with the facility's safety basis. These steps may not be changed without engineering approval to ensure that the Technical Safety Requirements (TSRs) and other associated requirements are maintained.
- Safety basis requirements incorporated and controlled within this procedure include:
 - Standard Waste Boxes (SWBs) and Pipe Overpack Containers (POCs) containing remediated nitrate salt (RNS) waste **SHALL** remain closed. (ESS-14-002, SAC 3)
 - SWBs and POCs containing RNS waste **SHALL** be visually inspected daily for signs of degradation. (ESS-14-002, SAC 4)

3. **PRECAUTIONS AND LIMITATIONS (continued)**

- Activities, items, and containers **SHALL** satisfy approved design specifications, regulatory requirements, process-specific parameters, and procedural requirements. Activities, items, or containers that do not conform to the approved specifications and requirements are considered nonconforming and Nonconformance Reports (NCRs) **SHALL** be generated in accordance with P330-6, Nonconformance Reporting, as required.
- When a worker observes an unsafe condition or act that may pose an imminent danger or other safety concern/hazard, the worker has the authority and responsibility to inform the worker engaged in the work and request that the work activity be paused and/or stopped based on the risk posed to the individual, the employees, the environment, or the facility in accordance with P101-18, Procedure for Pause/Stop Work.
- Not Applicable (N/A) is documented on the attachments during the performance of this procedure indicating information that is not required to be recorded.
- Personnel associated with this procedure **SHALL** review and understand the requirements of the Radiological Work Permit (RWP).
- Personal protective equipment (PPE) **SHALL** be worn as required by the RWP and Industrial Hygiene personnel.
- To comply with the intent of the As Low As Reasonably Achievable (ALARA) Program, all personnel **SHALL** apply the principles of time, distance, and shielding when working with radiological materials.
- Infrared thermometer is equipped with a laser. Care should be taken to prevent pointing beam to eyes. Do not allow eyes of user or observers to become exposed to the beam.
- Waste containers with liquids (any amount or configuration) that have not been solidified (absorbed) and are stored or staged for a period longer than 24 hours **SHALL** be labeled "Free Liquids" and managed on secondary containment pallets or in structures designed to satisfy the secondary containment requirements (e.g., Sheds, Bldg. TA-54-1027, 1028, 1030, 1041, 144, 145, 146, and 177, and Dome 230).
- Support Services Subcontractors executing this procedure **SHALL** comply with the safety and health requirements documented in contractual agreements with the LANL.

4. PREREQUISITE ACTIONS

NOTE *The listed prerequisite actions may be completed in any order.*

4.1 Planning and Coordination

PIC/Designee

- [1] **ENSURE** that the performance of this procedure has been scheduled on the TA-54 Area G schedule.
- [2] **ENSURE** that the procedure is the latest revision, and **IDENTIFY** this document as Working Copy or Information Only on the Title Page.
- [3] **ENSURE** that, as a minimum, the following personnel trained to the use of this procedure are available for the performance of this procedure, as required:
 - Two Operators
 - One Radiological Control Technician (RCT) [when performing operations within a Contamination Area (CA)]
- [4] **ENSURE** that a pre-job briefing is conducted for all personnel involved in the performance of this procedure in accordance with EP-DIV-AP-0112, EWMO Pre-Job Briefings.

Operator/Designee

- [5] **IF** performing Section 6, Temperature Readings of Nitrate Salt TRU Waste Containers, **THEN:**
 - [A] **ENSURE** that the applicable PermaCon round sheet (i.e., Dome TA-54-231, Dome TA-54-375) is completed.
 - [B] **ENSURE** that an RWP has been issued for the planned activity, as applicable.

4.2 Materials and Equipment

4.2.1 Measuring and Test Equipment (M&TE)

Operator/Designee

[1] **IF** performing Section 6,
AND an infrared thermometer is to be used to obtain the waste container temperatures,
THEN:

[A] **ENSURE** that a calibrated infrared thermometer is available.

[B] **RECORD** the following infrared calibration information on Attachment 2 through 6, as applicable:

- Brand name
- Model number
- Calibration due date
- File number

[C] **IF** the infrared thermometer has exceeded the calibration due date,
THEN:

[a] **NOTIFY** the TA-54 Operations Center of the discrepancy.

[b] **OBTAIN** another infrared thermometer that is within the calibration due date.

[c] **GO** to Step 4.2.1[1][A].

5. **INSTRUCTIONS—VISUAL INSPECTIONS OF NITRATE SALT TRU WASTE CONTAINERS**

This section is a stand-alone section and may be performed independently of, or in conjunction with, other Instructions sections.

This activity will be performed at a minimum of once an hour to meet the requirements of the LANL Nitrate Salt-Bearing Waste Container Isolation Plan. Performance of the first inspection of the day shift is credited to meet the daily surveillance frequency of AREAG-ESS-14-002, SAC 4.

NOTE *Multiple storage locations may be visually inspected concurrently.*

Operator/Designee

[1] **ENSURE** that the prerequisite actions have been completed.

NOTE *Visual inspections at TA-54-231 and TA-54-375 are conducted from outside of the PermaCon through the windows.*

[2] **IF** assuming nitrate drum observation (NDO) duties,
THEN DOCUMENT the following in the Comments section of Attachment 1, Nitrate Salt TRU Waste Container Visual Inspection Data Sheet:

- Time and assumption of duties
- Signature and Z number

[3] **IF** turning over NDO duties,
THEN DOCUMENT the following in the Comments section of Attachment 1:

- Time and turnover of duties
- Printed name of relief
- Signature

[4] **PROVIDE** a description of any unsatisfactory conditions, notifications, and corrective actions in the Comments section of Attachment 1.

[5] **IF** performing the first hourly inspection of the night shift,
THEN RECORD “N/A” (not applicable) and **DRAW** a line through the first row of Attachment 1.

5. **INSTRUCTIONS—VISUAL INSPECTIONS OF NITRATE SALT TRU WASTE
CONTAINERS (continued)**

[6] **RECORD** the following information on Attachment 1:

- Date range and time (24 hours)
- Storage Area (e.g., TA-54-231 PermaCon or TA-54-375 PermaCon)

[7] **DETERMINE** whether the following applicable PermaCon HVAC system components (TA-54-231 or TA-54-375) are operational, and **CHECK** (√) YES or NO on Attachment 1:

TA-54-231

- FE-1000, ON and operating
- FE-2000, ON and operating
- FE-3000, ON and operating
- FE-4000, ON and operating
- PDI-1000 and PDI-2000 alarm light are not illuminated (panel outside cell)

TA-54-375

- FE-001, VFD-001 is ON and set to HAND, 30 to 60 Hz, and
- FE-002, VFD-002 is ON and set to HAND, 30 to 60 Hz, and
- PDA-001, PDA-002, and PDA-003 alarm light are not illuminated (panel outside cell)

[8] **IF** NO was checked (√) in the previous step,
THEN:

[A] **GO TO** EP-AREAG-RM-ARP-1123, 231 PermaCon Low Cell D/P Alarm, or
EP-AREAG-RM-ARP-1150, 375 PermaCon Low Cell D/P Alarm, as applicable.

[B] **NOTIFY** the TA-54 Operations Center and Shift Operation Manager (SOM) for applicable actions.

5. **INSTRUCTIONS—VISUAL INSPECTIONS OF NITRATE SALT TRU WASTE
CONTAINERS (continued)**

NOTE *The first hourly inspection of the day shift of waste containers at TA-54-375 containing RNS waste is credited to meet the inspection frequency of AREAG-ESS-14-002.*

[9] **(\$ VISUALLY INSPECT** nitrate salt waste containers for signs of degradation, indications of an abnormal condition including an internal reaction (e.g., chemical/thermal), and/or loss of container integrity: (ESS-14-002, SAC 4)

- Evidence of deterioration such as signs of discoloration, paint peeling or yellowing
- Loss of container integrity such as evidence of leakage, or lid compromised
- Bulging such as pressurized, expansion of side walls, or round bottom
- Chemical reaction such as smoke or release of internal contents to atmosphere
- Signs of smoke and fire from a container

NOTE 1 *During back-shifts or off-shifts, or if the TA-54 Operations Center is not available, the SOM can be notified directly at 505-231-8289. Additional notifications to the Emergency Operations Support Center (EOSC), 505-667-6211, or 911, are performed based upon the severity of the situation or in accordance with direction from the SOM.*

NOTE 2 *Any follow-up calls to 911 should be conducted at a safe location from the incident after the activation of a manual pull.*

[10] **IF** a chemical reaction such as smoke, fire, or release of internal contents to the atmosphere are discovered,

THEN:

[A] **ACTIVATE** the manual pull station in the general area of the incident if safe to do so.

[B] **PERFORM** an Emergency response in accordance with EP-DIV-BEP-20048, EWMO Division Building Emergency Plan (BEP), to include:

- **SUSPEND** work.
- **WARN** others.
- **ISOLATE** immediate area.
- **EVACUATE** to an upwind Assembly/Muster area from the incident.
- **MAKE** notifications [e.g., TA-54 Operations Center, EOSC, 911].

[C] **CHECK** (✓) UNSAT for the inspection location, and **DOCUMENT** the condition in the Comments section of Attachment 1 when in a safe area and at a time when operationally convenient.

5. **INSTRUCTIONS—VISUAL INSPECTIONS OF NITRATE SALT TRU WASTE
CONTAINERS (continued)**

[11] **IF** evidence of deterioration is discovered, such as signs of discoloration, paint peeling or yellowing, loss of container integrity such as evidence of leakage or a compromised lid, bulging, pressurization (expansion of side walls, or round bottom) are discovered,
THEN:

[A] **PERFORM** an off-normal response in accordance with EP-DIV-BEP-20048, to include:

- **SUSPEND** work.
- **WARN** others.
- **ISOLATE** the immediate area.
- **MOVE-AWAY** upwind from the area of concern.
- **MAKE** notifications (e.g., TA-54 Operations Center).

[B] **CHECK** (✓) UNSAT for the status of the inspection location, and **DOCUMENT** the condition in the Comments section of Attachment 1 when in a safe area and at a time when operationally convenient.

[12] **CHECK** (✓) SAT for the status of the affected inspection location on Attachment 1.

[13] **RECORD** initials and Z number on Attachment 1.

[14] **REPEAT** Steps 5.[2] through 5.[13] until each nitrate salt TRU WASTE container storage location has been visually inspected.

[15] **PRINT** name, **SIGN**, and **RECORD** Z#, initials, and date on Attachment 1.

6. INSTRUCTIONS—TEMPERATURE READINGS OF NITRATE SALT TRU WASTE CONTAINERS

This section is a stand-alone section and may be performed independently of, or in conjunction with, other Instructions sections.

This section provides the instructions for performing hourly or daily temperature readings.

NOTE 1 *Waste container temperature measurements are obtained by entering the applicable PermaCon (e.g., TA-54-231 or TA-54-375) Contamination Area and individually measuring and recording the waste container temperatures or by observing the waste container temperature on the computer located in the TA-54-375 PermaCon Control Room.*

NOTE 2 *The temperature indications for each waste container with an input to the TA-54-375 PermaCon Control Room computer are labeled with the waste container number except for the ambient temperature thermocouple which is labeled AMBIENT.*

NOTE 3 *Separate attachments are provided to allow for recording daily waste container temperatures independently as listed below:*

- *Attachment 2, TA-54 Area G TA-54-231 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet*
- *Attachment 3, TA-54 Area G TA-54-375 Cell 1 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet*
- *Attachment 4, TA-54 Area G TA-54-375 Cell 2 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet*
- *Attachment 5, TA-54 Area G TA-54-375 Cell 3 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet*

NOTE 4 *Attachment 6, TA-54 Area G Nitrate Salt TRU Waste Container Hourly Temperature Data Sheet, is set up for documenting hourly readings of one or more containers as directed by the LTP-SSS management.*

Operator/Designee

- [1] **ENSURE** that all prerequisite actions have been completed.

6. **INSTRUCTIONS—TEMPERATURE READINGS OF NITRATE SALT TRU WASTE CONTAINERS (continued)**

- [2] **PROVIDE** a description of any unsatisfactory conditions, notifications, and corrective actions in the Comments section of Attachment 2 through 6, as applicable.
- [3] **IF** at any time during the performance of this section a chemical reaction such as smoke, fire, or release of internal contents to the atmosphere is discovered,
THEN:
- [A] **ACTIVATE** the manual pull station in the general area of the incident if safe to do so.
- [B] **PERFORM** an Emergency response in accordance with EP-DIV-BEP-20048, to include:
- **SUSPEND** work.
 - **WARN** others.
 - **ISOLATE** the immediate area.
 - **EVACUATE** to an upwind Assembly/Muster Area from the incident.
 - **MAKE** notifications (e.g., TA-54 Operations Center, EOSC, 911).
- [C] **DOCUMENT** the condition in the Comments section of the applicable attachment when in a safe area and at a time when operationally convenient.
- [4] **IF** at any time during the performance of this section evidence of deterioration is discovered, such as signs of discoloration, paint peeling or yellowing, loss of container integrity such as evidence of leakage or a compromised lid, bulging, pressurization (expansion of side walls, or round bottom) are discovered,
THEN:
- [A] **PERFORM** an off-normal response in accordance with EP-DIV-BEP-20048, to include:
- **SUSPEND** work.
 - **WARN** others.
 - **ISOLATE** the immediate area.
 - **MOVE-AWAY** upwind from the area of concern.
 - **MAKE** notifications (e.g., TA-54 Operations Center).
- [B] **DOCUMENT** the condition in the Comments section of the applicable attachment when in a safe area and at a time when operationally convenient.

6. **INSTRUCTIONS—TEMPERATURE READINGS OF NITRATE SALT TRU WASTE CONTAINERS (continued)**

[5] **DETERMINE** whether the daily or hourly temperature readings are to be conducted as directed by the SOM.

[6] **RECORD** the date range and start time on the applicable attachment.

[7] **DETERMINE** the ambient temperature (e.g., the wall of the contamination control enclosure or designated location using an infrared thermometer or the AMBIENT temperature indication on the TA-54-375 PermaCon Control Room computer), and **RECORD** the ambient temperature (in °F) on the applicable attachment.

NOTE 1 *Attachments 2 through 5 are pre-populated with the container numbers for TA-54-231 PermaCon and for Cells 1, 2, and 3 of TA-54-375 PermaCon.*

NOTE 2 *SWBs that were not packaged for Waste Isolation Pilot Plant (WIPP) shipment (without a LASBxxxxx number) identify the location of the nitrate salt-bearing drum inside by the location of the container label on the outside of the SWB.*

NOTE 3 *SWBs that were packaged for WIPP shipment (with a LASBxxxxx number) do not have the location of the nitrate salt-bearing drum identified on the outside of the SWB.*

NOTE 4 *The temperature indications for each waste container with an input to the TA-54-375 PermaCon Control Room computer are labeled with the waste container number except for the ambient temperature thermocouple which is labeled AMBIENT.*

[8] **IF** the nitrate salt-bearing drum location within the SWB is known, **THEN OBTAIN** the nitrate salt-bearing drum temperature using one or both of the following methods and **RECORD** the container number, as applicable, and temperature on the applicable attachment:

- **MEASURE** the temperature (in °F) on the top approximate center of each nitrate salt drum, through the SWB lid, using an infrared thermometer
- **READ** the SWB temperature (°F) indication on the TA-54-375 PermaCon Control Room computer

6. **INSTRUCTIONS—TEMPERATURE READINGS OF NITRATE SALT TRU WASTE CONTAINERS (continued)**

[9] **IF** the nitrate salt-bearing drum location within the SWB is **NOT** known, **THEN MEASURE** the temperature (in °F) on the top approximate center of each drum in the SWB, through the SWB lid, using an infrared thermometer, and **RECORD** the container number, as applicable, and the highest temperature measurement on the applicable attachment.

[10] **IF** a container's temperature is greater than 10 °F higher than the ambient temperature, **THEN:**

[A] **EXIT** the PermaCon.

[B] **NOTIFY** the TA-54 Operations Center of the discrepancy, **REPORT** the container's temperature and amount greater than ambient, and **REQUEST** direction.

TA-54 Operations Center

[C] **NOTIFY** the Operations Manager and EOSC at 505-667-6211 of the discrepancy.

[D] **IF** a container's temperature is greater than 15 °F higher than the ambient temperature, **THEN REQUEST** support from EOSC at 505-667-6211 and **NOTIFY** the Operations Manager of the discrepancy.

Operator/Designee

[11] **IF** a deficiency with a container number pre-populated on the attachment is discovered, **THEN:**

[A] **SUSPEND** operations.

[B] **NOTIFY** the TA-54 Operations Center and SOM for guidance and direction.

[12] **REPEAT** Steps 6.[8] through 6.[11] for the current location until all of the nitrate salt container temperatures have been recorded.

6. **INSTRUCTIONS—TEMPERATURE READINGS OF NITRATE SALT TRU WASTE CONTAINERS (continued)**

NOTE *The ambient temperature of the contamination control enclosure will be measured a second time after measuring the temperature of the last nitrate salt waste container.*

[13] **DETERMINE** the ambient temperature [e.g., of the contamination control enclosure using an infrared thermometer or the AMBIENT temperature indication on the TA-54-375 PermaCon Control Room computer], and **RECORD** the ambient temperature (in °F) on the applicable attachment.

[14] **RECORD** the end time and **INITIAL** on the applicable attachment.

[15] **RECORD** “N/A” (not applicable) for temperature readings that were not recorded and **DOCUMENT** an explanation in the Comments section of the applicable attachment.

[16] **IF** a temperature is recorded incorrectly,
THEN RECONCILE the discrepancy and **INITIAL** on the applicable attachment.

[17] **REPEAT** Steps 6.[1] through 6.[16] for remaining nitrate salt-bearing container storage locations (e.g., TA-54-231 and TA-54-375).

[18] **PRINT** name, **SIGN**, and **RECORD** Z#, initials, and date on the applicable attachments (Attachments 2 through 6).

7. **INSTRUCTIONS—OVERPACK INSPECTION OF REMEDIATED NITRATE SALT WASTE CONTAINERS**

This section is a stand-alone section and may be performed independently of, or in conjunction with, other Instructions sections.

This section provides the instructions for performing monthly inspections of the closure of outer SWBs and POCs containing RNS waste.

Operator/Designee

- [1] **ENSURE** that all prerequisite actions have been completed.
- [2] **RECORD** the date and time for beginning the RNS waste container overpack inspection on Attachment 7, TA-54 Area G Remediated Nitrate Salt Monthly Overpack Inspection Data Sheet.

NOTE *Visual inspections at TA-54-375 are conducted from outside of the PermaCon through the windows.*

- [3] **(\$ VISUALLY INSPECT** the outer SWBs and POCs containing RNS waste to verify that the containers are closed (i.e., lid is in place and secured), and **CHECK** (√) SAT or UNSAT on Attachment 7 for the waste containers within each cell at TA-54-375. (ESS-14-002, SAC 3)
- [4] **IF UNSAT** is checked for the inspection location,
THEN:
 - [A] **PERFORM** an off-normal response in accordance with EP-DIV-BEP-20048, to include:
 - **SUSPEND** work.
 - **WARN** others.
 - **ISOLATE** the immediate area.
 - **MOVE-AWAY** upwind from the area of concern.
 - **MAKE** notifications (e.g., TA-54 Operations Center).
 - [B] **DOCUMENT** the condition in the Comments section of Attachment 7 when in a safe area and at a time when operationally convenient.
- [5] **PRINT** name, **SIGN**, and **RECORD** Z#, initials, and date on the Attachment 7.

**8. INSTRUCTIONS—TA-54 AREA G EAST ENTRANCE/ROAD INTO AREA G
MONITORING**

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 significant precipitation (rain fall greater than 0.25 inches within 30 minutes or greater than a 0.5 inches in 24 hours of rain fall) that may cause damage or road deterioration of east entrance/road into TA-54 Area G. Weather information may be obtained from TA-54 Meteorological Station or National Oceanic and Atmospheric Administration (NOAA).

Shift Operations Manager

- [1] **VISUALLY INSPECT** the TA-54 Area G East entrance/road for deterioration (e.g., washout).

- [2] **IF** deterioration is observed,
THEN:
 - [A] **NOTIFY** Maintenance and Site Services.

 - [B] **GENERATE** a Facility Service Request (FSR) to repair roadway as applicable.

 - [C] **NOTIFY** the Los Alamos Fire Department (LFPD) of road condition.

9. POST-PERFORMANCE ACTIVITY

9.1 Disposition

SOM or designee

- [1] **REVIEW** the applicable attachments (Attachments 1 through 7) for accuracy and completeness.
- [2] **PRINT** name, **SIGN**, and **RECORD Z#**, initials, and date on the applicable attachments (Attachments 1 through 6).

NOTE *Completing a Post-Job Review may be accomplished using the applicable P300 form or online (the preferred method since the institution has access to feedback and lessons learned <http://int.lanl.gov/safety/iwmc/> [Click on the Submit IWD Part 4 Post-Job Review]).*

- [3] **IF** any of the following occur:
 - A new activity was completed for the first time
 - A request was made by anyone involved with the performance of this procedure to perform a post-job review
 - An abnormal event occurred
 - A revision to an existing procedure was issued and it has been determined by the procedure owner or designee that a Post-Job Review is required**THEN PERFORM** a Post-Job Review in accordance with P300.
- [4] **IF** the Post-Job Review identified any necessary changes to this procedure, **THEN INITIATE** a revision to this procedure.

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9.2 Records Processing

Operator/Designee

- [1] Ensure that documents generated by the performance of this procedure are processed as follows:

| Record Identification | Record Type Determination | Protection/Storage Methods | Processing Instructions |
|--|---------------------------|---|--|
| Attachment 1, Nitrate Salt TRU Waste Container Visual Inspection Data Sheet Attachment 2, TA-54 Area G TA-54-231 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet Attachment 3, TA-54 Area G TA-54-375 Cell 1 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet Attachment 4, TA-54 Area G TA-54-375 Cell 2 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet Attachment 5, TA-54 Area G TA-54-375 Cell 3 Nitrate Salt TRU Waste Container Daily Temperature Data Sheet Attachment 6, TA-54 Area G Nitrate Salt TRU Waste Container Hourly Temperature Data Sheet Attachment 7, TA-54 Area G Remediated Nitrate Salt Monthly Overpack Inspection Data Sheet | QA Record | Supervision SHALL implement a reasonable level of protection to prevent loss and degradation. Records should be maintained in a one-hour fire rated metal file cabinet when <u>not</u> in use. | When the records are ready for final disposition, the record is transferred to Records Management in accordance with EP-DIR-AP-10003, Records Management Procedure For ADEP Employees. |

10. REFERENCES

AREAG-ESS-14-002, Transuranic (TRU) Waste Drums Containing Treated Nitrate Salts May Challenge the Safety Basis

EP-AREAG-RM-ARP-1123, 231 PermaCon Low Cell D/P Alarm

EP-AREAG-RM-ARP-1150, 375 PermaCon Low Cell D/P Alarm

EP-DIR-AP-10003, Records Management Procedure For ADEP Employees

EP-DIV-AP-0112, EWMO Pre-Job Briefings

EP-DIV-BEP-20048, EWMO Division Building Emergency Plan (BEP)

EWMO-DOP-20215, EWMO RCRA Inspections and Notifications

LANL Hazardous Waste Facility Permit

LANL Nitrate Salt-Bearing Waste Container Isolation Plan

P101-18, Procedure for Pause/Stop Work

P300, Integrated Work Management

P330-6, Nonconformance Reporting

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ATTACHMENT 1

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5.[2]/[3]/[4] Comments: _____

5.[15] Performed by:

| | | | | |
|------------------|-----------|-----|----------|------|
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |
| Operator (print) | Signature | Z # | Initials | Date |

9.1[2] Reviewed By:

| | | | | |
|-------------------------|-----------|-----|----------|------|
| SOM or designee (print) | Signature | Z # | Initials | Date |
|-------------------------|-----------|-----|----------|------|

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ATTACHMENT 2

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TA-54 AREA G TA-54-231 NITRATE SALT TRU WASTE CONTAINER DAILY TEMPERATURE DATA SHEET

6.[6] Date: From _____ to _____

| | Monday 6.[6] Start Time: _____ | Tuesday 6.[6] Start Time: _____ | Wednesday 6.[6] Start Time: _____ | Thursday 6.[6] Start Time: _____ | Friday 6.[6] Start Time: _____ | Saturday 6.[6] Start Time: _____ | Sunday 6.[6] Start Time: _____ |
|--|---|---|---|---|---|---|---|
| TA-54-231 | | | | | | | |
| Calibrated Infrared Thermometer (4.2.1[1][B]) | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ |
| Ambient Temperature (6.[7]) | _____°F |
| Container ID # | Temp (°F) (6.[8]/6.[9]) |
| S818435 | | | | | | | |
| S802833 | | | | | | | |
| S801676 | | | | | | | |
| S816810 | | | | | | | |
| 70069 | | | | | | | |
| S822844 | | | | | | | |
| S825879 | | | | | | | |
| S793724 | | | | | | | |
| S813545 | | | | | | | |
| S822713 | | | | | | | |
| S802739 | | | | | | | |
| 69907 | | | | | | | |
| S804995 | | | | | | | |
| S816434 | | | | | | | |

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ATTACHMENT 2

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6.[6] Date: From _____ to _____

6.[2] Comments: _____

6.[18] Performed by:

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

9.1[2] Reviewed by:

| | | | | |
|-------------------------|-----------|----|----------|------|
| SOM or designee (print) | Signature | Z# | Initials | Date |
|-------------------------|-----------|----|----------|------|

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ATTACHMENT 3

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TA-54 AREA G TA-54-375 CELL 1 NITRATE SALT TRU WASTE CONTAINER DAILY TEMPERATURE DATA SHEET

6.[6] Date: From _____ to _____

| | | Monday 6.[6] Start Time: _____ | Tuesday 6.[6] Start Time: _____ | Wednesday 6.[6] Start Time: _____ | Thursday 6.[6] Start Time: _____ | Friday 6.[6] Start Time: _____ | Saturday 6.[6] Start Time: _____ | Sunday 6.[6] Start Time: _____ |
|--|-----------|---|---|---|---|---|---|---|
| TA-54-375 Cell 1 | | | | | | | | |
| Calibrated Infrared Thermometer (4.2.1[1][B]) | | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ |
| Ambient Temperature (6.[7]) | | _____ °F |
| Container ID # | | Temp (°F) (6.[8]/6.[9]) |
| | 68685 | | | | | | | |
| LA00000070503 | 68540 | | | | | | | |
| | 68553 | | | | | | | |
| | 69445 | | | | | | | |
| | 69618 | | | | | | | |
| | 69013 | | | | | | | |
| | LASB50522 | | | | | | | |
| | LASB50452 | | | | | | | |
| | LASB50431 | | | | | | | |
| | LASB50069 | | | | | | | |
| | LASB50073 | | | | | | | |
| | 69636 | | | | | | | |
| | 69616 | | | | | | | |
| | 69417 | | | | | | | |

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ATTACHMENT 3

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6.[6] Date: From _____ to _____

| Container ID # | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Temp (°F) (6.[8]/6.[9]) |
| TA-54-375 Cell 1 (continued) | | | | | | | |
| 69620 | | | | | | | |
| 69520 | | | | | | | |
| 69641 | | | | | | | |
| 69298 | | | | | | | |
| LASB02203 | | | | | | | |
| Ambient Temperature (6.[13]) | _____°F |
| End Time (6.[14]) | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| 6.[14] | Operator: _____ Operator: _____ |

6.[2] Comments:

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6.[6] Date: From _____ to _____

6.[18] Performed by:

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

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Nitrate Salt-Bearing TRU Waste Container Monitoring

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ATTACHMENT 4

Page 1 of 3

TA-54 AREA G TA-54-375 CELL 2 NITRATE SALT TRU WASTE CONTAINER DAILY TEMPERATURE DATA SHEET

6.[6] Date: From _____ to _____

| | Monday 6.[6] Start Time: _____ | Tuesday 6.[6] Start Time: _____ | Wednesday 6.[6] Start Time: _____ | Thursday 6.[6] Start Time: _____ | Friday 6.[6] Start Time: _____ | Saturday 6.[6] Start Time: _____ | Sunday 6.[6] Start Time: _____ |
|--|---|---|---|---|---|---|---|
| TA-54-375 Cell 2 | | | | | | | |
| Calibrated Infrared Thermometer (4.2.1[1][B]) | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ |
| Ambient Temperature (6.[7]) | _____°F |
| Container ID # | Temp (°F) (6.[8]/6.[9]) |
| LASB02198 | | | | | | | |
| 68638 | | | | | | | |
| 69615 | | | | | | | |
| 69635 | | | | | | | |
| 69642 | | | | | | | |
| 69630 | | | | | | | |
| 69633 | | | | | | | |
| 68430 | | | | | | | |
| 68631 | | | | | | | |
| 69634 | | | | | | | |
| 68567 | | | | | | | |
| 94227 | | | | | | | |
| LASB50442 | | | | | | | |
| 69644 | | | | | | | |
| LASB50443 | | | | | | | |
| 69638 | | | | | | | |

Nitrate Salt-Bearing TRU Waste Container Monitoring

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6.[6] Date: From _____ to _____

| Container ID # | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Temp (°F) (6.[8]/6.[9]) |
| TA-54-375 Cell 2 (continued) | | | | | | | |
| 68624 | | | | | | | |
| 68507 | | | | | | | |
| 69568 | | | | | | | |
| 69553 | | | | | | | |
| 69598 | | | | | | | |
| LASB50559 | | | | | | | |
| 69015 | | | | | | | |
| 69639 | | | | | | | |
| 69637 | | | | | | | |
| Ambient Temperature (6.[13]) | _____°F |
| End Time (6.[14]) | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| 6.[14] | Operator: _____ Operator: _____ |

6.[2] Comments:

Nitrate Salt-Bearing TRU Waste Container Monitoring

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UET

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Page 3 of 3

6.[6] Date: From _____ to _____

6.[18] Performed by:

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
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|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

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| SOM or designee (print) | Signature | Z# | Initials | Date |
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Nitrate Salt-Bearing TRU Waste Container Monitoring

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ATTACHMENT 5

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TA-54 AREA G TA-54-375 CELL 3 NITRATE SALT TRU WASTE CONTAINER DAILY TEMPERATURE DATA SHEET

6.[6] Date: From _____ to _____

| | Monday 6.[6] Start Time: _____ | Tuesday 6.[6] Start Time: _____ | Wednesday 6.[6] Start Time: _____ | Thursday 6.[6] Start Time: _____ | Friday 6.[6] Start Time: _____ | Saturday 6.[6] Start Time: _____ | Sunday 6.[6] Start Time: _____ |
|--|---|---|---|---|---|---|---|
| TA-54-375 Cell 3 | | | | | | | |
| Calibrated Infrared Thermometer (4.2.1[1][B]) | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ | Brand: _____ Model: _____ Cal. Due Date: _____ File Number _____ |
| Ambient Temperature (6.[7]) | _____°F |
| Container ID # | Temp (°F) (6.[8]/6.[9]) |
| 69519 | | | | | | | |
| 69645 | | | | | | | |
| 94068 | | | | | | | |
| 93605 | | | | | | | |
| 69548 | | | | | | | |
| 69604 | | | | | | | |
| LASB50529 | | | | | | | |
| LASB50418 | | | | | | | |
| 69036 | | | | | | | |
| LASB50451 | | | | | | | |
| 69559 | | | | | | | |
| LASB50448 | | | | | | | |
| 87823 | | | | | | | |
| 87825 | | | | | | | |
| 87826 | | | | | | | |
| 87827 | | | | | | | |

Nitrate Salt-Bearing TRU Waste Container Monitoring

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 Effective Date: 03/26/15
 Page: 35 of 40

UET

ATTACHMENT 5

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6.[6] Date: From _____ to _____

| Container ID # | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|-------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | Temp (°F) (6.[8]/6.[9]) |
| TA-54-375 Cell 3 (continued) | | | | | | | |
| Ambient Temperature (6.[13]) | _____°F |
| End Time (6.[14]) | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
| 6.[14] | Operator: _____ Operator: _____ |

6.[2] Comments:

Nitrate Salt-Bearing TRU Waste Container Monitoring

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Effective Date: 03/26/15
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6.[18] Performed by:

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

| | | | | |
|------------------|-----------|----|----------|------|
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |
| Operator (print) | Signature | Z# | Initials | Date |

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| SOM or designee (print) | Signature | Z# | Initials | Date |
|-------------------------|-----------|----|----------|------|

ATTACHMENT 7

Page 1 of 1

**TA-54 AREA G REMEDIATED NITRATE SALT
MONTHLY OVERPACK INSPECTION DATA SHEET**

7.[2] Date and time: _____

| Remediated Nitrate Salt Storage Area | (\$ Overpack Closure Visual Inspection (7.[3]) (ESS-14-002, SAC 3) |
|---|---|
| TA-54-375 Cell 1 | <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT |
| TA-54-375 Cell 2 | <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT |
| TA-54-375 Cell 3 | <input type="checkbox"/> SAT <input type="checkbox"/> UNSAT |

Comments: _____

7.[5] Performed by: _____ / _____ / _____ / _____
 Operator (print) Signature Z # Initials Date

9.1[2] Reviewed By: _____ / _____ / _____ / _____
 SOM or designee (print) Signature Z # Initials Date

Attachment 8

EWMO Division Building Emergency Plan (BEP)

Effective Date: 12/10/13

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:

- Emergency Planning and Preparedness
- Operations Center SME
- Engineering
- Facility Operations Director (FOD)
- Fire Protection Engineering
- Industrial Hygiene and Safety
- Operations Managers
- Quality Assurance
- Training
- Radiation Protection
- Shift Operations Managers
- SME WCRRF, RANT, TA-54 SOSs

Responsible Manager, EWMO Facility Operations Director

| | | | |
|-----------------------|----------|-------------------|------------|
| <u>Steve M. Henry</u> | / 219172 | / /s/ Steve Henry | / 12/10/13 |
| Name (print) | Z# | Signature | Date |

Classification Review: N/A Unclassified UCNI Classified _____

| | | | |
|--------------------|----------|-------------------|------------|
| <u>Teri Tingey</u> | / 200975 | / /s/ Teri Tingey | / 12/10/13 |
| Name (print) | Z# | Signature | Date |

Working Copy / Information Only (circle one)
Initials / Date: _____ / _____

EWMO Division Building Emergency Plan (BEP)

Document No.: EP-DIV-BEP-20048

Revision: 1

Effective Date: 12/10/13

Page: 2 of 47

Reference

REVISION HISTORY

| Document No./Revision No. | Issue Date | Action | Description |
|---------------------------|-------------------|----------------|--|
| EP-DIV-BEP-20048, Rev. 0 | December 9, 2013 | New Procedure | <p>This new Division-level building emergency plan supersedes the following facility-level BEPs:</p> <ul style="list-style-type: none"> • EP-DIV-PLAN-10, Radioassay and Nondestructive Testing Facility Emergency Plan • EP-DIV-PLAN-05, Waste Characterization, Reduction, and Repackaging Facility Building Emergency Plan • EP-DIV-PLAN-01, TA-54 Areas G, H, J, L, and Administrative Area Building Emergency Plan • TA-21-PLAN-00008, TA-21 Emergency Plan • EP-DIV-BEP-0102, TA-54 Buildings 1009 and 1014 Building Emergency Plan <p>EP-AREAG-RM-AOP-0421, Security Incident Notifications, EP-WCRR-RM-AOP-0208, Special Shapes, EP-AREAG-RM-ARP-0302, Evacuation Alarm, EP-RANT-RMC-ARP-0303, Evacuation Alarm, EP-AREAG-RM-EOP-0206, Seismic Event, EP-AREAG-RM-EOP-0207, Vehicle Accident, EP-RANT-RMB-EOP-0207, Vehicle Accident, EP-RANT-RMB-EOP-0208, Seismic Event, EP-RANT-RM-EOP-0206, Injured Person with Contamination, EP-WCRR-RM-EOP-0304, Security Threat, EP-WCRR-RM-EOP-0308, Seismic Event, EP-WCRR-RM-EOP-0309, Injured Person at WCRRF. This procedure also supersedes EP-DIV-AP-20045, EWMO Abnormal Event Notification Process. EP-DIV-AP-20045 requirements were incorporated into EWMO Response procedure and references LANL Site Requirements. Nuclear Environmental Site (NES) are also included in the BEP. No hazardous analysis was required; this is considered and administrative procedure.</p> |
| EP-DIV-BEP-20048, Rev. 1 | December 10, 2013 | Minor Revision | <p>Revise procedure to remove the OOU designation in accordance with SAFE-1. This revision does not introduce any new hazards.</p> |

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1. PURPOSE

The Environmental and Waste Management Operations (EWMO) Division Building Emergency Plan (BEP) captures the Site Emergency Management and Response program requirements from Los Alamos National Laboratory (LANL) procedure P1201-4, Emergency Procedures and Protective Actions and P315, Conduct of Operations Manual. In addition, the EWMO BEP identifies area-specific response requirements for (1) Technical Area (TA)-50-69 Waste Characterization, Reduction, and Repackaging Facility (WCRRF) complex, (2) TA-54 Area G, H, J, L and TA-54 Administrative areas, (3) TA-54 Radioassay and Nondestructive Testing (RANT) Building 54-38 complex, (4) TA-21, and (5) Nuclear Environmental Sites (NES).

2. SCOPE

The EWMO BEP requirements apply to all personnel, subcontractors, tenants, and visitors entering the TA-54, RANT, WCRRF complex, TA-21, and NES.

Building residents who are assigned and qualified for escorting visitors assume the responsibility for ensuring that visitors possess the appropriate level of area-specific information (e.g., rules, regulations, exits, evacuation routes, assembly/muster areas, area specific alarms, and response procedures) necessary to respond appropriately in the event of an off-normal or emergency situation that may arise. Management has the overall responsibility for personnel accountability during an off-normal/emergency event.

The EWMO Division BEP will be reviewed on an annual basis and updated as necessary for changes that alter the scope of this document, corrections based on internal and audit findings, emergency drill and exercise lessons learned external changes in governing standards and references, and changes to facility operations and associated hazards.

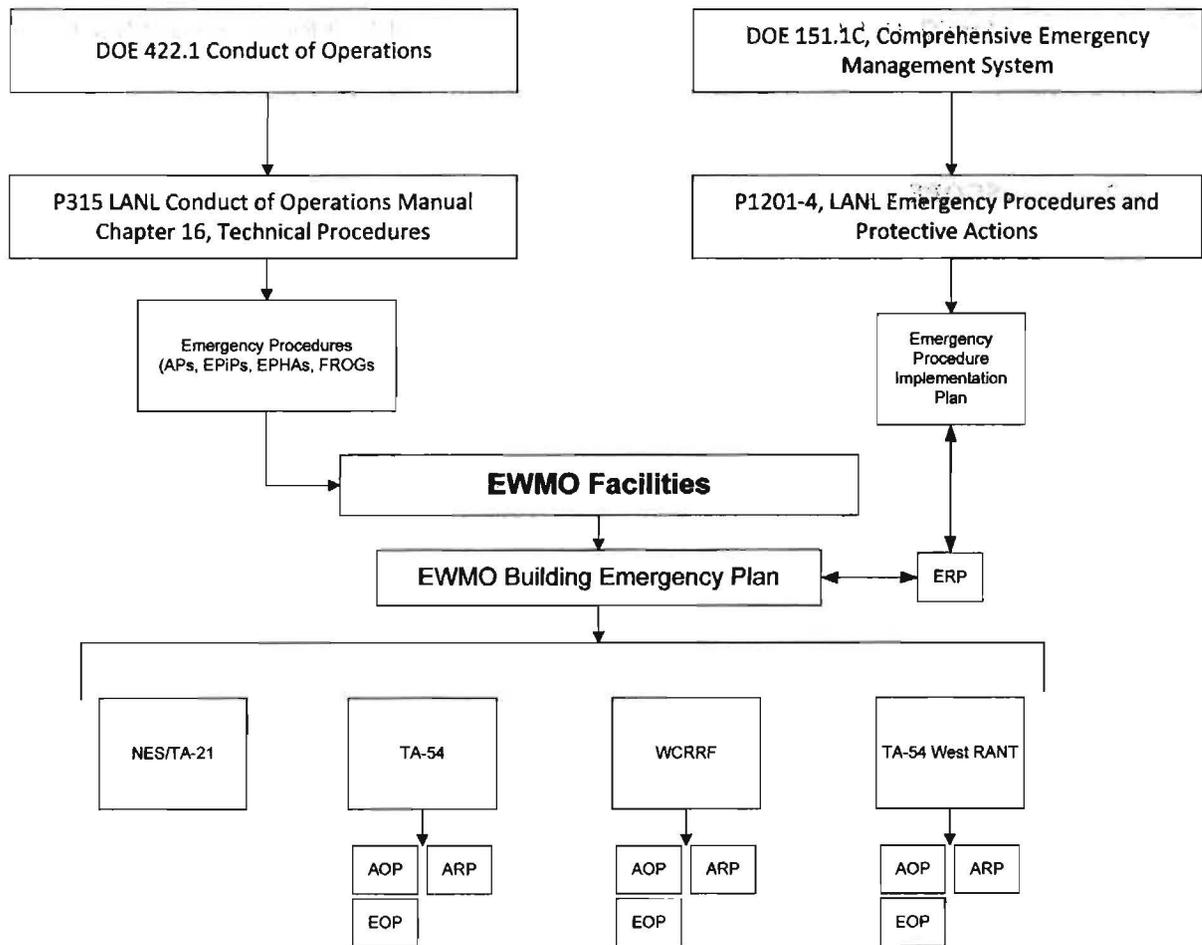
3. OVERVIEW

The EWMO Division BEP plays a key role in the successful implementation of the Site Emergency Management and Response program, Conduct of Operations, and area-specific response procedures for TA-54, WCRRF, RANT, TA-21 and NES. This plan also defines roles and responsibilities that are necessary to ensure that the chain of command is established and to ensure that employees respond correctly and consistently in a safe and timely manner when off-normal/emergency situations arise. Section 5, BEP Requirements, provides the requirements, roles, protective equipment, and standardized responses (i.e., Notification, Off-Normal, and Emergency) for employees working in EWMO facilities. Sections 6 through 10 provide building/area-specific requirements for WCRRF, TA-54, RANT, TA-21 and NES.

3. OVERVIEW (continued)

Figure 1, Emergency Management Process Requirements Flow-down illustrates the requirements derived from Department of Energy to LANL and into the EWMO BEP.

FIGURE 1, EMERGENCY MANAGEMENT PROCESS REQUIREMENTS FLOW-DOWN



4. RESPONSIBILITIES

4.1 First Responder at the Awareness Level

The first responder at the awareness level has the following responsibilities (i.e., first person at the scene of an off-normal/emergency event):

- Stops or suspends work
- Activates the appropriate alarm (i.e., fire, evacuation), as necessary
- Warns others in the immediate area of the off-normal/emergency event
- Secures the incident area to prevent others from entering
- Makes notifications to the Operation Centers, Emergency Operations and Support Center (EOSC) 7-6211, and/or 911 as appropriate

4.2 Shift Operations Manager/Facility Lead (SOM/FL)

NOTE *In EWMO facilities, the Shift Operations Manager (SOM) is the Facility Operations Director (FOD) designee in the field and assumes responsibilities as the Facility Leader (FL). The SOM/FL assumes the role of the FOD in the field. However, an Operations Manager (OM) may also conduct FL duties as long as the OM is trained, qualified, and knowledgeable of the area operations.*

The SOM/FL is the person in charge of the facility during an off-normal/emergency event and/or up until transfer to the Incident Commander (IC).

The SOM/FL has the following responsibilities:

- Coordinates with the Assembly/Muster Area Leader for personnel accountability, condition, and locations
- Ensures that 911 or EOSC 7-6211 has been called as necessary
- Updates the OM/designee of the situation
- Evaluates the event and potential hazards and determines whether additional evacuations are necessary
- Works with support personnel to mitigate the event within the EWMO facility

4.2 Shift Operations Manager/Facility Lead (SOM/FL) (continued)

- Available on-call outside normal working hours including nights, weekends, and holidays when assigned
- Determines appropriate actions for mitigation and notifications during an off-normal event
- Ensures appropriate actions are completed to protect the safety of workers, facility, equipment, records, and the environment
- Authorizes elevation of an off-normal event to an emergency event as necessary
- Makes notifications in accordance with respective response procedure
- Ensures that employees who may need special assistance are identified, and designates personnel to assist these employees
- Ensures accountability of all personnel
- Evaluates the potential hazards and determines the protective actions
- Briefs emergency responders and management personnel during an emergency
- Assists the IC in recovery and reentry efforts
- Transfers command and control to the IC and notifies Operations Center personnel when command and control is transferred

4.3 Incident Commander

Incident Commander is the formal title for the individual who is designated as the person in charge of an emergency response for the Site. This person will be a member of a designated emergency response organization and have completed formal training in emergency management and incident command.

NOTE *The IC will be from one of the formally designated and trained emergency response organizations from the Emergency Operations and Emergency Management (EO-EM), Los Alamos Fire Department (LAFD), SOC, or in unusual cases, from the Federal Bureau of Investigation (FBI) or other Federal agency, and will formally declare that he/she has assumed the IC role.*

- Manages the emergency event until mitigated or transferred back to the SOM/FL
- Authority to call out other response personnel and additional resources
- Assumes the role of IC during an emergency event

4.4 Shift Operations Supervisor

- Assists the SOM/FL to determine appropriate actions for mitigation and notifications during off-normal events
- Serves as a resource for the FL/IC and offsite responders during off-normal/emergency events
- Ensures that actions are initiated to protect the safety of site workers, programmatic equipment, records, and the environment
- Ensures that employees who require special assistance during an emergency are supported

4.5 Operations Center Operator

- Notifies personnel through various communication systems (e.g., E-pagers, public address system, land-line, two-way radio, cell phone, and face to face) on initial off-normal/emergency activities at WCRRF, TA-54, and TA-54 West RANT.
- Notifies adjacent facilities of off-normal/emergency events as applicable
- Facilitates command and control functions under the direction of the SOM/FL until turned over to the IC
- Records and logs initial and ongoing notifications in accordance with this plan
- Acts as a liaison between SOM/FL, IC, and the workers
- Coordinates accounting of personnel at the Assembly/Muster areas
- Assists in directing emergency response personnel and equipment to emergency site/areas
- Monitors the two-way radio base station and the Site Wide Alert Notification System (SWANS) radio
- Maintains a written log of off-normal and/or emergency events in the Operations Center log book
- Ensures that the SWANS radio is operational
- Develops and maintains the Emergency Contact List at the respective Operations Center (Appendices 3, 5, and 8)

4.6 Support Personnel (Environment, Safety, and Health)

The support personnel receive notification from the Operations Center and/or SOM/FL when an off-normal/emergency event arises as necessary.

- Acts a subject matter in their field of expertise (e.g., Industrial Hygiene/Safety) during off-normal/emergency events
- Supports IC or SOM/FL in developing remedial and recovery plans

4.7 Assembly/Muster Area Leader

- Assumes command of Assembly/Muster area
- Collects and gathers information from personnel who were at the incident site
- Liaison between Operations Center and personnel
- Initiates the accountability of personnel
- Makes notification to the respective Operations Center
- Ensures that personnel who may be radiologically contaminated are segregated from the general population
- Delegates tasks as necessary to employees at the Assembly/Muster area during an emergency event
- Directs vehicle traffic on roadways to ensure emergency response vehicles have an open route to the event area as necessary

4.8 Facility Resident

- Notifies Operations Center of off-normal/emergency events
- Notifies EOSC 7-6211 and/or 911 for emergency events
- Responds to off-normal/emergency events in accordance with the requirements of this plan and the facility-specific off-normal/emergency response procedures
- Performs assigned duties from Assembly/Muster Area Leader
- Performs escort responsibilities if assigned

4.9 Visitor

- Responds to alarms and notifications in the event of an off-normal/emergency event
- Stays with their designated escort during off-normal/emergency events

5. BEP REQUIREMENTS

5.1 Site Events

The Laboratory has identified several abnormal/emergency events (e.g., chemical, biological, radiological, fire, security, weather, vehicular accident, and personnel injury) that may affect the general laboratory population, the public, and the environment. These events and their responses are captured in LANL policies and procedures Table 1, General Site Events and References.

NOTE *Unless otherwise recommended or directed by EWMO management, the events listed in Table 2 below provide specific events and the associated reference that contains the response actions.*

TABLE 1, GENERAL SITE EVENTS AND REFERENCES

| | |
|------------------------------------|---|
| Bomb threat | P1201-4, LANL Emergency Procedures and Protective Actions |
| COOP | P1201-4 |
| Fire, Smoke and Explosion | P1201-4 |
| Flood | P1201-4 |
| Hazardous Substance/Chemical Spill | P1201-4 |
| Lightning | P1201-4 |
| Power Outage | P1201-4 |
| Security Concern | P1201-4 |
| Seismic Event (Earthquake) | P1201-4 |
| SIP/Stay Put | P1201-4 |
| Snow and Ice | P1201-4 |
| Suspicious/Unattended Packages | P1201-4 |
| Unexploded Ordnance | P1201-4 |
| Vehicle Accidents | P101-7, Vehicles and Pedestrian Safety |
| Work Related Injury, Illness | P102-2, Occupational Medicine |
| Workplace Violence | P724, Workplace Violence |

5.2 Facility Specific Procedures

TA-54 and WCRRF Operations Centers maintain controlled copies of the facility-specific response procedures that apply to TA-54, WCRRF, and RANT. Four types of response procedures are used in accordance with P315, Conduct of Operations Manual, Section 16, Technical Procedures.

5.2.1 Abnormal Operating Procedure (AOP)

AOPs provide instructions for responding to events that affect several systems, threaten the safety envelope, or require action to mitigate damage.

5.2.2 Alarm Response Procedure (ARP)

ARPs direct the response of personnel to visible and audible alarms.

5.2.3 Emergency Operating Procedure (EOP)

EOPs provide instructions for responding to events that result in operation outside the safety envelope.

5.2.4 Emergency Response Procedure (ERP)

ERPs provide instructions for responding to an emergency in progress. ERPs include steps or reference other procedures that define the response to additional casualties that could result from the initial event.

5.3 Response Actions

EWMO has developed the following three worker response actions.

5.3.1 Notification Response

The notification response is a notification by the worker of an upset condition. Notification response does not require immediately exiting or evacuating. Once the worker has completed the notification response steps, the SOM/FL and/or support team will provide guidance and protective measures for the worker via the applicable Operations Center.

The notification response action is as follows;

1. **MAKE** Notifications (i.e., Operations Center).
2. **WARN** others.
3. **WAIT** for directions and guidance from the Operations Center and FL/IC.

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Reference

5.3.1 Notification Response (continued)

The following events have been categorized as requiring a Notification Response:

| TA-54 Area G | RANT | WCRRF |
|---|---|---|
| <ul style="list-style-type: none"> • Loss of Electronic Badge Reader • 231 Permacon HVAC LOW Cell D/P • 375 Permacon HVAC LOW Cell D/P • Fire Department Manning Less than 50 Percent | <ul style="list-style-type: none"> • Loss of Electronic Badge Reader • Fire Department Manning Less than 50 Percent | <ul style="list-style-type: none"> • Loss of Electronic Badge Reader • Fire Department Manning Less than 50 Percent • WCRRF Loss of Confinement Ventilation System (CVS) • WCRRF Glovebox Fire Suppression Inadvertent Initiation • WCRRF WCG High Pressure Alarms • WCRRF Confinement Ventilation System (CVS) Low Flow Alarms • WCRRF Confinement Ventilation System (CVS) Room 102 High Pressure Alarms • WCRRF CVS HEPA Filter Alarms • WCRRF Confinement Ventilation System (CVS) GBE High Pressure Alarms • WCRRF TE/TI-001 and 002 Low Temperature Alarms • WCRRF Confinement Ventilation System HVA Low Flow Alarm |

5.3.2 Off-Normal Response

An off-normal response is an action taken by the worker in a timely manner to ensure they back away from the immediate area (e.g., out of harm’s way) until the event can be evaluated and appropriate actions taken to mitigate the situation to prevent it from elevating to an emergency.

The off-normal response steps are:

1. **SUSPEND** work.
2. **WARN** others.
3. **ISOLATE** the immediate area.
4. **MOVE-AWAY** upwind from the area of concern
5. **MAKE** Notifications (e.g., Operations Center and SOS).

Once the worker has performed the off-normal response steps listed above, there are no further actions taken by the worker to mitigate the incident at this time. The SOM/FL and the support team will provide guidance and protective measures to the workers via the applicable Operations Center.

The following list below provides events that have been categorized as response procedures requiring an off-normal response:

| TA-54 Area G | RANT | WCRRF |
|---|---|---|
| <ul style="list-style-type: none"> • Discovery of an Airborne, Liquid or Solid Material Release or Spill • Unplanned Loss of Electrical Power • Waste Container • Questionable Integrity • CSLA Non-Compliance | <ul style="list-style-type: none"> • Discovery of an Airborne, Liquid or Solid Material Release or Spill • Unplanned Loss of Electrical Power • Waste Container • Questionable Integrity • CSLA Non-Compliance | <ul style="list-style-type: none"> • Discovery of an Airborne, Liquid or Solid Material Release or Spill • Loss of Glovebox Integrity • Unplanned Loss of Electrical Power • Waste Container • Questionable Integrity • CSLA Non-Compliance |

5.3.3 Emergency Response

Emergency response actions taken by the operator in the event of an emergency to ensure personnel safety and prompt notification to management and/or Emergency Management. There are no actions taken by the worker to attempt to mitigate the event. Once the worker has performed the emergency response steps listed below, the EOSC, 911, SOM/FL, and the support team will provide guidance and protective measures to the workers via the applicable Operations Center.

The emergency response activities are as follows:

1. **SUSPEND** work.
2. **WARN** others.
3. **ISOLATE** immediate area.
4. **EVACUATE** to an upwind Assembly/Muster area from the incident.
5. **MAKE** Notifications (e.g., SOS, OC, EOSC, 911).

| TA-54 Area G | RANT | WCRRF |
|--|--|--|
| <ul style="list-style-type: none"> • EWMO Area Emergency Response | <ul style="list-style-type: none"> • EWMO Area Emergency Response | <ul style="list-style-type: none"> • EWMO Area Emergency Response |

5.4 **Operations Center Response Protocol**

Upon entering the abnormal or emergency response procedure (i.e., AOP, EOP, or ERP) the SOM will designate roles and responsibilities (record keeping, log keeping, phones, communications systems) to members of the Operations Center as necessary. The SOM's primary duty during an off-normal/emergency event is to act as the facility leader and overall controller of activities and operations in order to maintain attention to the incident. The response procedure is used to document all event activities (e.g. times, dates, actions) and is a quality record. The OCO logbook is the official logbook that requires documenting the entry into, and exit from, the response procedure and other important non-incident specific information. The SOS and SOM are not required to keep logs during the incident. When a facility enters an ARP, the Operations Center will be notified, but other activities at the facilities will continue normal operations, including the Operations Center, unless deemed otherwise by the SOM.

5.5 Responsibilities Assembly/Muster Areas

Assembly/Muster areas are designated areas for workers and visitors to gather in the event of an emergency or as directed by the SOM/FL.

The Assembly/Muster areas are identified by a large yellow metal box and an orange and white striped wind sock on a pole. Assembly/Muster areas maps for WCRRF, TA-54, RANT, and TA-21 are illustrated in the appendices of this procedure. Assembling/Mustering to a secondary location after initial evacuation if necessary is directed by the Operations Center/SOM/FL and/or the IC.

NOTE *Assembly/Muster area equipment and supplies are inspected weekly in accordance with EP-DIV-DOP-0102, EWMO RCRA Inspections.*

Assembly/Muster areas contain at a minimum the following equipment and supplies for use during off-normal/emergency events:

- A clipboard with roll-call checklists and two-way radio instructions (shown in Appendix 2)
- A copy of the Division Building Emergency Plan
- Assembly/Muster area lead vest (blue)
- Assembly/Muster Area Leader Checklist (instructions for Assembly/Muster Area Leader)
- First aid kit
- Grease pens and pencils
- Instruction card and "Gone to Assembly/Muster area #" card
- Two-way radio
- Wind sock
- Orange vest (for personnel performing traffic control)

The first person to arrive at the Assembly/Muster area during an emergency who is knowledgeable and willing to perform the duties assigned, acts as the Assembly/Muster Area Leader. A checklist is available at each Assembly/Muster area that provides actions to be performed by the Assembly/Muster Area Leader.

5.6 Accountability

Each worker has the primary responsibility to report to the Assembly/Muster Area Leader for accountability.

In EWMO organizations, there are three methods for obtaining personnel accountability during an off-normal/emergency event:

- Badge reader
- Sweep process
- Sign-in sheets at Assembly/Muster areas

The electronic badge reader system records and tracks personnel who enter and exit TA-54 Area G, TA-54 Area L, RANT, and WCRRF. If a situation arises where personnel accountability is required, the applicable Operations Center can generate a personnel accountability report from the badge reader system which provides a list of personnel currently logged into a specific area (e.g., TA-54 G, L, RANT, and WCRRF).

The sweep process is used primarily in administration areas and other areas that do not possess an electronic accountability system. When personnel are required to evacuate, each person will perform a visual sweep and verbal communications (e.g., is anyone here? the area is being evacuated) for personnel in the exit route out of the building. The last person to egress the facility will provide personnel accountability information to the Assembly/Muster Area Leader. Once employees assemble at the Assembly/Muster areas, they will complete a sign-in sheet/roster to document their location.

In all three methods, personnel not accounted for will be communicated to the FL/IC.

5.7 Protective Actions**5.7.1 Shelter-In-Place (SIP)**

SIP means to make a shelter where workers are currently located. It is a method to protect occupants until help arrives or otherwise directed by Operations Center and FL. This type of sheltering is for hazardous material events (chemical, biological, radiological). Taking cover in any building will provide some shelter, and is safer than staying outside and potentially receiving a greater exposure to the hazard. Personnel are instructed to remain inside and follow instructions from the SOM/FL or IC. SIP is a temporary protective action and is short-term (1 to 3 hours) until the hazardous situation has passed, and the "All Clear" has been announced. The SOM/FL or IC will make the decision to SIP. Notifications will be communicated via one or more of the following: Public Address system, two-way radio, e-pagers, cell phones, and/or face to face.

General guidelines to SIP include:

- If a SIP kit is not available: assign workers to shut all windows (if any), doors, and assemble in a location away from windows and doors (hallway) for SIP
- Turn building thermostats off to stop outside airflow into building
- Conduct accountability and report results to respective Operations Center/FL/SOM
- Remain in shelter location until the Operations Center/FL/SOM informs personnel it is safe and the sheltering order has been lifted

5.7.2 Stay-Put

The type of sheltering utilized most often by the LANL population is Stay-Put sheltering. Stay-Put sheltering is the protective action used during non-hazardous material events (terrorism event, inclement weather, wild fire). This protective action calls for personnel to move or remain indoors due to an event that may place personnel in harms way outside. Examples of these events are wild land fire, a terrorism event, or inclement weather. The SOM/FL or IC will make the decision to Stay-Put.

Recommended actions to Stay-Put include:

- Stay inside
- Notify building personnel and visitors of the protective action and information about the event (if provided)
- Contact the applicable Operations Center and provide personnel status and accountability

5.7.3 Lightning

If lightning is sighted, employees **SHALL** use the 30/30 rule:

- Seek shelter if lightning is within 6 miles (flash to bang count is 30)
- Move away from any metal objects and grounding system components
- Do not remain upright in an open area or seek shelter near tall, upright objects (trees), take cover in a vehicle or building
- Shelter for at least 30 minutes after the last lightning strike within 6 miles

5.8 Chain of Command Process

The chain of command is the process that identifies positions, roles, and responsibilities for those individuals who are designated and authorized as the person-in-charge during an off-normal/emergency event.

The FL (e.g., SOM, OM) directs the initial command and control during an Off-normal/emergency event. The SOM/FL is a person who possesses the experience and knowledge associated with the area to lead the facility management and workers in an off-normal/emergency response and/or until relieved by the Site IC. An IC will be a designated Emergency Management person who responds as the individual authorized by the institution with the authority and responsibility for command and control at the incident scene.

When the responsibility for command and control is transferred to the IC, the SOM/FL remains available to the IC for area-specific technical support and assistance. A formal transfer of duty from the SOM/FL to the IC is required in a timely manner. Transferring command and control back to the SOM/FL is also a formal process. The level of formality is based upon the severity level of the event.

EWMO utilizes the Operations Center model at WCRRF and TA-54 as part of the EWMO organizational structure which acts as a liaison between LTP management, Facility Lead, IC, Emergency Operations and Emergency Management (EO-EM), and the workers. The TA-54 and WCRRF Operations Centers are staffed during normal operations. The notification process for off-normal hours is performed through the EWMO on-call list and Emergency Operations and Support Center (EOSC) 7-6211.

5.8 Chain of Command Process (continued)

Figure 2, Chain of Command Model

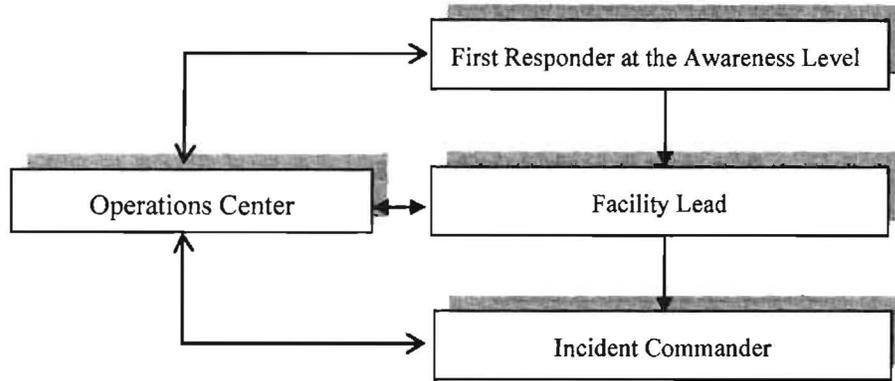
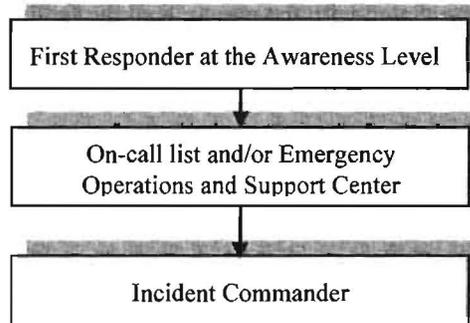


Figure 3, Chain of Command Model Off-Hours



5.9 EWMO Communication Equipment and Warning Systems

EWMO maintains a variety of communication equipment and warning systems to effectively communicate with personnel and emergency responders when off-normal/emergency situations arise.

Cell Phones – Cell phones may be used for notifying the applicable Operations Center, EOSC 7-6211, and 911. Cell phones may also be set-up to receive emergency text messages the same as E-Pagers. If cell phones are used to contact 911, callers must communicate their location and the location of the event. Cell phones are a primary means of communication during an off-normal/emergency event.

Conventional Telephones – Conventional telephones may be used to notify the Operations Center, EOSC, and 911 in the event of an off-normal/emergency event.

5.9 EWMO Communication Equipment and Warning Systems (continued)

Continuous Air Monitor (CAM) – CAMs are used in areas that require continuous air monitoring for radiological airborne contamination. If radiological airborne contamination reaches the pre-determined level, the CAM will produce an audible and visual alarm warning personnel that radiological airborne contamination is present thus requiring personnel not wearing respiratory protection to exit the area and follow the instructions of a supporting Radiological Control Technician (RCT).

E-Pagers – E-pagers are electronic devices set-up to receive text messages from a variety of sources (e.g., LANL phone book, LAN line, EOSC) for the purposes of communicating general information to employees. E-Pagers are limited to 140 characters. E-pagers can also be set-up to receive broadcast emergency messages from Operations Center and LANL.

Evacuation Alarm – The evacuation alarm provides an audible alarm that can be heard throughout the area to alert workers to evacuate to the nearest upwind Assembly/Muster areas. An evacuation alarm system is available at TA-54 Area G, L, and the Administrative area, and an additional independent system for the RANT complex. The evacuation alarm can be activated from several locations as illustrated on Appendix 7, TA-54 Area G Evacuation Alarm Button Locations, and Appendix 10, RANT Evacuation Alarm Button Locations. Any worker who determines an emergency situation that endangers all workers in the area can activate the evacuation alarm. The evacuation alarm is a local alarm, and is not connected to Central Alarm Systems (CAS).

Fire Alarms – Fire alarm systems and warning devices are engineered for facilities and a structure’s specific needs (e.g., sprinkler head, heat sensors, and manual pull station). Fire alarms emit an audible long whooping tone that warns personnel in the immediate area to evacuate to the nearest upwind Assembly/Muster area and the alarm transmits and signals to CAS. See Sections 6, 7, and 8 for area-specific fire system information.

Conventional Phones – Land lines can be used for communicating off-normal and emergency information to the Operations Center, EOSC, and 911.

PA System – Public address systems are installed in the TA-54 and RANT facilities to provide a means for broadcasting audio communication to employees for off-normal/emergency events. Use of the PA for non-emergency announcements SHALL require approval from the Operations Center and the SOM.

5.9 EWMO Communication Equipment and Warning Systems (continued)

Two-Way Radios – Two-way radios are another method to communicate between Assembly/Muster areas, SOS, Operations Center, SOM/FL and EOSC. Each Assembly/Muster area is equipped with a two-way radio.

Site Wide Area Notification System (SWANS) Radio – The SWANS Radio is a LANL-wide emergency radio system designed primarily as a back-up communication system in the event normal communication systems are diminished or unavailable. SWANS radios are monitored in the Operations Center. Instructions for proper testing and operation are listed in Appendix 2, Site Wide Area Notification System (SWANS).

Wind Sock – Wind socks are placed strategically placed throughout LANL site to provide a visual means for employees to determine the wind direction. There are two different colors schemes. Wind socks that are solid orange are placed throughout the site in areas that are populated with workers that would require a reference point to determine wind direction. Wind socks that are orange with white strips denote the location of an Assembly/Muster area. Wind socks are especially important when an abnormal/emergency event occurs which requires employees to quickly determine wind direction for the purposes of staying upwind from the event to prevent unnecessary exposure to potential hazardous materials.

5.10 Support Personnel

Support personnel are subject matter experts (SMEs) in their field who assist the SOM/FL or IC during an off-normal/emergency event as necessary.

The following personnel groups may support the FL/IC in an off-normal/emergency event:

- Industrial Safety and Hygiene
- Radiological Protection

Additional organizations that may provide assistance:

- Criticality Safety Officer
- Criticality Safety Engineer
- Emergency Management
- Engineering
- Environmental
- Hazardous Waste
- Maintenance
- On-Site Transportation
- Operations Manager
- Security
- Utilities
- Waste Coordinator

5.11 Emergency Access Control

During an emergency, saving life **SHALL** take precedence. Emergency personnel **SHALL** be allowed to enter the area without delay. Personnel **SHALL not** leave the incident area unless directed to do so by the IC.

5.12 Adjacent Facilities

Off-normal/emergency events have the potential to impact adjacent facilities (e.g., response vehicles, road closures). Notification to adjacent facilities will normally be accomplished by the Operations Center, SOM/FL and/or the EOSC.

5.13 EWMO Abnormal Event Notification Process

The first communication is defined as Initial Notification. During an off-normal/emergency event, the initial notification from the first responder (awareness) to the respective Operations Center and/or 911 initiates the process. The Operations Center will in turn notify the Shift Operations Manager.

The SOM/FL is responsible for notifying the Operations Manager who in turn will at a minimum notify the FOD, ES&H Manager, and the Project Manager as necessary.

Communications up the chain of command are required in accordance with P322-3 and with directorate-level reporting requirements as described in SOP-5228, ADEP Reporting Requirements for Abnormal Events.

5.14 Recovery Plan

The recovery plan is a process to determine actions required to return the facility/area to normal operations. The Recovery Manager will develop the requirements for resuming normal operations. A graded approach to the level of formality should be applied based upon the type of event/incident and hazards involved; extent of damage to facility, equipment, and environment; cause of the emergency/event; and actions required to prevent a re-occurrence. For an off-normal event, the SOM/FL has the authorization to return operations to normal. If the event is considered an emergency event, reentry and return to normal operation **SHALL** be at the discretion of the IC.

5.14 Recovery Plan (continued)

If the Duty Emergency Manager has categorized the emergency as an Operational Emergency, reentry and return to normal operations will be at the discretion of the Emergency Director at the EOSC. The FOD will generally be appointed as the Recovery Manager for returning the facility to normal operations.

When an emergency is over, then the IC will declare that the emergency has ended and direct that the “All Clear” be announced.

- Only the IC may declare an emergency is over
- Each Assembly/Muster area may be released individually
- Some Assembly/Muster areas may be released prior to others if the hazards are localized
- Assembly/Muster area **SHALL** be released only if the release will not endanger personnel or present problems for mitigating the situation

Each event will be evaluated independently for reentry and return to normal operation. Under no circumstances are personnel authorized to reenter the affected area, in an emergency unless given the “All Clear” by the IC.

An off-normal/emergency event **SHALL not** be considered over when an alarm is silenced or acknowledged.

6. WCRRF SPECIFIC REQUIREMENTS

The WCRRF Operations Center is the access control point for entry to WCRRF Building TA-50-69 and WCRRF 50-69 yard.

Assembly/Muster Areas

The Assembly/Muster areas are illustrated on Appendix 4, WCRRF Assembly/Muster Area Locations.

Fire Alarms – WCRRF Building TA-50-69 is equipped with automatic fire suppression and manual pull stations to notify personnel of a fire. The automatic and manual stations are connected to the Digital Alarm Communication System (DACS) which in turn will communicate the alarm with the Central Alarm Station (CAS). There is one DACS panel for Building TA-50-69: Fire Alarm Control Panel DACS 1522 (-1).

Fire alarm manual pull stations are distinctive red metal boxes mounted on walls inside Building TA-50-69. In the event of a fire or explosion, personnel should activate the manual fire alarm pull stations and call 911 and the WCRRF Operations Center at 665-2797, or the Maintenance on Call (MOC) pager 500-6965 (after hours). When an automatic or manual fire manual pull station is activated at WCRRF, the LAFD is automatically notified of the location. The WCRRF Operations Center will notify personnel of the situation using one or more of the communication systems (Public address, two-way radio, e-pagers, cell phones, and/or face to face).

Additional requirements when an off-normal or emergency event occurs:

- If wearing a respirator, do not attempt to remove the respirator until given direction by a RCT.
- If working with classified or sensitive material, and the area is established as a Temporary Limited Area, and if safe to do so, cover up the material prior to exiting the facility, and inform the Assembly/Muster Area Lead and Supervisor of the situation.
- When working in a facility/structure that is designed with a Confinement Ventilation System (e.g., TA-50-69) for the purpose of maintaining a negative differential pressure, employees **SHALL** ensure that one set of personnel airlocks remains closed upon exiting
- If working in a radiological controlled area during an off-normal event, follow the instructions of an RCT.
- During an emergency event, all personnel who may be potentially contaminated should not commingle with other personnel at the Assembly/Muster area prior to being surveyed by an RCT.

7. TA-54 SPECIFIC REQUIREMENTS

TA-54 consists of the TA-54 Administrative Area, and Areas G, H, J, and L. RANT complex is known as TA-54 West RANT and is described in Section 8, RANT Specific Requirements.

The TA-54 Operations Center is the access point for Area G is located at the entrance of the TA-54 Area G Controlled Area TA-54-315, Room 105). The Operations Center is staffed during day shift (0700) to 1730 hours). The Operations Center may be staffed to support after-hour activities as determined by management. The TA-54 Operations Center maintains a phone number for regular business activities at extension 665-2735. When notifying the TA-54 Operations Center of an abnormal/emergency event the following number **665-1288 SHALL** be used. The Operations Center will ensure this phone number receives priority over all other calls.

TA-54 maintains a database of the hazardous constituents contained within the waste at TA-54 Area G. The database is accessible from the Waste Services group and the Information Management group. Emergency Planning and Preparedness maintains Building Run Sheets that contain limited information on hazardous material inventories for the FL/IC and emergency responders.

The fire alarms are zoned into five areas, which operate independently.

TABLE 2, DACS IN TA-54

| | |
|--|--|
| Zone 1, Fire Alarm Control Panel DACS 6148(-1) (located in 54-48) | Structures 54-48, 54-229, 54-230, 54-231, 54-232, 54-289 |
| Zone 2, Fire Alarm Control Panel DACS 6146(-1) (located in 54-412) | Structure 54-412 |
| Zone 3, Fire Alarm Control Panel DACS 6149(-1) (located in 54-11) | Structures 54-2, 54-11, 54-33, 54-49, 54-153, 54-224, 54-273, 54-283, 54-287, 54-302, 54-321, 54-322, 54-323, 54-375, 54-491, 54-1027, 54-1028, 54-1030, 54-1041, |
| Zone 4, Fire Alarm Control Panel DACS 6147(-1) (located in 54-51) | Structures 215 (Area L), Admin. Bldgs: 54-22, 54-37, 54-51, 54-60, 54-64, 54-244, 54-245, 54-246, 54-247, 54-290, 54-434, 54-1050, |
| Zone 5, Fire Alarm Control Panel DACS 6144 (-1), Structure 54-38 | Structures 54-38 |

7. TA-54 SPECIFIC REQUIREMENTS (continued)

Building 54-532 and 54-533 do not have fire alarms. Areas J and H do not possess automated fire alarms systems.

Additional TA-54 requirements during an off-normal or emergency event

- If wearing a respirator, do not attempt to remove the respirator until given direction by the RCT.
- The location of the safe zone may vary depending on whether the event is inside or outside the facility.
- If working in a radiological controlled area during an off-normal event, follow the instructions of an RCT.
- During an emergency event, all personnel who may be potentially contaminated should not commingle with other personnel at the Assembly/Muster area prior to being surveyed by a RCT.
- If working with classified or sensitive material, and the area is established as a Temporary Limited Area, and if safe to do so, cover up the material prior to exiting the facility, and/or inform the Assembly/Muster Area Lead of the situation.
- When working in a facility/structure that is designed as a contamination control enclosure (e.g., TA-54-412 Tent, TA-54-231 PermaCon, and TA-54-375 PermaCon), employees **SHALL** ensure that all doors to the contamination control enclosure remain closed upon exiting.

TA-54 is divided into eight response zones that correspond to locations where the fire alarm was initiated or activated (see Appendix 6). Emergency response zones were developed because of the size of the work areas at TA-54, thus allowing the worker to exit to the nearest upwind Assembly/Muster Area and to provide pertinent information to the TA-54 Operations Center for the zone in which the alarm was activated.

| | |
|---|--------------|
| Area G Controlled Area | Zones I – IV |
| Domes | |
| Buildings | |
| Structures | |
| Area G Operations Center | Zone IV |
| Main Administrative Area | Zone V |
| Area L Storage Yard | Zone V |
| Building 54-532 and 54-533 | Zone VI |
| Area between Area J and Building 54-533 | Zone VI |
| Area J and Area H | Zone VII |
| Radioassay and Nondestructive Testing Facility (RANT) | Zone VIII |
| Other Alarms – TA-54 Area G maintains additional alarms (such as Tritium, O2, low flow) in certain areas that warn personnel in the immediate vicinity. | |

8. RANT SPECIFIC REQUIREMENTS

RANT is equipped with an Evacuation Alarm system that may be activated from several strategic locations in the RANT facility for the purpose of alerting all employees to evacuate to the nearest upwind Assembly/Muster area (see Appendix 9, RANT Assembly/Muster Area Locations). This alarm is not connected to the CAS.

Additional requirements at RANT during an off-normal or emergency event:

- Workers in a facility/structure that is designed with ventilation (e.g., TA-54-38) for the purpose of personnel comfort (heating, cooling) **SHALL** ensure that exterior doors of the facility are closed upon exiting during an off-normal event.
- Alarms are considered actual unless notified by TA-54 Operations Center or Facility Lead.
- Personnel who are trained and qualified to use fire extinguishers may attempt to mitigate small incipient fires.
- If working in a radiological controlled area during an off-normal event, follow the instructions of an RCT.
- During an emergency event, all personnel who may be potentially contaminated should not commingle with other personnel at the Assembly/Muster area prior to being surveyed by an RCT.

Fire Alarm System – RANT Building TA-54-38 is equipped with automatic fire suppression and manual pull stations in the event a fire develops. The automatic and manual stations are connected to Digital Alarm Communication System (DACS) which in turn will communicate the alarm with Central Alarm Station (CAS). There is one DACS panel for Bldg. TA-54-38: Fire Alarm Control Panel DACS 6144 (-1).

Fire alarm manual pull stations are distinctive red metal boxes mounted about 4 feet above the ground on walls inside Building TA-54-38. In the event of a fire or explosion, personnel should activate the manual fire alarm pull stations and notify 911 and call either the TA-54 Operations Center at **665-1288**, or the Maintenance on Call (MOC) pager **500-6965** (after hours). The TA-54 Operations Center maintains a phone number for regular business activities at extension **665-2735**. When an automatic or manual pull station is activated at RANT, the LAFD is automatically notified of the location. The TA-54 Operations Center will notify personnel of the situation using one or more communication systems (Public address, two-way radio, e-pagers, cell phones, and/or face to face).

9. TA-21 SPECIFIC REQUIREMENTS

TA-21 is a secured and locked area. Access and work activities are controlled through the TA-64 Operations Center. Any work conducted at TA-21 will be performed under an approved Integrated Work Document (IWD). The IWD at a minimum **SHALL** identify the following requirements for personnel entering and/or conducting work activities at TA-21:

- Assembly/Muster station locations
- Process for accountability of personnel in an abnormal/emergency event
- Type of communications systems (e.g., two-way radio, cell phones)

The following types of activities are conducted at TA-21 under an approved IWD

- Maintenance of lights on water towers
- PMIs
- Stormwater/Pollution Prevention
- Vegetation control
- Water/Air Quality activities

10. NES SPECIFIC REQUIREMENTS

Any work conducted at Nuclear Environmental Sites will be under an approved Integrated Work Document (IWD). The IWD at a minimum **SHALL** identify the following requirements for personnel entering and/or conducting work activities at NES:

- Assembly/Muster station locations
- Process for accountability of personnel in an abnormal/emergency event
- Type of communications systems (e.g., two-way radio, cell phones)

11. TRAINING

Workers will be trained to the information in this BEP as determined by analysis to be commensurate with their job, access, and duty requirements.

12. RECORD PROCESSING

None

13. REFERENCES

EP-DIV-DOP-0102, EWMO RCRA Inspections

P101-7, Vehicles and Pedestrian Safety

P102-2, Occupational Injury and Illness reporting and Investigation

P201-3, Reporting Known and Potential Incidents of Security Concern

P315, Conduct of Operations Manual

P322-3, Performance Improvement for Abnormal Events

P724, Workplace Violence

P1201-4, LANL Emergency Procedures and Protective Actions

SOP-5228, ADEP Reporting Requirements for Abnormal Events

APPENDIX 1

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DEFINITIONS AND ACRONYMS

Definitions

Assembly Muster Station – A designated rallying point away from the work area equipped with communication equipment and first aid supplies. Personnel evacuate to the upwind Assembly/Muster areas in response to emergency situations.

Chain of Command – The chain of command is the formal process of establishing authority to manage an off-normal or emergency event.

Controlled Area – Any area to which access is controlled in order to limit access of the general public to radiation and radioactive materials. A Controlled Area is an area in which elevated radiation and/or contamination levels may exist as a consequence of routine or non-routine site operations.

Emergency Management & Response – A Laboratory organization tasked with directing and coordinating response actions to emergencies throughout the Laboratory.

Emergency Management Group – A Laboratory organization tasked with directing and coordinating response actions to emergencies throughout the Laboratory.

Emergency Operations and Support Center – LANL's Emergency Operations Center (EOC) runs the 24/7 Emergency Operations Support Center staffed by communications specialists and on-call emergency managers, LANL personnel can call the Center for assistance with or information about all non-life-threatening situations that involve off-normal or unusual circumstances.

Facility Leader – The FL is the TA-54 Facility person in charge of emergency operations until transferred to the incoming IC.

First Responder at the Awareness Level – The first person to become aware of an abnormal/emergency event.

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DEFINITIONS AND ACRONYMS

Incident Commander – A trained and qualified emergency professional from emergency management, SOC Los Alamos (the Laboratory’s protective force), Los Alamos County Fire Department, Los Alamos County Police Department, or other federal authority having jurisdiction that takes command and control of the event.

Stay-Put – The type of sheltering utilized most often by the LANL population is stay-put sheltering. Stay-put sheltering is the protective action used during non-hazardous material events. This protective action calls for personnel to move or remain indoors due to an event that puts personnel in harm’s way outside. The SOM/FL or IC will make the decision to Stay-Put.

Shelter-in-Place – A protective action taken by personnel to isolate themselves from a hazard.

Spill – An intentional or unintentional release of oil, PCBs, liquid hazardous substances, or liquid radioactive substances to the environment that is not permitted under Laboratory, state, or federal permits.

APPENDIX 1

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DEFINITIONS AND ACRONYMS

Technical Area 54 – Technical Area 54 is comprised of process and administrative support areas. Contained in TA-54 are the following Area G, H, J, L, 54 Administrative areas, and RANT complex.

Visitor – Any individual, including Laboratory employees or subcontractors, who requires access to RANT but does not have authorized access to the specific area he/she wishes to enter.

Acronyms

| | |
|-------|---|
| A/MAL | Assembly/Muster Area Lead |
| BEP | Building Emergency Plan |
| CAM | Continuous Air Monitor |
| CAS | Central Alarm Station |
| EO-EM | Emergency Operations and Emergency Management |
| EOSC | Emergency Operations and Support Center |
| EWMO | Environmental Waste Management Organization |
| FL | Facility Leader |
| FOD | Facility Operations Director |
| IC | Incident Commander |
| IS&H | Industrial Safety and Hygiene |
| LAFD | Los Alamos Fire Department |
| LAPD | Los Alamos Police Department |
| LTP | LANL TRU Programs |
| NES | Nuclear Environmental Sites |
| OCO | Operations Center Operator |
| OM | Operations Manager |
| PA | Public Address |
| RANT | Radioassay and Nondestructive Testing Facility |
| RCT | Radiological Control Technician |
| SIP | Shelter in Place |
| SP | Stay-Put |
| SOM | Shift Operations Manager |
| SWANS | Site Wide Alert Notification System |
| TA | Technical Area |
| WCRRF | Waste Characterization, Reduction, and Repackaging Facility |

APPENDIX 2

Page 1 of 2

SITE WIDE AREA NOTIFICATION SYSTEM (SWANS)**Radio Instructions**

The Site Wide Area Notification System (SWANS) Radio is a LANL-wide emergency radio system for the purpose of back-up communications, in the event normal communications protocols are diminished or not available. Emergency Operations and Emergency Management (EO-EM) monitors the SWANS frequency during normal working hours. The Central Alarm Station (CAS) monitors the frequency continuously.

WARNING

Do not use the SWANS Radio instead of calling 911. Always call 911 first if needed.

To Contact Emergency Operations and Support Center

- [1] **TURN** up the volume.
- [2] **DEPRESS** the Push-To-Talk button.
- [3] **SPEAK** after the solid tone ends.
- [4] **SAY**, "EOSC, EOSC, this is [*your name*] at TA-__, Building ____."
- [5] **LET GO** of the Push-To-Talk button to hear response.
- [6] **IF** evacuation to an Assembly/Muster area is necessary,
THEN the Operations Center will take the SWANS radio.

Daily Monitoring with the SWANS Radio (Operations Center)

- [1] **LEAVE** radio turned on and sitting in charger and on Channel 1.
- [2] **ENSURE** the volume is turned up enough to hear radio traffic.
- [3] **IF** you receive an alert tone (4 beeps, pause, 4 beeps, continuously)
THEN:
 - [A] **PRESS** the Push-To-Talk button to stop the alert tone.
 - [B] **TURN** the volume up.
 - [C] **FOLLOW** the directions that are given on the radio.
 - [D] **RELAY** message as applicable.
 - [E] **IF** your building or organization is addressed directly,
THEN respond immediately.
- [4] **IF** you return to the office and hear an alert tone,
THEN:
 - [A] **PRESS** the Push-To-Talk button to stop the alert tone.
 - [B] **CONTACT** EOSC by radio or phone (7-6211).
 - [C] **INFORM** EO-EM the alert tone was sounding on your radio, and they will relay the alert tone message.

APPENDIX 2

Page 2 of 2

Radio Testing Instructions**Use of the Orange Panic Button**

If the orange panic button located on the top of the radio is pushed, EOSC will try to call you on the radio. If there is no response, EOSC will try to call you on the phone. If there is still no response, the duty Emergency Manager will respond to your location.

Testing and Maintenance

- [1] **PERFORM** a radio check once a week by calling EOSC and saying, "TA--- ____ Facility to EOSC, radio check"
- [2] **CALL** EOSC at 7-6211 if you have any problems with the radio. (A warbling tone may indicate the battery is failing)
- [3] **IF** you are getting excessive static or poor reception, **THEN** notify EOSC so a test can be run.

WARNING

Use the orange panic button for extreme emergency only.

Two-Way Radio Instructions

- [1] **TURN** the radio on.
- [2] **SWITCH** the radio to Channel 1.
- [3] **PRESS** the button on the side of the radio to transmit.
- [4] **ESTABLISH** contact with the Operations Center. Speak slowly and clearly.
- [5] **IF** you do not receive an immediate response, **THEN** remain calm and **REPEAT** steps [3] and [4].
- [6] **WHEN** contact is established, **THEN** transmit your name and location **AND WAIT** for the Operations Center to ask for additional information.
- [7] **UPON** request from the Operations Center, **THEN** transmit the names and condition of personnel at your location. Only relevant and essential information should be given.

APPENDIX 3

Page 1 of 1

WCRRF TA-50-69 EMERGENCY CONTACT LIST

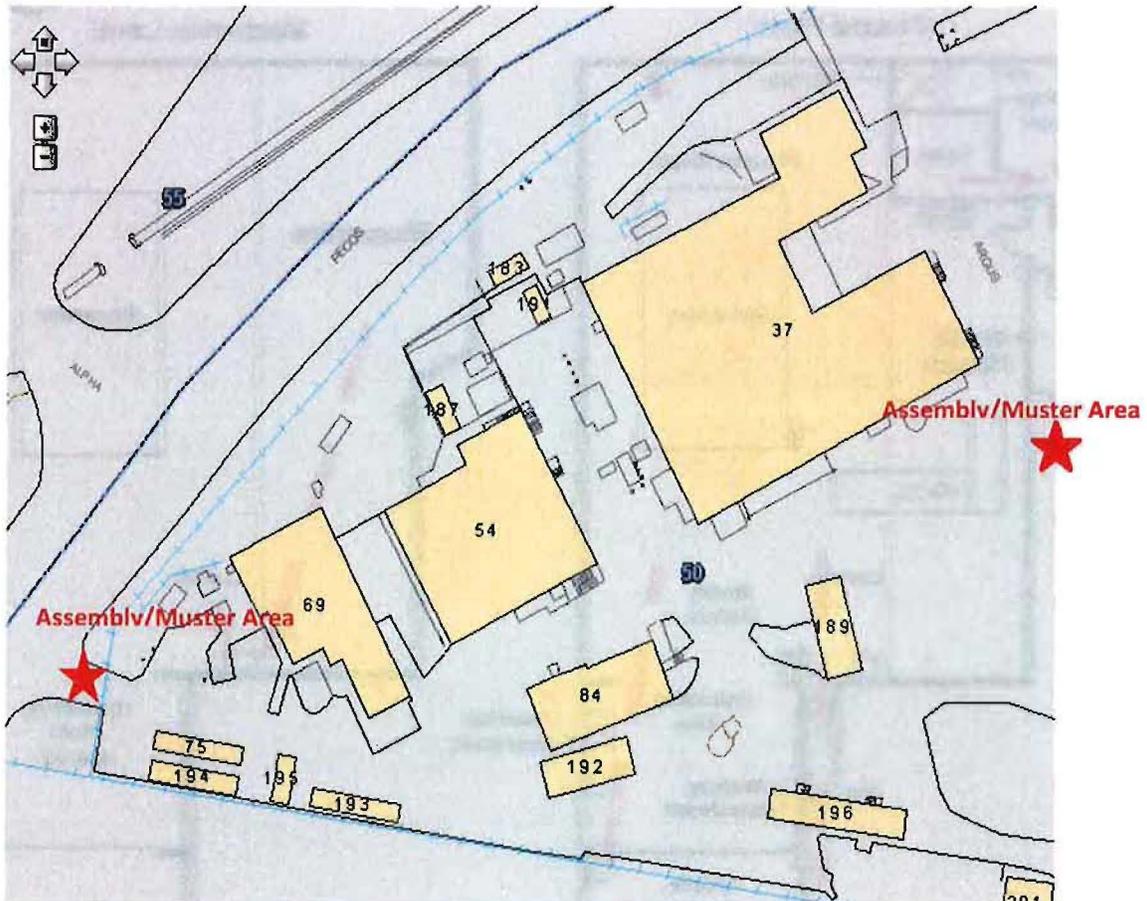
| Organizations |
|---|
| Emergency Operations Support Services 7-6211 |
| Engineering |
| Environmental |
| EWMO FOD |
| Fire/Ambulance |
| Fire Protection Engineer |
| Industrial Safety/Hygiene |
| Maintenance Manager |
| On-call list |
| Occupational Medicine Nurse's Station |
| Operations Manager |
| Radiation Protection |
| RP Supervisor |
| Security |
| Shift Operations Manager |
| Site Services Subcontractor (EnergySolutions) |
| Transportation |
| Utilities |
| Waste Coordinator |
| *Surrounding facilities contacts |

* Identify surrounding facilities for performing notifications of an off-normal/emergency event

APPENDIX 4

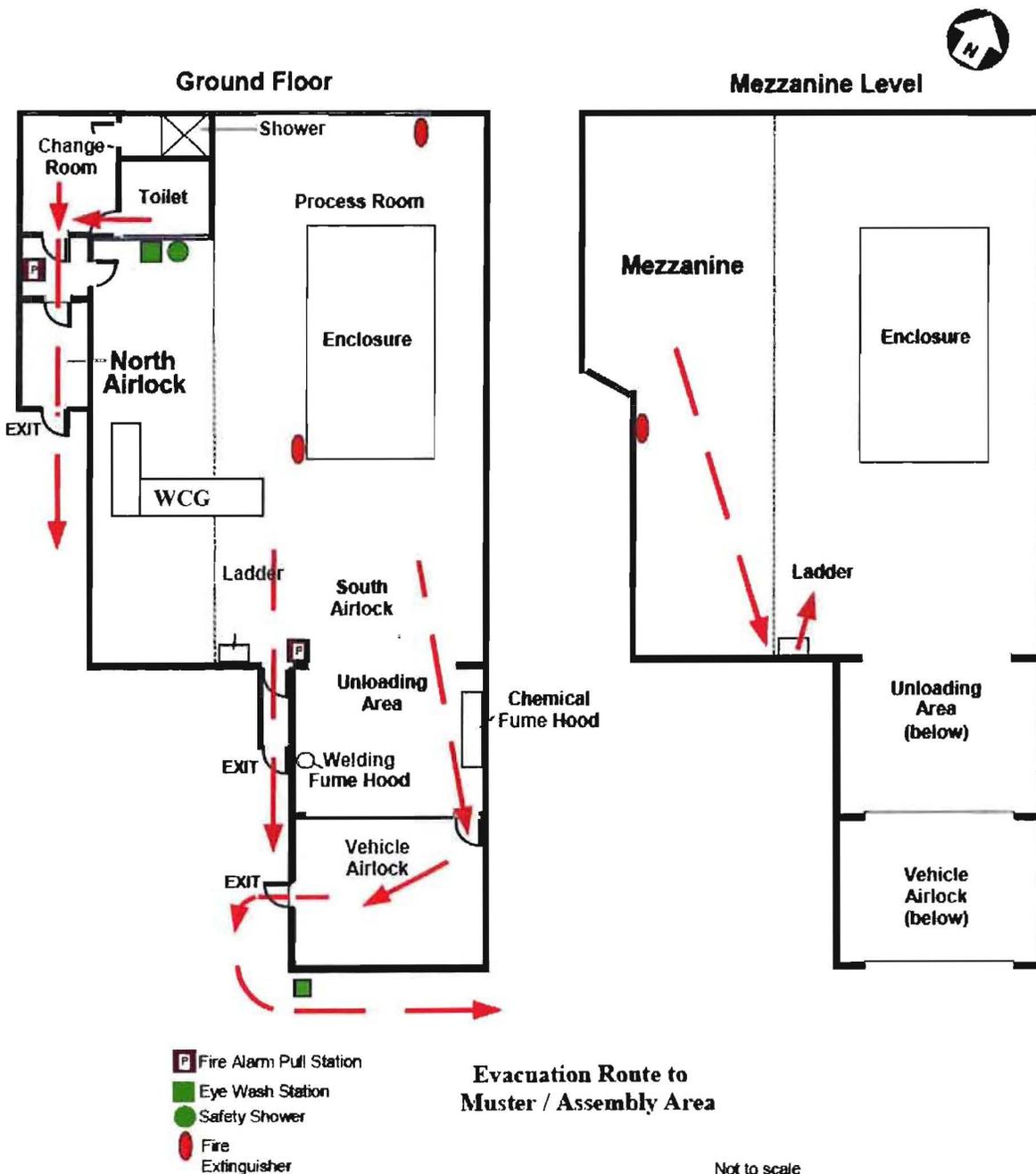
Page 1 of 2

WCRRF ASSEMBLY/MUSTER AREA LOCATIONS



APPENDIX 4

Page 2 of 2



APPENDIX 5

Page 1 of 2

TA-54 AND RANT EMERGENCY CONTACT LIST

| Organizations |
|--|
| Emergency Operations Support Services 7-6211 |
| Engineering |
| Environmental |
| EWMO FOD |
| Fire Protection Engineer |
| Fire/Ambulance |
| Industrial Safety/Hygiene |
| Maintenance Manager |
| On-call list |
| Occupational Medicine Nurse's Station |
| Operations Manager |
| Radiation Protection |
| RP Supervisor |
| Security |
| Shift Operations Manager |
| Shift Operations Supervisor |
| Transportation |
| Utilities |
| Waste Coordinator |
| LTP-SOS |
| HMLW |
| Site Services Contractor |
| Operations Center SOS |
| *Surrounding facilities contacts |

* Identify surrounding facilities for performing notifications of an off-normal/emergency event

APPENDIX 5

Page 2 of 2

TA-54 AND RANT EMERGENCY CONTACT LIST

| Organizations |
|--|
| Emergency Operations Support Services 7-6211 |
| Engineering |
| Environmental |
| EWMO FOD |
| Fire/Ambulance |
| Fire Protection Engineer |
| Industrial Safety/Hygiene |
| Maintenance Manager |
| On-call list |
| Occupational Medicine Nurse's Station |
| Operations Manager |
| Radiation Protection |
| RP Supervisor |
| Security |
| Shift Operations Manager |
| Shift Operations Supervisor |
| Transportation |
| Utilities |
| Waste Coordinator |
| *Surrounding facilities contacts |

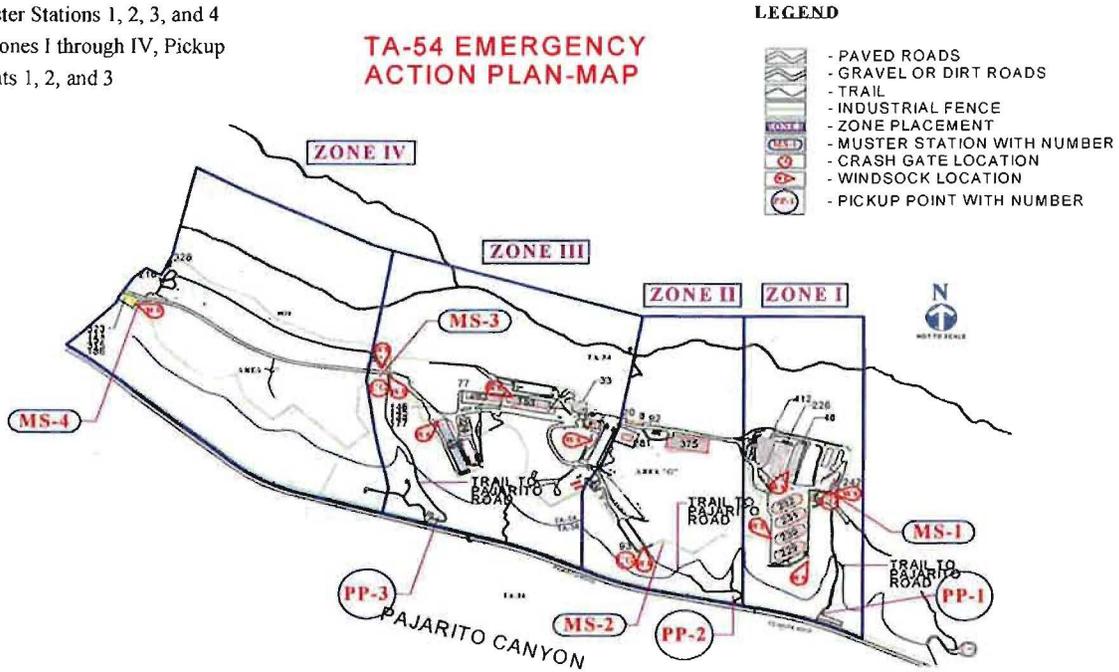
* Identify surrounding facilities for performing notifications of an off-normal/emergency event

APPENDIX 6

Page 1 of 2

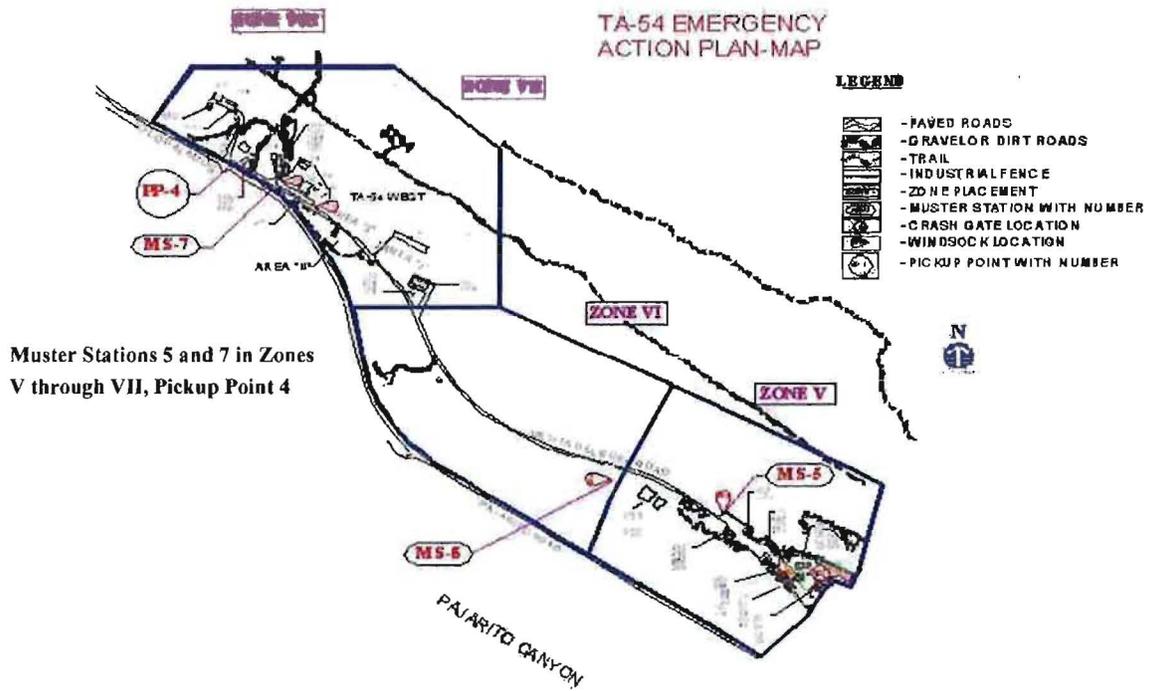
TA-54 ZONE BORDERS, PICKUP POINTS, AND ASSEMBLY/MUSTER AREA LOCATIONS

Muster Stations 1, 2, 3, and 4
in Zones I through IV, Pickup
Points 1, 2, and 3



APPENDIX 6

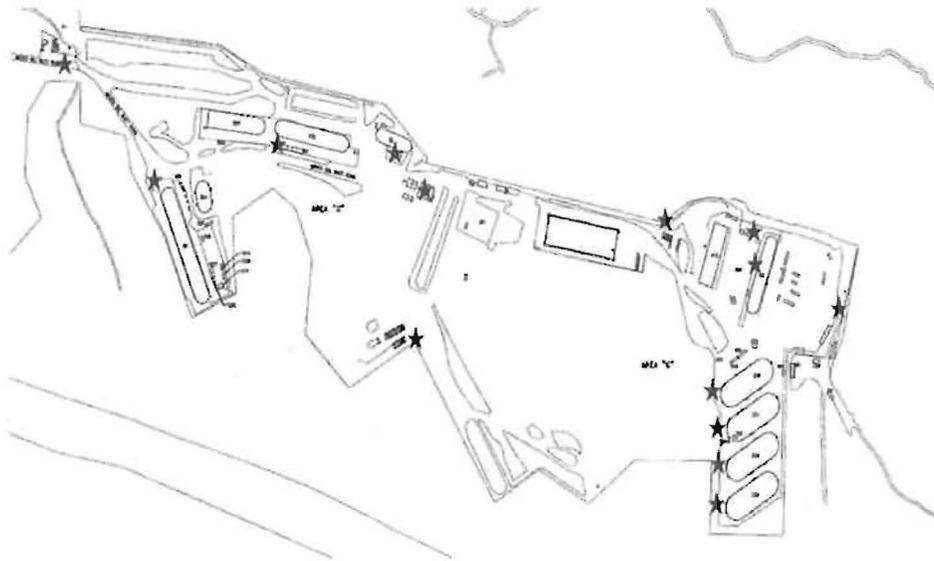
Page 2 of 2



APPENDIX 7

Page 1 of 2

TA-54 AREA G EVACUATION ALARM BUTTON LOCATIONS



EWMO Division Building Emergency Plan (BEP)

Document No.: EP-DIV-BEP-20048

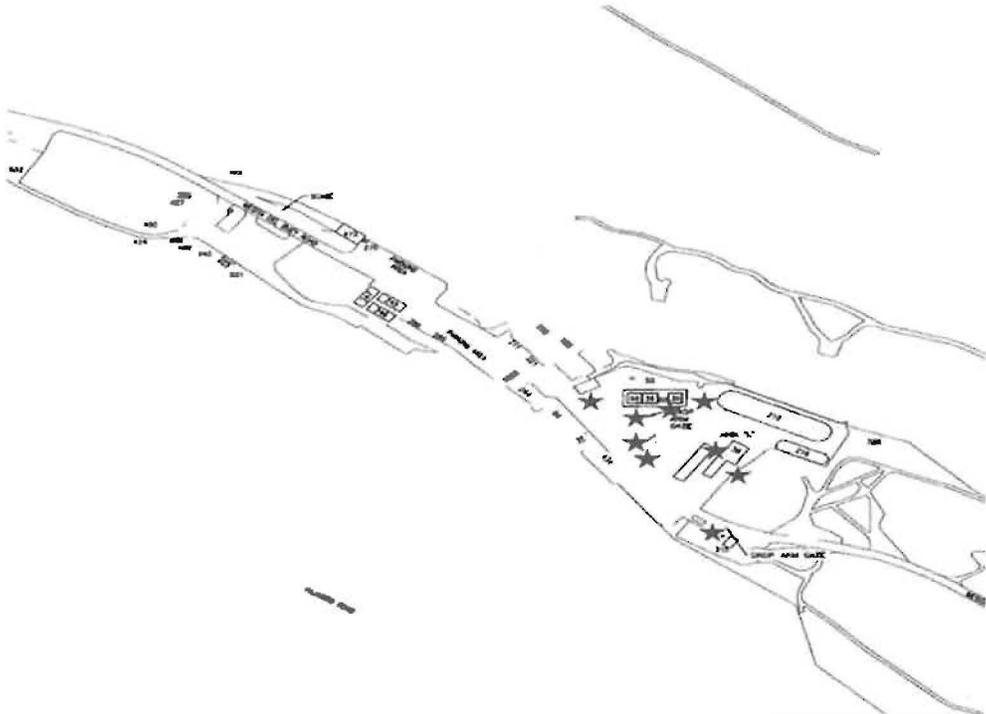
Revision: 1

Effective Date: 12/10/13

Page: 44 of 47

Reference

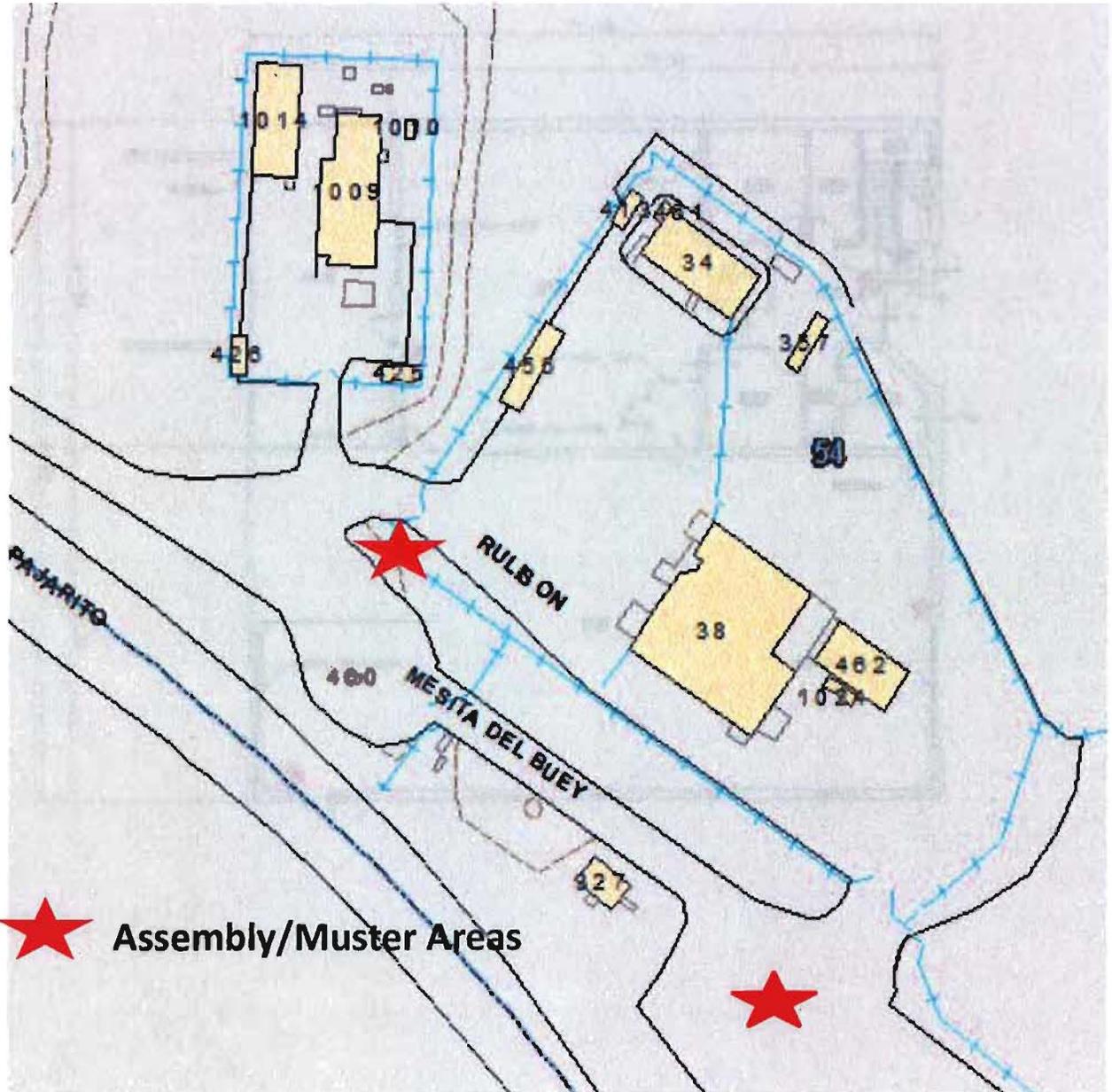
APPENDIX 7
Page 2 of 2



APPENDIX 8

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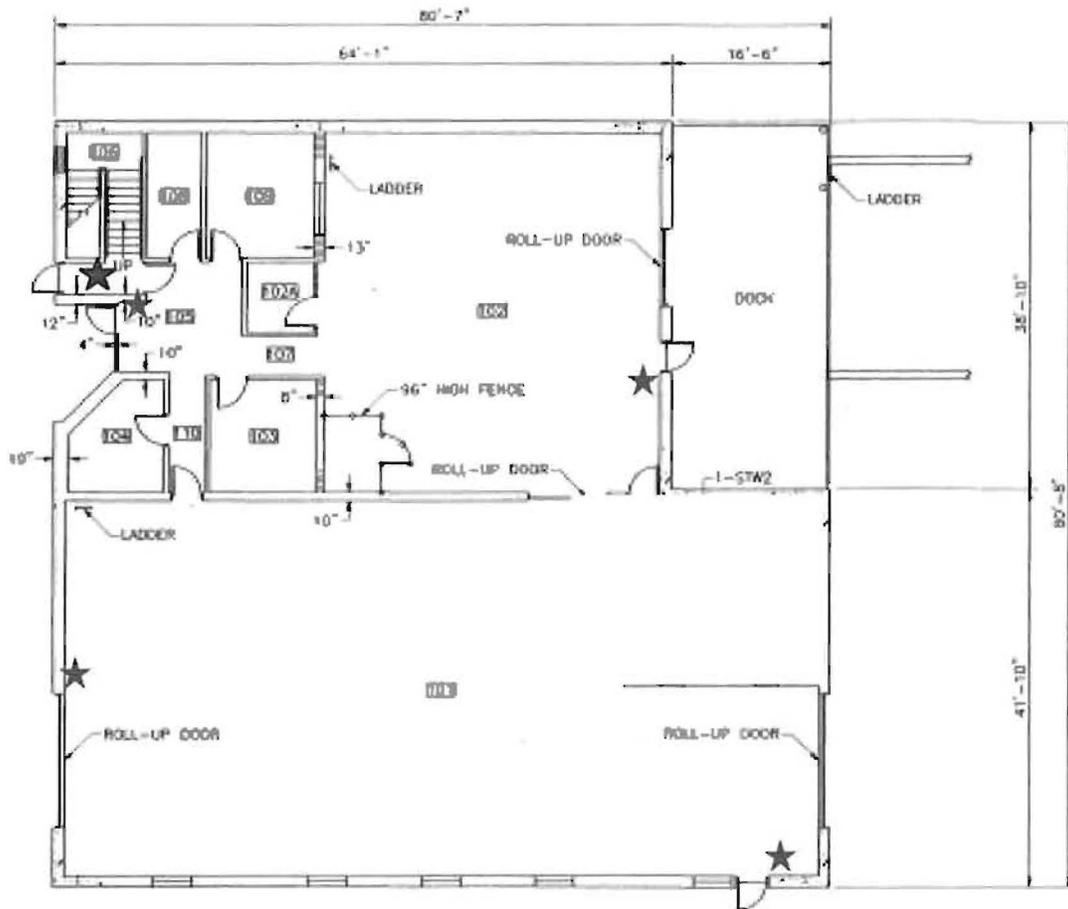
RANT ASSEMBLY/MUSTER AREA LOCATIONS



APPENDIX 9

Page 1 of 1

RANT EVACUATION ALARM BUTTON LOCATIONS

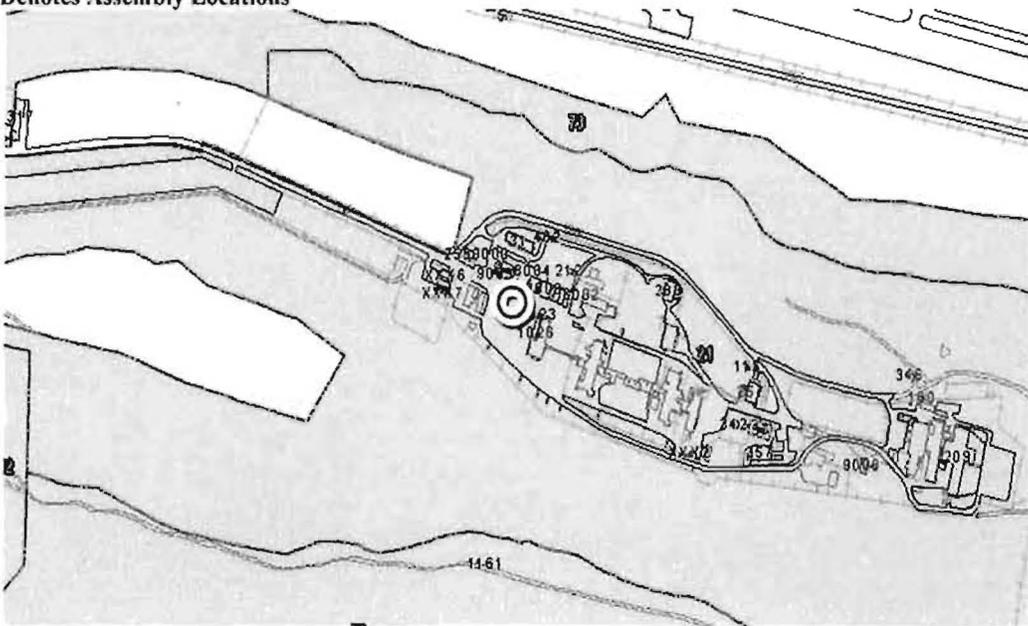


APPENDIX 10

Page 1 of 1

TA-21 ASSEMBLY AREA LOCATIONS

⊙ - Denotes Assembly Locations



Attachment 9

EWMO Area Emergency Response

Effective Date: 12/09/13

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:

- Emergency Operations
- Engineering
- IH&S
- Operations Managers
- Quality Assurance
- Radiation Protection
- Shift Operations Managers

Responsible Manager, EWMO Facility Operations Director

Steve M. Henry / 219172 / /s/ Andy Baumer for / 12/04/13
Name (print) Z# Signature Date

Classification Review: N/A Unclassified UCNI Classified _____

Art Crawford / 080070 / /s/ Art Crawford / 12/05/13
Name (print) Z# Signature Date

Working Copy / Information Only (circle one)
Initials / Date: _____ / _____

1.0 ENTRY CONDITIONS

- Request is made for Emergency Response Personnel support
- Visual observation of a Fire, smoke
- Audible fire alarm
- Manual fire pull station activated
- Serious personnel injury (job related)
- Utility (water, gas, electricity) outages or leaks (water, fuel, sewer, oil) with significant impact to the facility or the environment
- Situations where the likely potential for involvement of more than one emergency response elements

2.0 IMMEDIATE RESPONSE ACTIONS

| √ | Time/Date | # | ACTIONS |
|--|-----------|-----|---|
| Operations Center | | | |
| | | 2.1 | ENSURE personnel have completed the <u>Emergency Response</u> in accordance with EWMO-DIV-BEP-20048, Building Emergency Plan, and OBTAIN incident information from the caller. (e.g., location, inside/outside building/structure). Narrative/Comments: |
| | | 2.2 | NOTIFY personnel of incident. (e.g., Public address, 2-way radio, E-Pagers, cell phones, and face to face) |
| | | 2.3 | NOTIFY the Shift Operations Manager/Facility Lead (SOM/FL). Name: _____ |
| NOTE <i>The following steps may be performed out of sequence.</i> | | | |
| | | 2.4 | ENSURE that Emergency Operations and Support Center (7-6211), Fire Department, and/or 911 was notified. |

2.0 IMMEDIATE RESPONSE ACTIONS (continued)

| √ | Time/Date | # | ACTIONS |
|---|-----------|------|---|
| | | 2.5 | PERFORM accountability of the personnel in affected area. |
| | | 2.6 | DISPATCH a Nuclear Operator/Waste Handler to meet the Emergency Response vehicles and OPEN access gates if safe to do so. |
| | | 2.7 | NOTIFY the support personnel to assist Shift Operations Manager. (e.g., Environmental, Safety and Health) |
| Shift Operations Manager/Facility Lead | | | |
| <p>NOTE <i>When the Operations Manager is not physically present and/or on shift, the SOM will conduct the minimum notifications up the chain of command (e.g., FOD, ES&H Manager, and Project Manager).</i></p> | | | |
| | | 2.8 | NOTIFY the applicable Operations Manager of the event, and REQUEST the Operations Manager to conduct the minimum notifications (e.g., FOD, ES&H Manager and Project Manager). |
| | | 2.9 | BRIEF support personnel and the emergency responders upon arrival to incident site. |
| | | 2.10 | CONDUCT formal transfer of command and control to the Incident Commander (IC). |
| | | 2.11 | ENSURE EWMO support team is available to assist IC as necessary. |

3.0 SUBSEQUENT ACTIONS

| Shift Operations Manager/Facility Lead | | | |
|---|------------------|----------|--|
| √ | Time/Date | # | ACTIONS |
| | | 3.1 | ENSURE a formal transfer of command and control from IC is performed once the emergency has been downgraded. |
| Operations Center | | | |
| | | 3.2 | IF actions were developed after transfer from IC, THEN IMPLEMENT actions to return area/operations to normal. Actions: |
| | | 3.3 | PROCESS the procedure as a quality record in accordance with EP-DIR-AP-10003, Records Management Procedure For ADEP Employees. |

Attachment 10

Discovery of an Airborne, Liquid, and/or Solid Material Release or Spill

Effective Date: 12/9/2013

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:

- Engineering
- IH&S
- Operations Managers
- Quality Assurance
- Radiation Protection
- Shift Operations Managers

Responsible Manager, EWMO Facility Operations Director

| | | | |
|-----------------------|-----------------|---|------------------|
| <u>Steve M. Henry</u> | <u>/ 219172</u> | <u>/ /s/ Andy Baumer 234651 for SMH</u> | <u>/ 12/3/13</u> |
| Name (print) | Z# | Signature | Date |

Classification Review: N/A Unclassified UCNI Classified _____

| | | | |
|--------------------|-----------------|--------------------------|------------------|
| <u>Teri Tingey</u> | <u>/ 200975</u> | <u>/ /s/ Teri Tingey</u> | <u>/ 12/3/13</u> |
| Name (print) | Z# | Signature | Date |

| |
|--|
| Working Copy / Information Only (circle one) Initials / Date: _____ / _____ |
|--|

1.0 ENTRY CONDITIONS

- Discovery of airborne, liquid, and/or solid material release
- Uncontrolled release of hazardous and/or radioactive material into the environment
- Hazardous material release or spill in an area that does not possess controls to mitigate the consequences
- Strong chemical odor (e.g., acid, ammonia, liquefied petroleum, gasoline)

2.0 IMMEDIATE RESPONSE ACTIONS

| √ | Time/Date | # | ACTIONS |
|---|-----------|-----|---|
| Operations Center | | | |
| | | 2.1 | <p>ENSURE personnel have completed the <u>Off-Normal Response</u> in accordance with EWMO-DIV-BEP-20048, Building Emergency Plan and OBTAIN incident information from the caller (e.g., location, odor, gas, liquid, amount, inside/outside building/structure).</p> <p>Narrative/Comments:</p> |
| | | 2.2 | <p>NOTIFY personnel of incident. (e.g. Public address, 2-way radio, E-Pagers, cell phones, and face to face)</p> |
| | | 2.3 | <p>NOTIFY the Shift Operations Manager/Facility Lead (SOM/FL). Name: _____</p> |
| <p>NOTE <i>The following steps may be performed out of sequence.</i></p> | | | |
| | | 2.4 | <p>NOTIFY the support personnel to assist Shift Operations Manager. (e.g., Environmental, Safety, and Health)</p> |

2.0 IMMEDIATE RESPONSE ACTIONS (continued)

| √ | Time/Date | # | ACTIONS |
|--|-----------|-----|---|
| Shift Operations Manager/Facility Lead | | | |
| <p>NOTE <i>When the Operations Manager is not physically present and/or on shift, the SOM will conduct the minimum notifications up the chain of command (e.g., FOD, ES&H Manager, and Project Manager).</i></p> | | | |
| | | 2.5 | NOTIFY the applicable Operations Manager of the event, and REQUEST the Operations Manager to conduct the minimum notifications (e.g., FOD, ES&H Manager and Project Manager). |
| | | 2.6 | <p>CONDUCT information gathering, such as the following applicable items:</p> <ul style="list-style-type: none"> • Container number and contents • Inside/outside facility structure • Location and amount • Spills or release • Temporary Limited Area • Weather conditions |
| | | 2.7 | DETERMINE and EVALUATE the incident to develop actions as applicable. |
| | | 2.8 | IF Emergency Response Personnel are required, THEN GO to EP-DIV-RM-ERP-20200, EWMO Area Emergency Response and EXIT this procedure as necessary. |

3.0 SUBSEQUENT ACTIONS

| | | | |
|--------------------------|--|-----|---|
| Operations Center | | | |
| | | 3.1 | <p>IF actions were developed, THEN IMPLEMENT actions to return area/operations to normal.</p> <p>Actions:</p> |
| | | 3.2 | PROCESS the procedure as a quality record in accordance with EP-DIR-AP-10003, Records Management Procedure For ADEP Employees. |

Attachment 11

Waste Container Questionable Integrity

Effective Date: 12/9/2013

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:

Engineering
IH&S
Operations Managers
Quality Assurance
Radiation Protection
Shift Operations Managers

Responsible Manager, EWMO Facility Operations Director

Steve M. Henry / 219172 / /s/ Andy Baumer 234651 for SMH / 12/3/13
Name (print) Z# Signature Date

Classification Review: N/A Unclassified UCNI Classified _____

Teri Tingey / 200975 / /s/ Teri Tingey / 12/3/13
Name (print) Z# Signature Date

Working Copy / Information Only (circle one)

Initials / Date: _____ / _____

1.0 ENTRY CONDITIONS

- Visual indication of a fallen/dropped waste container
- Visual inspection of a waste container indicates an unanticipated loss of waste container integrity (e.g., missing or broken filter, puncture, corrosion, missing drum locking ring, external contamination)
- Visual indication of a bulging waste drum
- Visual indication of a bulging inner waste drum

2.0 IMMEDIATE RESPONSE ACTIONS

| √ | Time/Date | # | ACTIONS |
|--------------------------|-----------|-----|--|
| Operations Center | | | |
| | | 2.1 | <p>ENSURE personnel have completed the <u>Off-Normal Response</u> in accordance with EWMO-DIV-BEP-20048, Building Emergency Plan and OBTAIN incident information from the caller (e.g., location, position, container information, visual damage to exterior of container, leaking, personnel injury, inside/outside building/structure).</p> <p>Narrative/Comments:</p> |
| | | 2.2 | <p>NOTIFY personnel of incident. (e.g., Public address, 2-way radio, E-Pagers, cell phones, and face to face)</p> |
| | | 2.3 | <p>NOTIFY the Shift Operations Manager/Facility Lead (SOM/FL). Name: _____</p> |

2.0 IMMEDIATE RESPONSE ACTIONS (continued)

| √ | Time/Date | # | ACTIONS |
|---|-----------|-----|--|
| <p>NOTE <i>The following steps may be performed out of sequence.</i></p> | | | |
| | | 2.4 | <p>NOTIFY the support personnel to assist Shift Operations Manager. (e.g., Environmental, Safety and Health, Engineering, Waste Coordinator, and Security)</p> |
| <p>Shift Operations Manager/Facility Lead</p> | | | |
| <p>NOTE <i>When the Operations Manager is not physically present and/or on shift, the SOM will conduct the minimum notifications up the chain of command (e.g., FOD, ES&H Manager, and Project Manager).</i></p> | | | |
| | | 2.5 | <p>NOTIFY the applicable Operations Manager of the event, and REQUEST the Operations Manager to conduct the minimum notifications (e.g., FOD, ES&H Manager and Project Manager).</p> |
| | | 2.6 | <p>CONDUCT information gathering, such as the following applicable items:</p> <ul style="list-style-type: none"> • Container number and contents • Spills/release • Temporary Limited Area • Weather conditions |
| | | 2.7 | <p>DETERMINE and EVALUATE the incident to develop actions in accordance with the applicable compliance documents (e.g., Safety Basis, RCRA, Radiation Protection).</p> |
| | | 2.8 | <p>IF Emergency Response Personnel are required, THEN GO to EP-DIV-RM-ERP-20200, EWMO Area Emergency Response and EXIT this procedure as necessary.</p> |

3.0 SUBSEQUENT ACTIONS (continued)

| √ | Time/Date | # | ACTIONS |
|--------------------------|-----------|-----|--|
| Operations Center | | | |
| | | 3.1 | <p>IF actions were developed, THEN IMPLEMENT actions to return area/operations to normal.</p> <p>Actions:</p> |
| | | 3.2 | <p>PROCESS the procedure as a quality record in accordance with EP-DIR-AP-10003, Records Management Procedure For ADEP Employees.</p> |

Attachment 12

STANDING ORDER

| | | | | | | | |
|------------|--|------------|------------------|------------|------------|-----------|------|
| 1. | Standing Order Number: EWMO-AREAG-SO-1247, R.2 | | | | | | |
| 2. | Standing Order Type: (check one) <input type="checkbox"/> Division <input checked="" type="checkbox"/> Facility | | | | | | |
| 3. | Applicable Facilities: TA-54 Area G | | | | | | |
| 4. | Standing Order Title: TA-54 Area G Domes TA-54-231 and TA-54-375 PermaCon Access Restrictions | | | | | | |
| 5. | Distribution List: (By Functional Title): TA-54 Timely Order Book and Environmental Programs (EP) Document Control | | | | | | |
| 6. | Approval: <table style="width: 100%; border: none;"><tr><td style="border-bottom: 1px solid black; width: 33%;">Gail Welsh</td><td style="border-bottom: 1px solid black; width: 33%; text-align: center;">/ /s/ Gail Welsh</td><td style="border-bottom: 1px solid black; width: 33%; text-align: right;">/ 10/15/14</td></tr><tr><td>Print name</td><td style="text-align: center;">Signature</td><td style="text-align: right;">Date</td></tr></table> <p>(Approval Authority for division-level standing orders is the FOD, for facility-level, the OM or designee.)</p> Standing Order Effective Date: <u>10/15/14</u> | Gail Welsh | / /s/ Gail Welsh | / 10/15/14 | Print name | Signature | Date |
| Gail Welsh | / /s/ Gail Welsh | / 10/15/14 | | | | | |
| Print name | Signature | Date | | | | | |
| | Convert this Standing Order to a procedure? <input type="checkbox"/> Yes, by _____ <input checked="" type="checkbox"/> No <div style="text-align: right; margin-right: 100px;">Date</div> | | | | | | |
| 7. | Purpose: This standing order restricts access to the PermaCons in Domes TA-54-231 and TA-54-375 to prevent workers from coming into unnecessary contact with the waste containers and establishes restrictions for the entry into the TA-54-375 PermaCon [e.g., personal protective equipment (PPE) and waste container temperature]. Background: Monitoring requirements of LA-UR-14-23820, LANL Nitrate Salt-Bearing Waste Container Isolation Plan, (i.e., Isolation Plan) is accomplished by the performance of EWMO-AREAG-FO-DOP-1246, Nitrate Salt-Bearing TRU Waste Container Monitoring. The required monitoring performed includes hourly visual inspection and daily temperature measurements of all waste containers within the TA-54-231 and TA-54-375 PermaCon. Additionally, hourly temperature measurements are obtained for waste containers within the TA-54-375 PermaCon that have attached thermocouples, using computer located inside of the TA-54-375 PermaCon Control Room. Daily head-space gas sampling is performed for containers 68685 and LASB50522. Biweekly head space gas sampling is also performed for five additional waste containers. The following personnel are affected by this standing order: EWMO Operations Manager, Shift Operations Managers, Nuclear Operators, Radiological Control Technicians, and Operations Center Operators. | | | | | | |
| 8. | Actions and Duration: | | | | | | |
| 8.1 | Requirement Shift Operations Manager (SOM) approval is required to access the PermaCons in Domes TA-54-231 and TA-54-375, except for inspections performed in accordance with EWMO-AREAG-FO-DOP-1246. The PermaCons in Domes TA-54-231 and TA-54-375 SHALL be posted on the outside of each access point instructing personnel to obtain SOM approval before entering the PermaCon, unless they are performing EWMO-AREAG-FO-DOP-1246. | | | | | | |

8.1 Requirement (continued)

Additional Dome TA-54-375 PermaCon access requirements:

- Entry into any cell requires Level I PPE (coveralls, booties, hood, and gloves) and Air Purifying Respirators with a dual GMC-P100 cartridge, in addition to the applicable Radiological Work Permit.
- Before entry the temperature of Standard Waste Box (SWB) 68685 **SHALL** be verified to be less than or equal to 10 °F above ambient using the computer in the TA-54-375 PermaCon Control Room.

8.2 Action(s) to be taken

8.2.1 TA-54-231 PermaCon Entry

- [1] **OBTAIN** SOM approval for entry except to perform EWMO-AREAG-FO-DOP-1246 inspections.

8.2.2 TA-54-375 PermaCon Entry

- [1] **OBTAIN** SOM approval for entry except to perform EWMO-AREAG-FO-DOP-1246 inspections.

NOTE *The following action is performed using the computer located inside of the TA-54-375 PermaCon Control Room and receiving input from SWB 68685 using three thermocouples (T1 – SWB top, T2 – SWB side, and T3 – ambient).*

- [2] **DETERMINE** whether the T1 (SWB top thermocouple) and T2 (SWB side thermocouple) indicated temperatures are less than or equal to 10 °F above the T3 (ambient thermocouple) indicated temperature.

- [3] **IF** either the T1 or T2 indicated temperature is greater than 10 °F above than the T3 (ambient) temperature,
THEN STOP activities associated with the entry into the TA-54-375 PermaCon and **NOTIFY** the TA-54 Operations Center of the discrepancy.

- [4] **IF** both the T1 and T2 indicated temperatures satisfy either of the following:
 - Less than the T3 (ambient temperature)
 - Less than or equal to 10 °F above the T3 (ambient) temperature,**THEN OBTAIN** and **DON** level I PPE and Air Purifying Respirator with a dual GMC-P100 cartridge for the TA-54-375 PermaCon entry.

8.2.3 EWMO-AREAG-FO-DOP-1246 Inspections

Hourly visual inspections will be conducted from outside of the PermaCon through the windows into the cells and hourly temperature measurements will be obtained from using the TA-54-375 PermaCon control Room computer. Daily head-space gas sampling will be conducted as required by the Isolation Plan. Temperature measurements of the exterior of the waste containers and visual inspection of the waste containers by personnel within the PermaCon will also be performed daily.

8.3 Duration

This standing order will remain in effect until cancelled or superseded.

9. Unreviewed Safety Question (USQ) Review:

USQ process complete? Yes N/A

USQ No. (if applicable): AREAG-14-441-C

If "N/A" is checked, then justify below:

USQ Qualified Evaluator (QEV)

Lawrence Garcia / /s/ Lawrence Garcia / 10/14/14
Print name Signature Date

10. Derivative Classifier Review:

This document was reviewed to ensure proper classification and is classified as:

- Unclassified Unclassified Controlled Nuclear Information (UCNI)
 Official Use Only (OUO) Classified

NOTE: If this document is OUO, UCNI, and/or classified, add the appropriate markings, distribution limitation statement, and guidance data block(s).

Derivative Classifier (DC)

Art Crawford / /s/ Art Crawford / 10/15/14
Print name Signature Date

11. Standing Order Cancellation:

Choose one of the following: USQ complete N/A

USQ No. (if applicable): _____

Responsible Manager (FOD for division-level standing orders, OM or designee for facility-level)

Print name Signature Date

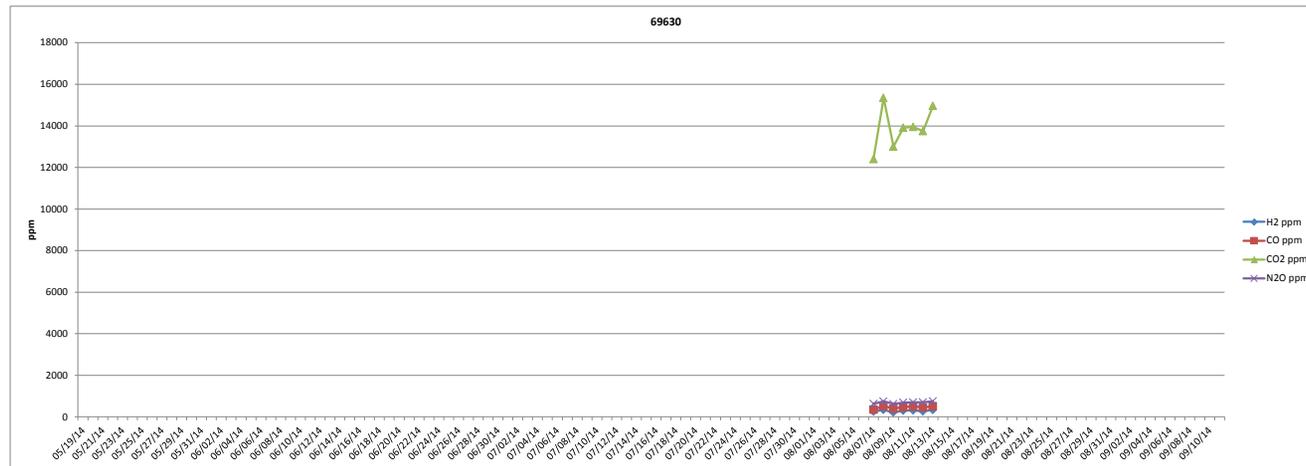
(Attach Attachment 2, Timely Order Reviewer Signoff Sheet, to document reviews of this standing order.)

Attachment 13

| Date | 69630 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
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| 07/18/14 | | | | |
| 07/19/14 | | | | |

| 69630 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
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| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 258 | 351 | 12403 | 629 |
| 08/08/14 | 337 | 520 | 15351 | 744 |
| 08/09/14 | 221 | 395 | 13000 | 622 |
| 08/10/14 | 301 | 468 | 13909 | 689 |
| 08/11/14 | 311 | 505 | 13951 | 705 |
| 08/12/14 | 269 | 454 | 13745 | 705 |
| 08/13/14 | 334 | 509 | 14968 | 751 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
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| | | | | |
|---------|-----|-----|-------|-----|
| Maximum | 337 | 520 | 15351 | 751 |
| Minimum | 221 | 351 | 12403 | 622 |



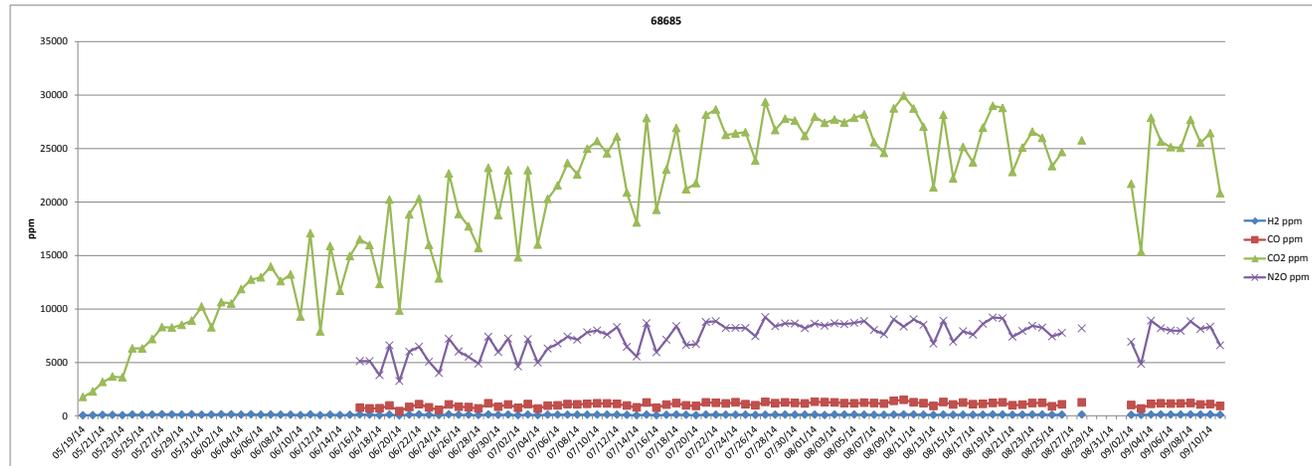
Headspace Gas Analysis Results for Container 68685

| Date | 68685 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | 54 | | 1772 | |
| 05/20/14 | 62 | | 2282 | |
| 05/21/14 | 80 | | 3171 | |
| 05/22/14 | 87 | | 3677 | |
| 05/23/14 | 65 | | 3609 | |
| 05/24/14 | 127 | | 6314 | |
| 05/25/14 | 97 | | 6302 | |
| 05/26/14 | 126 | | 7180 | |
| 05/27/14 | 143 | | 8300 | |
| 05/28/14 | 138 | | 8263 | |
| 05/29/14 | 123 | | 8506 | |
| 05/30/14 | 147 | | 8909 | |
| 05/31/14 | 107 | | 10230 | |
| 06/01/14 | 125 | | 8278 | |
| 06/02/14 | 145 | | 10639 | |
| 06/03/14 | 146 | | 10506 | |
| 06/04/14 | 115 | | 11863 | |
| 06/05/14 | 143 | | 12754 | |
| 06/06/14 | 112 | | 12955 | |
| 06/07/14 | 121 | | 13962 | |
| 06/08/14 | 111 | | 12602 | |
| 06/09/14 | 114 | | 13219 | |
| 06/10/14 | 69 | | 9287 | |
| 06/11/14 | 131 | | 17089 | |
| 06/12/14 | 57 | | 7904 | |
| 06/13/14 | 114 | | 15887 | |
| 06/14/14 | 74 | | 11701 | |
| 06/15/14 | 99 | | 14963 | |
| 06/16/14 | 121 | 769 | 16498 | 5110 |
| 06/17/14 | 112 | 691 | 15969 | 5117 |
| 06/18/14 | 64 | 713 | 12334 | 3804 |
| 06/19/14 | 119 | 964 | 20237 | 6591 |
| 06/20/14 | 35 | 443 | 9853 | 3255 |
| 06/21/14 | 114 | 830 | 18847 | 6009 |
| 06/22/14 | 133 | 1091 | 20304 | 6477 |
| 06/23/14 | 100 | 788 | 15999 | 5059 |
| 06/24/14 | 71 | 565 | 12856 | 4010 |
| 06/25/14 | 142 | 1057 | 22667 | 7203 |
| 06/26/14 | 92 | 852 | 18877 | 6016 |
| 06/27/14 | 104 | 818 | 17714 | 5517 |
| 06/28/14 | 69 | 693 | 15710 | 4886 |
| 06/29/14 | 136 | 1175 | 23205 | 7394 |
| 06/30/14 | 81 | 849 | 18787 | 5966 |
| 07/01/14 | 126 | 1063 | 22982 | 7231 |
| 07/02/14 | 56 | 757 | 14828 | 4619 |
| 07/03/14 | 122 | 1100 | 22978 | 7167 |
| 07/04/14 | 61 | 680 | 16019 | 4982 |
| 07/05/14 | 106 | 949 | 20298 | 6295 |
| 07/06/14 | 107 | 974 | 21555 | 6771 |
| 07/07/14 | 115 | 1096 | 23660 | 7412 |
| 07/08/14 | 107 | 1072 | 22584 | 7119 |
| 07/09/14 | 106 | 1123 | 24984 | 7819 |
| 07/10/14 | 107 | 1172 | 25711 | 7990 |
| 07/11/14 | 119 | 1165 | 24560 | 7600 |
| 07/12/14 | 113 | 1127 | 26119 | 8302 |
| 07/13/14 | 84 | 963 | 20897 | 6452 |
| 07/14/14 | 64 | 788 | 18083 | 5541 |
| 07/15/14 | 105 | 1245 | 27856 | 8669 |
| 07/16/14 | 63 | 762 | 19271 | 5946 |
| 07/17/14 | 99 | 1055 | 23037 | 7118 |
| 07/18/14 | 118 | 1193 | 26921 | 8391 |
| 07/19/14 | 91 | 978 | 21197 | 6608 |

Headspace Gas Analysis Results for Container 68685

| 68685 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 55 | 925 | 21770 | 6716 |
| 07/21/14 | 121 | 1262 | 28155 | 8784 |
| 07/22/14 | 110 | 1224 | 28656 | 8854 |
| 07/23/14 | 111 | 1160 | 26284 | 8206 |
| 07/24/14 | 108 | 1264 | 26414 | 8230 |
| 07/25/14 | 109 | 1091 | 26541 | 8212 |
| 07/26/14 | 89 | 991 | 23888 | 7444 |
| 07/27/14 | 115 | 1301 | 29375 | 9226 |
| 07/28/14 | 111 | 1186 | 26734 | 8372 |
| 07/29/14 | 119 | 1257 | 27797 | 8642 |
| 07/30/14 | 108 | 1214 | 27628 | 8637 |
| 07/31/14 | 107 | 1155 | 26177 | 8194 |
| 08/01/14 | 110 | 1321 | 27978 | 8623 |
| 08/02/14 | 78 | 1283 | 27404 | 8426 |
| 08/03/14 | 119 | 1255 | 27718 | 8660 |
| 08/04/14 | 116 | 1178 | 27441 | 8571 |
| 08/05/14 | 120 | 1174 | 27878 | 8691 |
| 08/06/14 | 115 | 1236 | 28195 | 8867 |
| 08/07/14 | 102 | 1194 | 25590 | 8031 |
| 08/08/14 | 101 | 1142 | 24599 | 7633 |
| 08/09/14 | 123 | 1404 | 28754 | 9018 |
| 08/10/14 | 134 | 1505 | 29935 | 8352 |
| 08/11/14 | 128 | 1265 | 28751 | 9033 |
| 08/12/14 | 114 | 1183 | 27049 | 8514 |
| 08/13/14 | 87 | 927 | 21367 | 6749 |
| 08/14/14 | 116 | 1293 | 28165 | 8900 |
| 08/15/14 | 98 | 1058 | 22213 | 6941 |
| 08/16/14 | 110 | 1243 | 25159 | 7912 |
| 08/17/14 | 98 | 1092 | 23720 | 7590 |
| 08/18/14 | 107 | 1121 | 26968 | 8612 |
| 08/19/14 | 131 | 1205 | 29004 | 9193 |
| 08/20/14 | 116 | 1258 | 28791 | 9130 |
| 08/21/14 | 96 | 988 | 22811 | 7399 |
| 08/22/14 | 115 | 1050 | 25082 | 7937 |
| 08/23/14 | 120 | 1196 | 26589 | 8430 |
| 08/24/14 | 119 | 1225 | 26003 | 8258 |
| 08/25/14 | 99 | 886 | 23361 | 7423 |
| 08/26/14 | 108 | 1078 | 24679 | 7765 |
| 08/27/14 | | | | |
| 08/28/14 | 117 | 1261 | 25765 | 8184 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 96 | 1013 | 21716 | 6918 |
| 09/03/14 | 88 | 677 | 15348 | 4857 |
| 09/04/14 | 126 | 1120 | 27887 | 8902 |
| 09/05/14 | 129 | 1172 | 25641 | 8192 |
| 09/06/14 | 121 | 1145 | 25132 | 7982 |
| 09/07/14 | 125 | 1165 | 25072 | 7951 |
| 09/08/14 | 139 | 1191 | 27700 | 8839 |
| 09/09/14 | 122 | 1061 | 25544 | 8121 |
| 09/10/14 | 132 | 1104 | 26452 | 8332 |
| 09/11/14 | 100 | 930 | 20830 | 6597 |

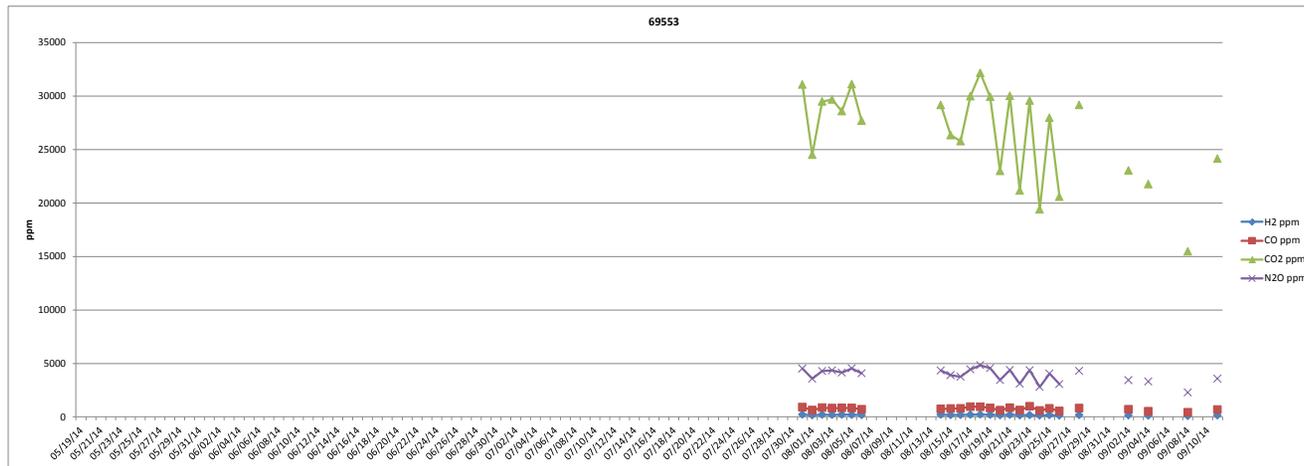
| | | | | |
|---------|-----|------|-------|------|
| Maximum | 147 | 1505 | 29935 | 9226 |
| Minimum | 35 | 443 | 1772 | 3255 |



| Date | 69553 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 69553 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 214 | 909 | 31097 | 4517 |
| 08/01/14 | 160 | 637 | 24522 | 3564 |
| 08/02/14 | 210 | 863 | 29498 | 4282 |
| 08/03/14 | 191 | 819 | 29686 | 4347 |
| 08/04/14 | 202 | 844 | 28601 | 4142 |
| 08/05/14 | 196 | 833 | 31130 | 4539 |
| 08/06/14 | 168 | 707 | 27704 | 4077 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | 206 | 740 | 29180 | 4340 |
| 08/15/14 | 166 | 784 | 26350 | 3902 |
| 08/16/14 | 179 | 799 | 25790 | 3757 |
| 08/17/14 | 205 | 946 | 29995 | 4439 |
| 08/18/14 | 219 | 939 | 32177 | 4833 |
| 08/19/14 | 196 | 835 | 29942 | 4551 |
| 08/20/14 | 154 | 616 | 23009 | 3448 |
| 08/21/14 | 196 | 856 | 30029 | 4389 |
| 08/22/14 | 146 | 636 | 21173 | 3105 |
| 08/23/14 | 171 | 987 | 29584 | 4365 |
| 08/24/14 | 131 | 602 | 19406 | 2810 |
| 08/25/14 | 175 | 795 | 27973 | 4049 |
| 08/26/14 | 133 | 544 | 20587 | 3069 |
| 08/27/14 | | | | |
| 08/28/14 | 176 | 814 | 29173 | 4303 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 146 | 711 | 23055 | 3428 |
| 09/03/14 | | | | |
| 09/04/14 | 125 | 519 | 21770 | 3307 |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | 87 | 429 | 15482 | 2288 |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | 150 | 683 | 24156 | 3579 |

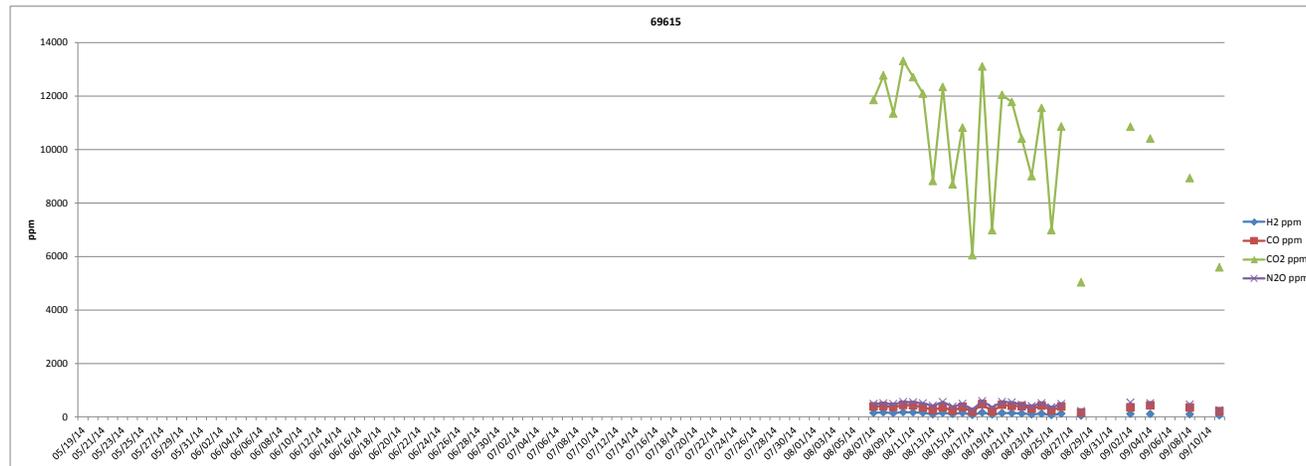
| | | | | |
|---------|-----|-----|-------|------|
| Maximum | 219 | 987 | 32177 | 4833 |
| Minimum | 87 | 429 | 15482 | 2288 |



| Date | 69615 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
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| 07/18/14 | | | | |
| 07/19/14 | | | | |

| 69615 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 151 | 392 | 11857 | 485 |
| 08/08/14 | 172 | 405 | 12777 | 506 |
| 08/09/14 | 141 | 369 | 11350 | 481 |
| 08/10/14 | 174 | 444 | 13317 | 558 |
| 08/11/14 | 169 | 436 | 12708 | 548 |
| 08/12/14 | 157 | 358 | 12093 | 510 |
| 08/13/14 | 96 | 263 | 8828 | 421 |
| 08/14/14 | 153 | 362 | 12342 | 557 |
| 08/15/14 | 108 | 236 | 8699 | 386 |
| 08/16/14 | 151 | 372 | 10826 | 489 |
| 08/17/14 | 72 | 194 | 6049 | 261 |
| 08/18/14 | 162 | 480 | 13109 | 592 |
| 08/19/14 | 88 | 208 | 6983 | 353 |
| 08/20/14 | 142 | 452 | 12049 | 562 |
| 08/21/14 | 141 | 412 | 11782 | 544 |
| 08/22/14 | 128 | 399 | 10413 | 453 |
| 08/23/14 | 94 | 307 | 9007 | 407 |
| 08/24/14 | 122 | 420 | 11559 | 513 |
| 08/25/14 | 66 | 246 | 6986 | 362 |
| 08/26/14 | 121 | 384 | 10866 | 484 |
| 08/27/14 | | | | |
| 08/28/14 | 42 | 161 | 5032 | 221 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 114 | 355 | 10853 | 535 |
| 09/03/14 | | | | |
| 09/04/14 | 106 | 428 | 10414 | 511 |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | 95 | 352 | 8935 | 465 |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | 57 | 208 | 5595 | 251 |

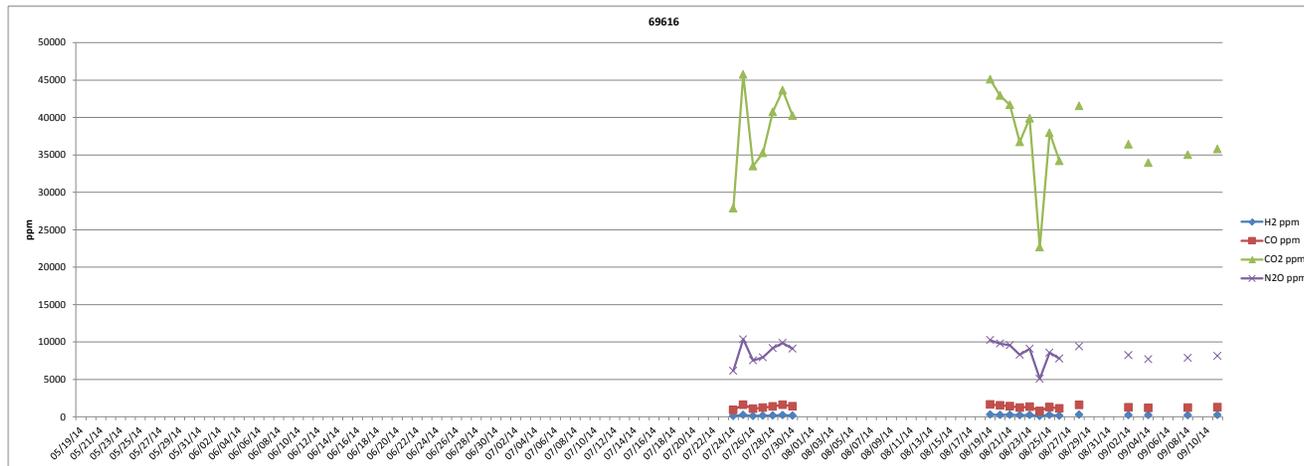
| | | | | |
|---------|-----|-----|-------|-----|
| Maximum | 174 | 480 | 13317 | 592 |
| Minimum | 42 | 161 | 5032 | 221 |



| Date | 69616 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
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| 06/02/14 | | | | |
| 06/03/14 | | | | |
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| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
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| 06/23/14 | | | | |
| 06/24/14 | | | | |
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| 06/26/14 | | | | |
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| 07/01/14 | | | | |
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| 07/04/14 | | | | |
| 07/05/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
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| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| 69616 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 115 | 918 | 27870 | 6152 |
| 07/25/14 | 268 | 1617 | 45757 | 10363 |
| 07/26/14 | 126 | 1098 | 33518 | 7547 |
| 07/27/14 | 165 | 1229 | 35267 | 7962 |
| 07/28/14 | 185 | 1396 | 40753 | 9194 |
| 07/29/14 | 239 | 1618 | 43649 | 9892 |
| 07/30/14 | 171 | 1406 | 40257 | 9120 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
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| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | 311 | 1650 | 45119 | 10266 |
| 08/20/14 | 266 | 1536 | 42951 | 9801 |
| 08/21/14 | 282 | 1437 | 41706 | 9580 |
| 08/22/14 | 226 | 1236 | 36738 | 8301 |
| 08/23/14 | 266 | 1367 | 39895 | 9110 |
| 08/24/14 | 118 | 788 | 22677 | 5088 |
| 08/25/14 | 264 | 1315 | 37969 | 8574 |
| 08/26/14 | 149 | 1125 | 34212 | 7789 |
| 08/27/14 | | | | |
| 08/28/14 | 289 | 1605 | 41551 | 9423 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 246 | 1275 | 36423 | 8257 |
| 09/03/14 | | | | |
| 09/04/14 | 235 | 1200 | 33958 | 7707 |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | 225 | 1245 | 35036 | 7885 |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | 261 | 1283 | 35802 | 8142 |

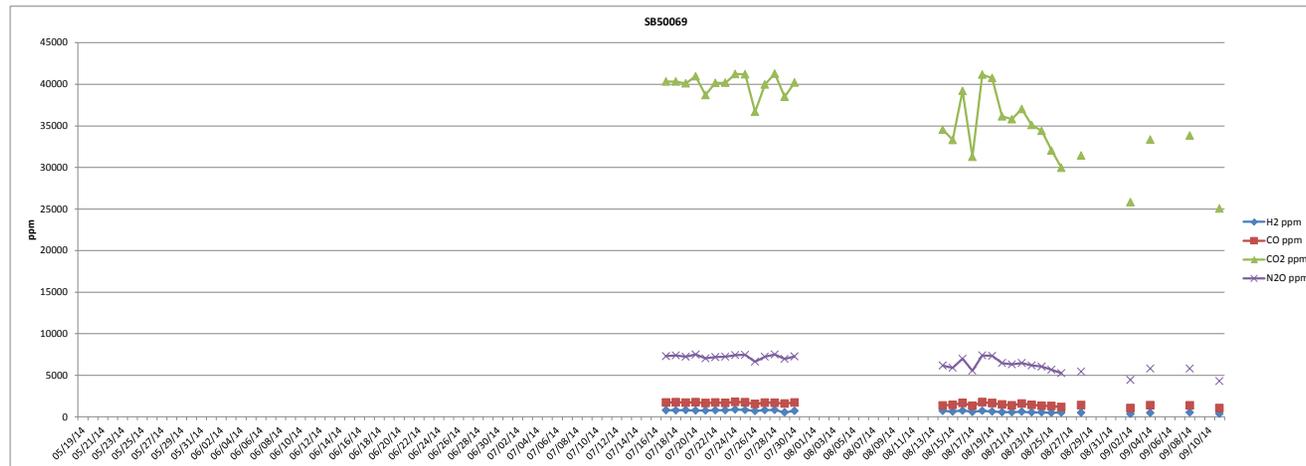
| | | | | |
|---------|-----|------|-------|-------|
| Maximum | 311 | 1650 | 45757 | 10363 |
| Minimum | 115 | 788 | 22677 | 5088 |



| Date | SB50069 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
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| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | | | | |
| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
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| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 799 | 1719 | 40330 | 7297 |
| 07/18/14 | 790 | 1752 | 40331 | 7402 |
| 07/19/14 | 821 | 1717 | 40114 | 7231 |

| SB50069 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 768 | 1765 | 40967 | 7495 |
| 07/21/14 | 776 | 1657 | 38707 | 7034 |
| 07/22/14 | 795 | 1724 | 40159 | 7193 |
| 07/23/14 | 794 | 1686 | 40188 | 7244 |
| 07/24/14 | 891 | 1810 | 41238 | 7433 |
| 07/25/14 | 835 | 1758 | 41207 | 7454 |
| 07/26/14 | 713 | 1547 | 36694 | 6643 |
| 07/27/14 | 809 | 1716 | 39981 | 7234 |
| 07/28/14 | 831 | 1694 | 41282 | 7502 |
| 07/29/14 | 547 | 1607 | 38496 | 6963 |
| 07/30/14 | 727 | 1720 | 40217 | 7274 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | 720 | 1370 | 34540 | 6169 |
| 08/15/14 | 647 | 1437 | 33305 | 5908 |
| 08/16/14 | 758 | 1682 | 39200 | 6989 |
| 08/17/14 | 595 | 1333 | 31273 | 5554 |
| 08/18/14 | 741 | 1775 | 41161 | 7389 |
| 08/19/14 | 639 | 1657 | 40763 | 7335 |
| 08/20/14 | 569 | 1498 | 36150 | 6483 |
| 08/21/14 | 570 | 1386 | 35803 | 6314 |
| 08/22/14 | 623 | 1594 | 37026 | 6477 |
| 08/23/14 | 541 | 1442 | 35104 | 6190 |
| 08/24/14 | 542 | 1331 | 34395 | 6049 |
| 08/25/14 | 498 | 1301 | 32036 | 5664 |
| 08/26/14 | 522 | 1183 | 29958 | 5262 |
| 08/27/14 | | | | |
| 08/28/14 | 499 | 1413 | 31439 | 5454 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 364 | 1048 | 25820 | 4435 |
| 09/03/14 | | | | |
| 09/04/14 | 484 | 1391 | 33346 | 5801 |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | 529 | 1387 | 33835 | 5812 |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | 375 | 1055 | 25053 | 4295 |

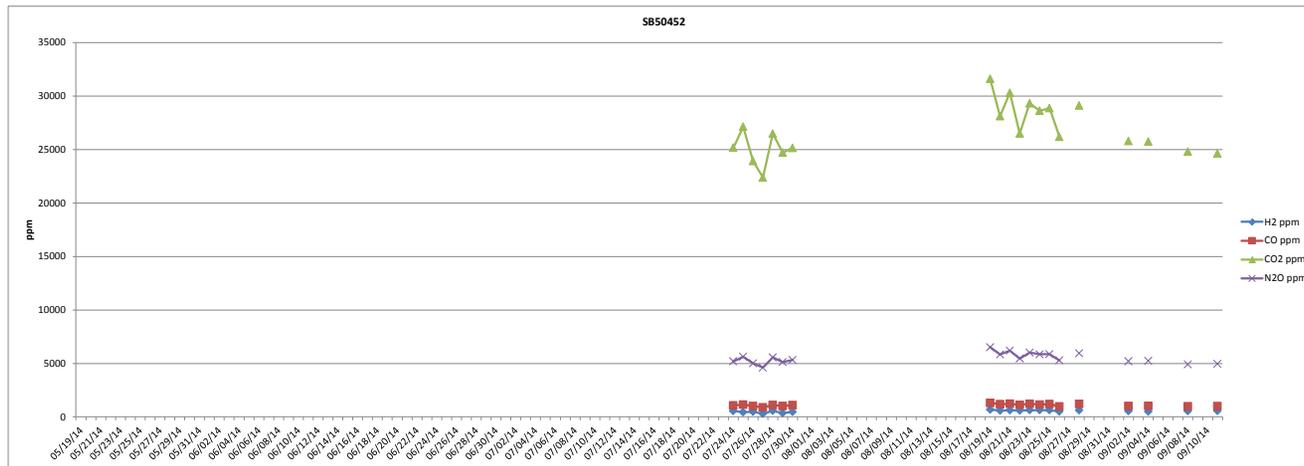
| | | | | |
|---------|-----|------|-------|------|
| Maximum | 891 | 1810 | 41282 | 7502 |
| Minimum | 364 | 1048 | 25053 | 4295 |



| Date | SB50452 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
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| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
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| 06/15/14 | | | | |
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| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
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| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| SB50452 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 551 | 1069 | 25183 | 5196 |
| 07/25/14 | 439 | 1149 | 27142 | 5630 |
| 07/26/14 | 486 | 1014 | 23931 | 5001 |
| 07/27/14 | 296 | 895 | 22385 | 4603 |
| 07/28/14 | 578 | 1113 | 26505 | 5555 |
| 07/29/14 | 359 | 1017 | 24723 | 5128 |
| 07/30/14 | 480 | 1093 | 25154 | 5320 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | | | | |
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| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | 677 | 1311 | 31626 | 6510 |
| 08/20/14 | 582 | 1181 | 28124 | 5833 |
| 08/21/14 | 624 | 1228 | 30314 | 6185 |
| 08/22/14 | 594 | 1121 | 26516 | 5457 |
| 08/23/14 | 634 | 1218 | 29331 | 6004 |
| 08/24/14 | 639 | 1148 | 28632 | 5854 |
| 08/25/14 | 639 | 1195 | 28881 | 5866 |
| 08/26/14 | 513 | 977 | 26195 | 5284 |
| 08/27/14 | | | | |
| 08/28/14 | 624 | 1208 | 29125 | 5949 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 548 | 1012 | 25803 | 5199 |
| 09/03/14 | | | | |
| 09/04/14 | 499 | 1021 | 25752 | 5240 |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | 543 | 985 | 24810 | 4914 |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | 565 | 997 | 24647 | 4958 |

| | | | | |
|---------|-----|------|-------|------|
| Maximum | 677 | 1311 | 31626 | 6510 |
| Minimum | 296 | 895 | 22385 | 4603 |

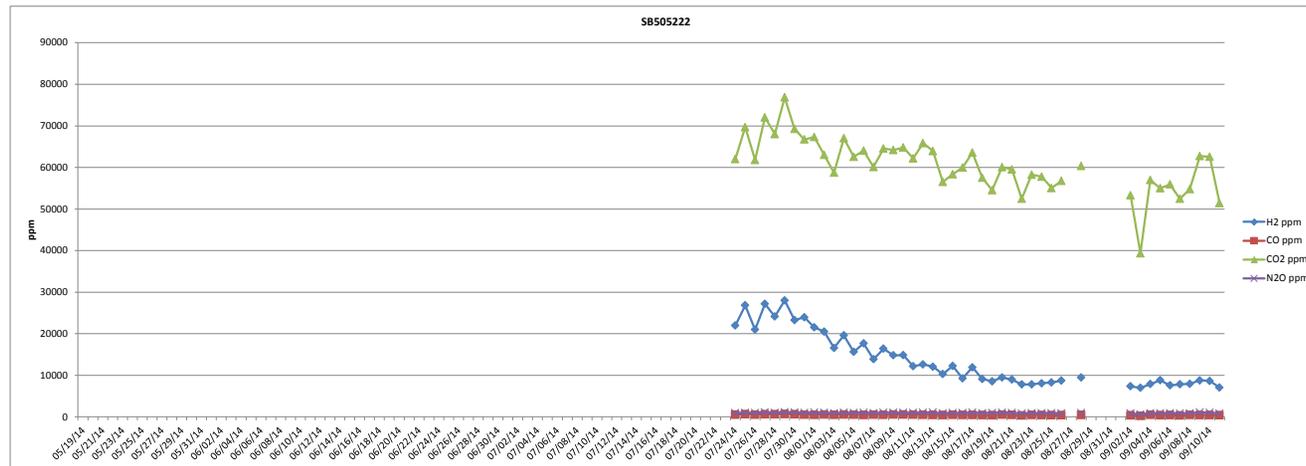


| Date | SB50522 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
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| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
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| 06/07/14 | | | | |
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| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| SB50522 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 21975 | 539 | 62032 | 945 |
| 07/25/14 | 26838 | 662 | 69674 | 993 |
| 07/26/14 | 20998 | 537 | 61790 | 971 |
| 07/27/14 | 27179 | 639 | 72050 | 1134 |
| 07/28/14 | 24154 | 630 | 68024 | 1011 |
| 07/29/14 | 28020 | 684 | 76858 | 1155 |
| 07/30/14 | 23282 | 626 | 69258 | 1086 |
| 07/31/14 | 23961 | 525 | 66745 | 982 |
| 08/01/14 | 21551 | 509 | 67320 | 1068 |
| 08/02/14 | 20507 | 563 | 63031 | 989 |
| 08/03/14 | 16585 | 510 | 58759 | 916 |
| 08/04/14 | 19640 | 554 | 67041 | 1031 |
| 08/05/14 | 15630 | 522 | 62544 | 964 |
| 08/06/14 | 17687 | 476 | 64068 | 1036 |
| 08/07/14 | 13890 | 520 | 60111 | 920 |
| 08/08/14 | 16420 | 496 | 64567 | 1027 |
| 08/09/14 | 14813 | 573 | 64181 | 1032 |
| 08/10/14 | 14862 | 554 | 64810 | 991 |
| 08/11/14 | 12188 | 538 | 62173 | 1017 |
| 08/12/14 | 12624 | 507 | 65850 | 1028 |
| 08/13/14 | 12071 | 472 | 63927 | 1104 |
| 08/14/14 | 10291 | 439 | 56528 | 873 |
| 08/15/14 | 12242 | 489 | 58382 | 976 |
| 08/16/14 | 9258 | 455 | 59976 | 928 |
| 08/17/14 | 11912 | 469 | 63588 | 1078 |
| 08/18/14 | 9111 | 448 | 57532 | 918 |
| 08/19/14 | 8549 | 419 | 54547 | 968 |
| 08/20/14 | 9490 | 543 | 60061 | 1040 |
| 08/21/14 | 8971 | 460 | 59551 | 972 |
| 08/22/14 | 7829 | 352 | 52471 | 829 |
| 08/23/14 | 7816 | 456 | 58254 | 894 |
| 08/24/14 | 8081 | 443 | 57782 | 908 |
| 08/25/14 | 8300 | 394 | 55044 | 920 |
| 08/26/14 | 8713 | 400 | 56774 | 872 |
| 08/27/14 | | | | |
| 08/28/14 | 9472 | 455 | 60365 | 967 |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | 7373 | 362 | 53304 | 859 |
| 09/03/14 | 6986 | 259 | 39338 | 633 |
| 09/04/14 | 7911 | 500 | 57002 | 924 |
| 09/05/14 | 8823 | 407 | 55026 | 900 |
| 09/06/14 | 7588 | 425 | 55944 | 907 |
| 09/07/14 | 7841 | 343 | 52486 | 840 |
| 09/08/14 | 7930 | 460 | 54799 | 886 |
| 09/09/14 | 8771 | 427 | 62741 | 1082 |
| 09/10/14 | 8625 | 427 | 62596 | 1031 |
| 09/11/14 | 7071 | 391 | 51431 | 822 |

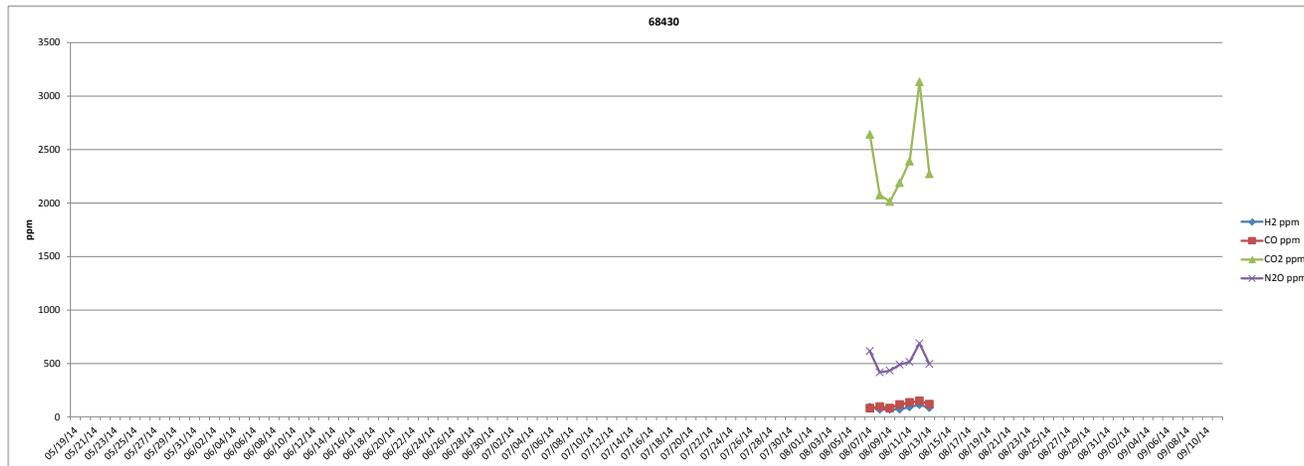
| | | | | |
|---------|-------|-----|-------|------|
| Maximum | 28020 | 684 | 76858 | 1155 |
| Minimum | 6986 | 259 | 39338 | 633 |



| Date | 68430 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| Date | 68430 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
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| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 91 | 82 | 2642 | 615 |
| 08/08/14 | 70 | 96 | 2075 | 416 |
| 08/09/14 | 69 | 82 | 2014 | 433 |
| 08/10/14 | 70 | 116 | 2189 | 488 |
| 08/11/14 | 92 | 135 | 2391 | 514 |
| 08/12/14 | 112 | 150 | 3133 | 687 |
| 08/13/14 | 86 | 118 | 2272 | 494 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
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|---------|-----|-----|------|-----|
| Maximum | 112 | 150 | 3133 | 687 |
| Minimum | 69 | 82 | 2014 | 416 |

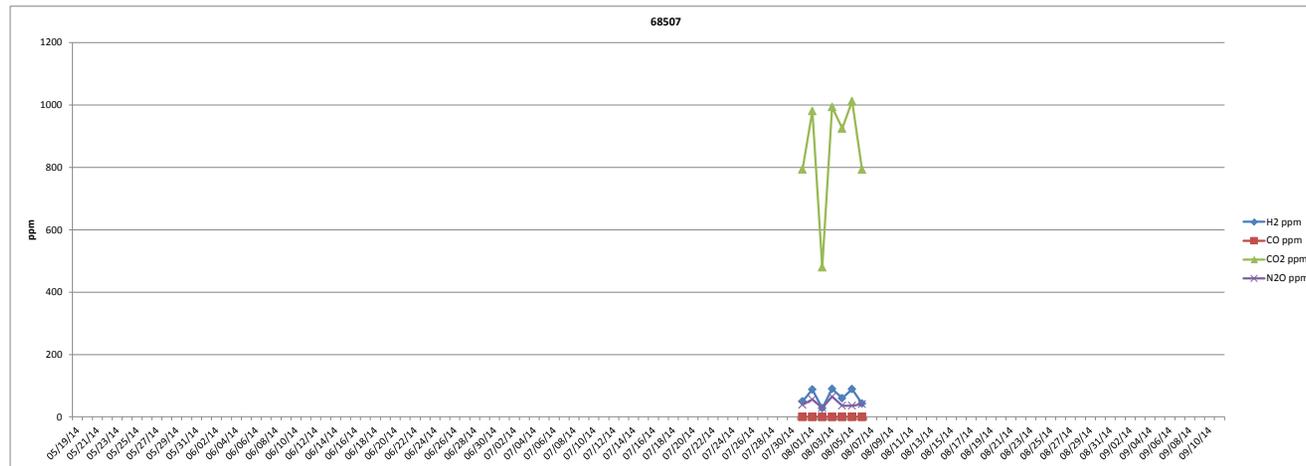


| Date | 68507 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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Headspace Gas Analysis Results for Container 68685

| 68507 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
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| 07/22/14 | | | | |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 50 | 0 | 794 | 39 |
| 08/01/14 | 88 | 0 | 981 | 56 |
| 08/02/14 | 28 | 0 | 480 | 29 |
| 08/03/14 | 90 | 0 | 994 | 65 |
| 08/04/14 | 60 | 0 | 925 | 36 |
| 08/05/14 | 89 | 0 | 1013 | 36 |
| 08/06/14 | 43 | 0 | 793 | 41 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
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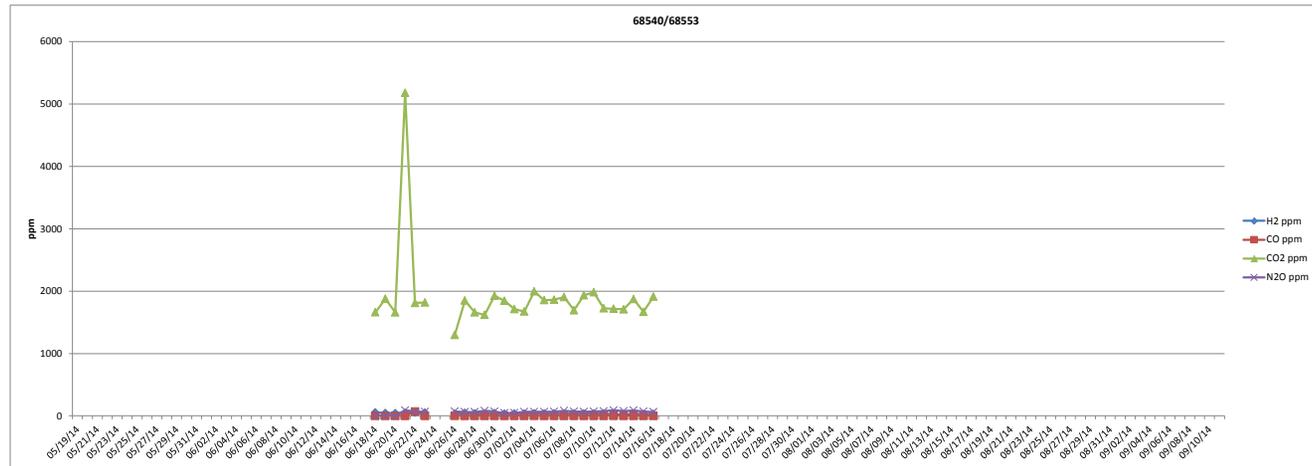
| | | | | |
|---------|----|---|------|----|
| Maximum | 90 | 0 | 1013 | 65 |
| Minimum | 28 | 0 | 480 | 29 |



| Date | 68540/68553 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 56 | 0 | 1662 | 0 |
| 06/19/14 | 45 | 0 | 1880 | 0 |
| 06/20/14 | 43 | 0 | 1660 | 0 |
| 06/21/14 | 45 | 0 | 5182 | 90 |
| 06/22/14 | 53 | 69 | 1811 | 68 |
| 06/23/14 | 52 | 0 | 1820 | 67 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 33 | 0 | 1298 | 73 |
| 06/27/14 | 48 | 0 | 1850 | 62 |
| 06/28/14 | 37 | 0 | 1661 | 63 |
| 06/29/14 | 35 | 0 | 1621 | 81 |
| 06/30/14 | 44 | 0 | 1925 | 70 |
| 07/01/14 | 35 | 0 | 1846 | 43 |
| 07/02/14 | 38 | 0 | 1712 | 47 |
| 07/03/14 | 36 | 0 | 1674 | 65 |
| 07/04/14 | 40 | 0 | 1997 | 64 |
| 07/05/14 | 37 | 0 | 1856 | 64 |
| 07/06/14 | 37 | 0 | 1863 | 68 |
| 07/07/14 | 37 | 0 | 1906 | 84 |
| 07/08/14 | 35 | 0 | 1694 | 72 |
| 07/09/14 | 37 | 0 | 1934 | 64 |
| 07/10/14 | 37 | 0 | 1983 | 71 |
| 07/11/14 | 37 | 0 | 1725 | 76 |
| 07/12/14 | 28 | 0 | 1718 | 90 |
| 07/13/14 | 22 | 0 | 1708 | 78 |
| 07/14/14 | 33 | 0 | 1874 | 89 |
| 07/15/14 | 29 | 0 | 1669 | 72 |
| 07/16/14 | 31 | 0 | 1914 | 63 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 68540/68553 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/21/14 | | | | |
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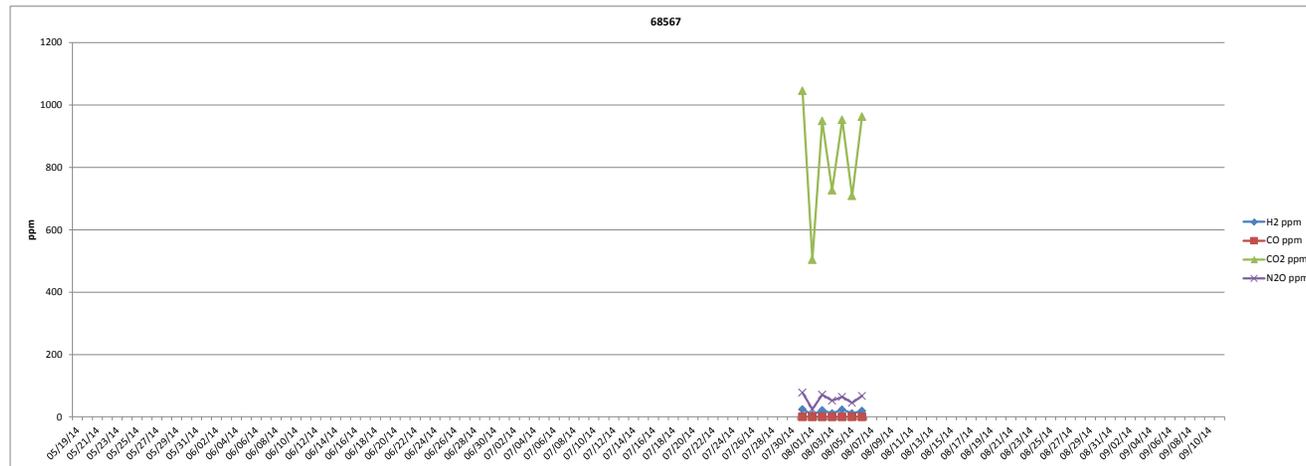
| | | | | |
|---------|----|----|------|----|
| Maximum | 56 | 69 | 5182 | 90 |
| Minimum | 22 | 0 | 1298 | 0 |



| Date | 68567 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 68567 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
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| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 24 | 0 | 1046 | 78 |
| 08/01/14 | 7 | 0 | 504 | 25 |
| 08/02/14 | 21 | 0 | 949 | 71 |
| 08/03/14 | 11 | 0 | 727 | 52 |
| 08/04/14 | 23 | 0 | 953 | 64 |
| 08/05/14 | 11 | 0 | 709 | 45 |
| 08/06/14 | 19 | 0 | 963 | 67 |
| 08/07/14 | | | | |
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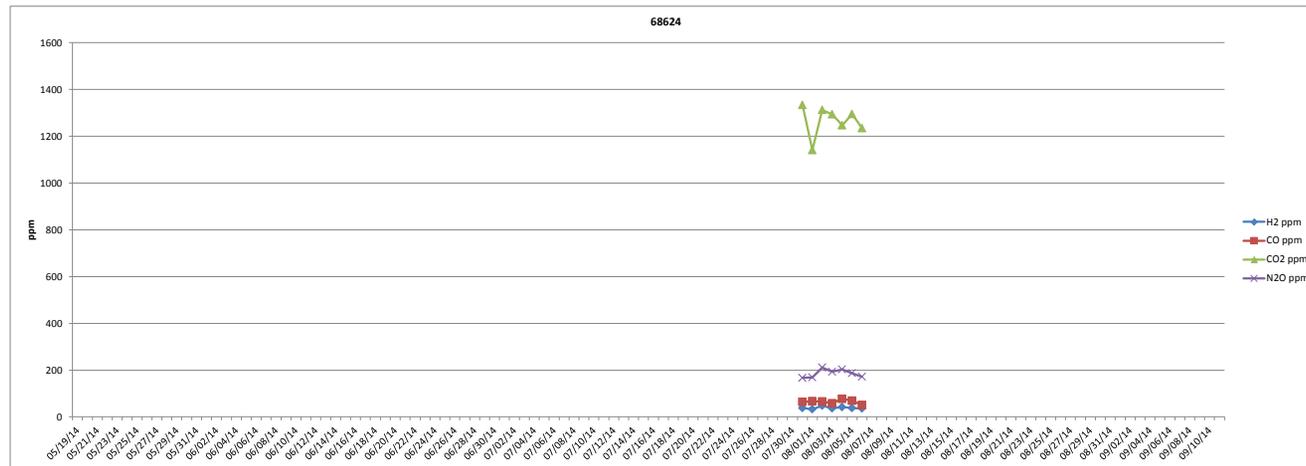
| | | | | |
|---------|----|---|------|----|
| Maximum | 24 | 0 | 1046 | 78 |
| Minimum | 7 | 0 | 504 | 25 |



| Date | 68624 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 68624 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 38 | 64 | 1334 | 167 |
| 08/01/14 | 33 | 67 | 1141 | 169 |
| 08/02/14 | 48 | 66 | 1313 | 211 |
| 08/03/14 | 37 | 58 | 1294 | 193 |
| 08/04/14 | 42 | 77 | 1247 | 203 |
| 08/05/14 | 38 | 69 | 1295 | 187 |
| 08/06/14 | 36 | 51 | 1235 | 172 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
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| 08/26/14 | | | | |
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| 08/28/14 | | | | |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|----|----|------|-----|
| Maximum | 48 | 77 | 1334 | 211 |
| Minimum | 33 | 51 | 1141 | 167 |

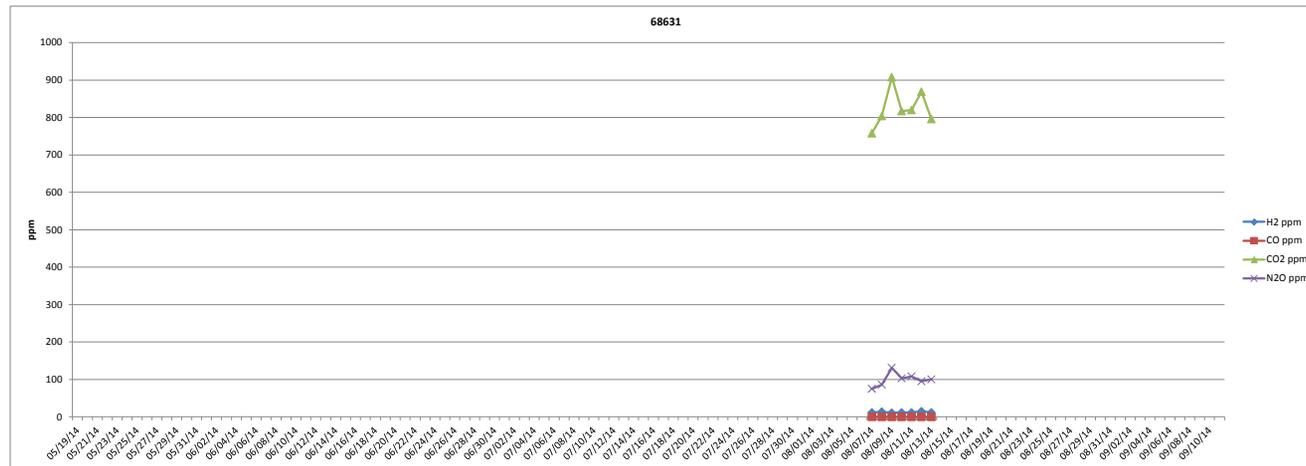


| Date | 68631 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
| 06/06/14 | | | | |
| 06/07/14 | | | | |
| 06/08/14 | | | | |
| 06/09/14 | | | | |
| 06/10/14 | | | | |
| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
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| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | | | | |
| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
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| 07/09/14 | | | | |
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| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| Date | 68631 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 12 | 0 | 758 | 75 |
| 08/08/14 | 14 | 0 | 804 | 86 |
| 08/09/14 | 11 | 0 | 908 | 131 |
| 08/10/14 | 12 | 0 | 817 | 103 |
| 08/11/14 | 12 | 0 | 820 | 108 |
| 08/12/14 | 15 | 0 | 869 | 95 |
| 08/13/14 | 12 | 0 | 796 | 100 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
| 08/23/14 | | | | |
| 08/24/14 | | | | |
| 08/25/14 | | | | |
| 08/26/14 | | | | |
| 08/27/14 | | | | |
| 08/28/14 | | | | |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|----|---|-----|-----|
| Maximum | 15 | 0 | 908 | 131 |
| Minimum | 11 | 0 | 758 | 75 |

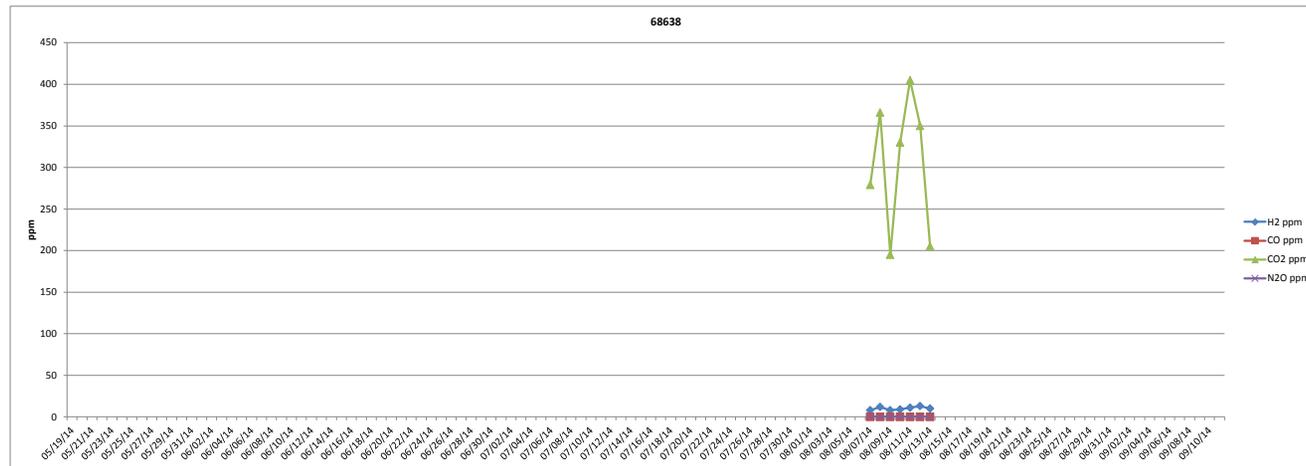


| Date | 68638 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
| 06/06/14 | | | | |
| 06/07/14 | | | | |
| 06/08/14 | | | | |
| 06/09/14 | | | | |
| 06/10/14 | | | | |
| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
| 06/14/14 | | | | |
| 06/15/14 | | | | |
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| 06/18/14 | | | | |
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| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68638

| Date | 68638 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 8 | 0 | 279 | 0 |
| 08/08/14 | 12 | 0 | 366 | 0 |
| 08/09/14 | 8 | 0 | 195 | 0 |
| 08/10/14 | 9 | 0 | 330 | 0 |
| 08/11/14 | 11 | 0 | 405 | 0 |
| 08/12/14 | 13 | 0 | 350 | 0 |
| 08/13/14 | 10 | 0 | 205 | 0 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
| 08/23/14 | | | | |
| 08/24/14 | | | | |
| 08/25/14 | | | | |
| 08/26/14 | | | | |
| 08/27/14 | | | | |
| 08/28/14 | | | | |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

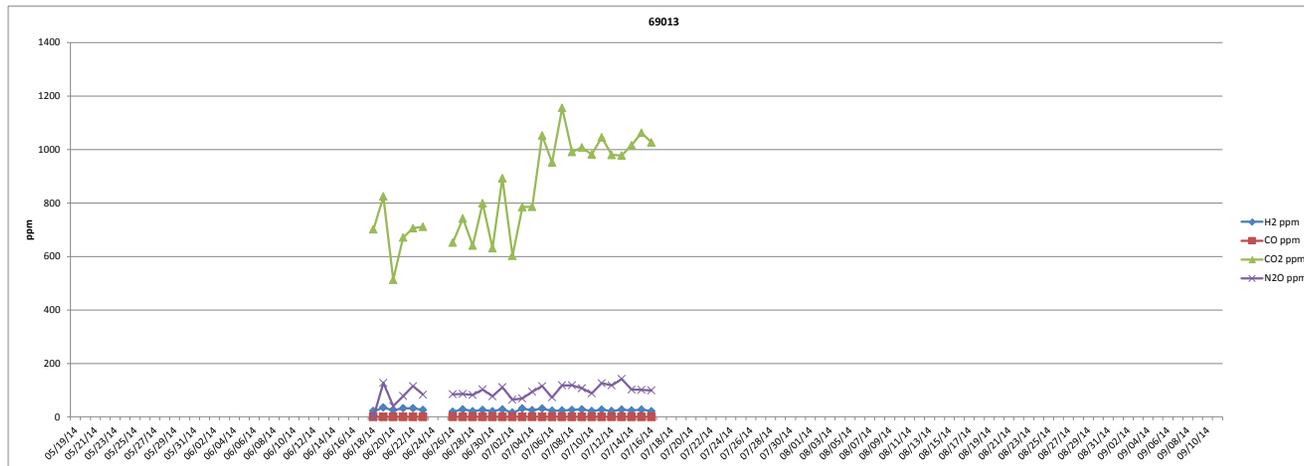
| | | | | |
|---------|----|---|-----|---|
| Maximum | 13 | 0 | 405 | 0 |
| Minimum | 8 | 0 | 195 | 0 |



| Date | 69013 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
| 06/06/14 | | | | |
| 06/07/14 | | | | |
| 06/08/14 | | | | |
| 06/09/14 | | | | |
| 06/10/14 | | | | |
| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 22 | 0 | 702 | 0 |
| 06/19/14 | 35 | 0 | 825 | 127 |
| 06/20/14 | 25 | 0 | 513 | 40 |
| 06/21/14 | 32 | 0 | 671 | 78 |
| 06/22/14 | 32 | 0 | 706 | 115 |
| 06/23/14 | 26 | 0 | 711 | 83 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 19 | 0 | 652 | 85 |
| 06/27/14 | 28 | 0 | 742 | 86 |
| 06/28/14 | 21 | 0 | 641 | 82 |
| 06/29/14 | 26 | 0 | 799 | 103 |
| 06/30/14 | 21 | 0 | 631 | 77 |
| 07/01/14 | 28 | 0 | 893 | 111 |
| 07/02/14 | 16 | 0 | 603 | 64 |
| 07/03/14 | 31 | 0 | 785 | 69 |
| 07/04/14 | 25 | 0 | 786 | 94 |
| 07/05/14 | 31 | 0 | 1053 | 115 |
| 07/06/14 | 23 | 0 | 952 | 73 |
| 07/07/14 | 24 | 0 | 1156 | 118 |
| 07/08/14 | 26 | 0 | 991 | 118 |
| 07/09/14 | 28 | 0 | 1008 | 107 |
| 07/10/14 | 22 | 0 | 982 | 88 |
| 07/11/14 | 27 | 0 | 1046 | 126 |
| 07/12/14 | 22 | 0 | 980 | 118 |
| 07/13/14 | 27 | 0 | 978 | 142 |
| 07/14/14 | 24 | 0 | 1016 | 102 |
| 07/15/14 | 27 | 0 | 1063 | 101 |
| 07/16/14 | 21 | 0 | 1027 | 99 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69013 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
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| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

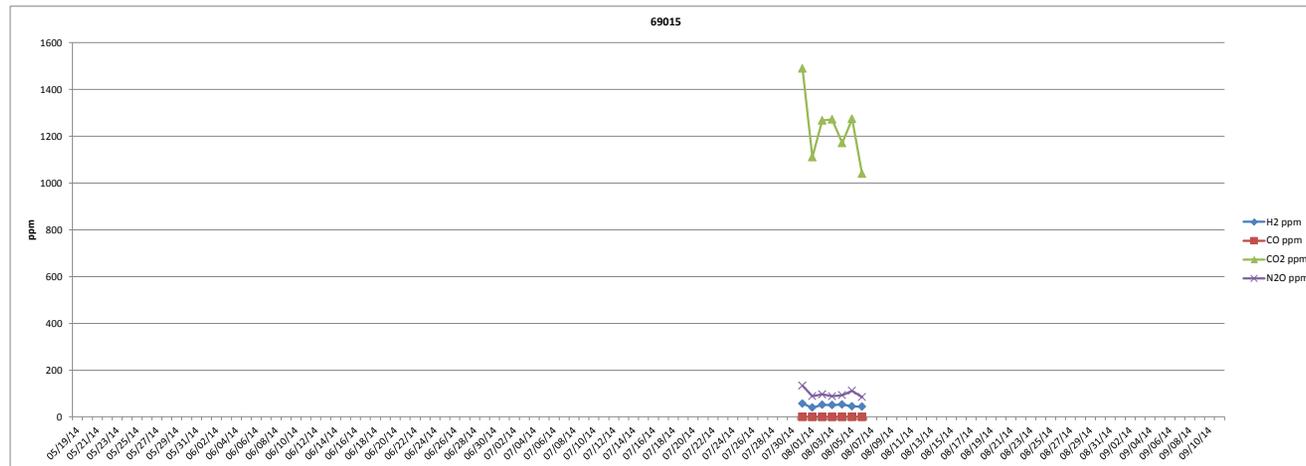
| | | | | |
|---------|----|---|------|-----|
| Maximum | 35 | 0 | 1156 | 142 |
| Minimum | 16 | 0 | 513 | 0 |



| Date | 69015 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
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| 05/26/14 | | | | |
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| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
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| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
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| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
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| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| 69015 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 57 | 0 | 1490 | 134 |
| 08/01/14 | 40 | 0 | 1111 | 89 |
| 08/02/14 | 52 | 0 | 1268 | 96 |
| 08/03/14 | 51 | 0 | 1272 | 88 |
| 08/04/14 | 53 | 0 | 1171 | 93 |
| 08/05/14 | 45 | 0 | 1275 | 112 |
| 08/06/14 | 44 | 0 | 1040 | 85 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
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| 08/15/14 | | | | |
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| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
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| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

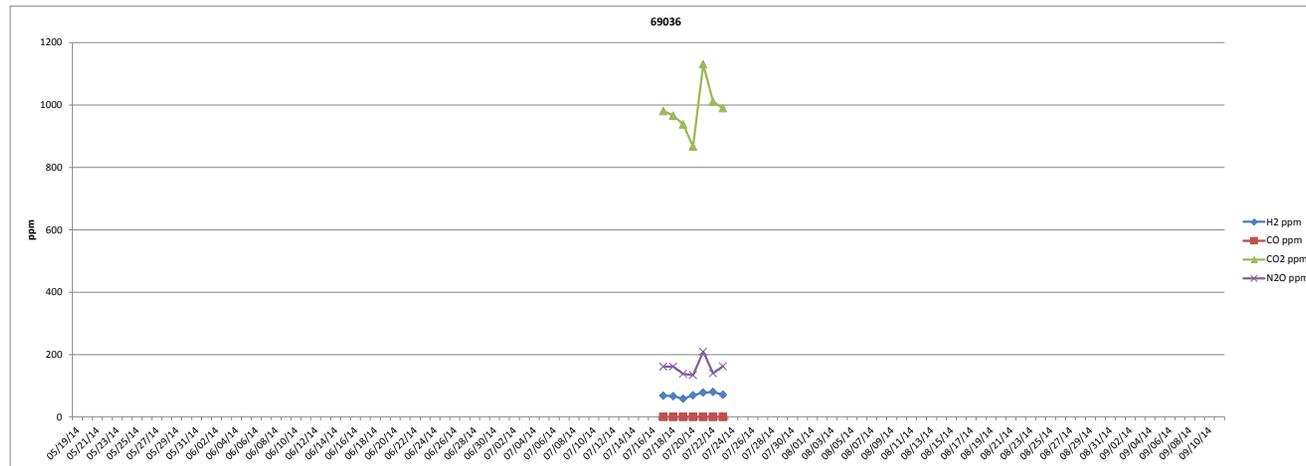
| | | | | |
|---------|----|---|------|-----|
| Maximum | 57 | 0 | 1490 | 134 |
| Minimum | 40 | 0 | 1040 | 85 |



| Date | 69036 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
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| 05/30/14 | | | | |
| 05/31/14 | | | | |
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| 06/02/14 | | | | |
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| 06/18/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 68 | 0 | 981 | 161 |
| 07/18/14 | 66 | 0 | 966 | 161 |
| 07/19/14 | 58 | 0 | 938 | 138 |

| Date | 69036 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 69 | 0 | 867 | 134 |
| 07/21/14 | 78 | 0 | 1131 | 209 |
| 07/22/14 | 80 | 0 | 1011 | 140 |
| 07/23/14 | 71 | 0 | 990 | 162 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
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| 09/11/14 | | | | |

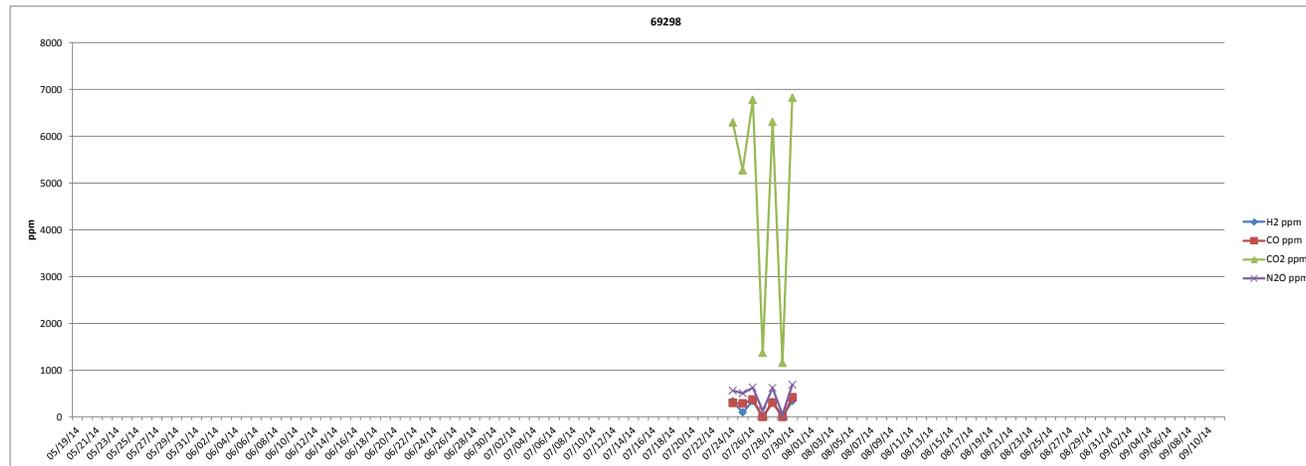
| | | | | |
|---------|----|---|------|-----|
| Maximum | 80 | 0 | 1131 | 209 |
| Minimum | 58 | 0 | 867 | 134 |



| Date | 69298 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
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| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69298 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 333 | 298 | 6298 | 562 |
| 07/25/14 | 97 | 288 | 5274 | 505 |
| 07/26/14 | 339 | 371 | 6780 | 627 |
| 07/27/14 | 3 | 0 | 1370 | 132 |
| 07/28/14 | 317 | 305 | 6308 | 619 |
| 07/29/14 | 4 | 0 | 1156 | 46 |
| 07/30/14 | 339 | 418 | 6826 | 687 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | | | | |
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| 08/31/14 | | | | |
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| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 339 | 418 | 6826 | 687 |
| Minimum | 3 | 0 | 1156 | 46 |

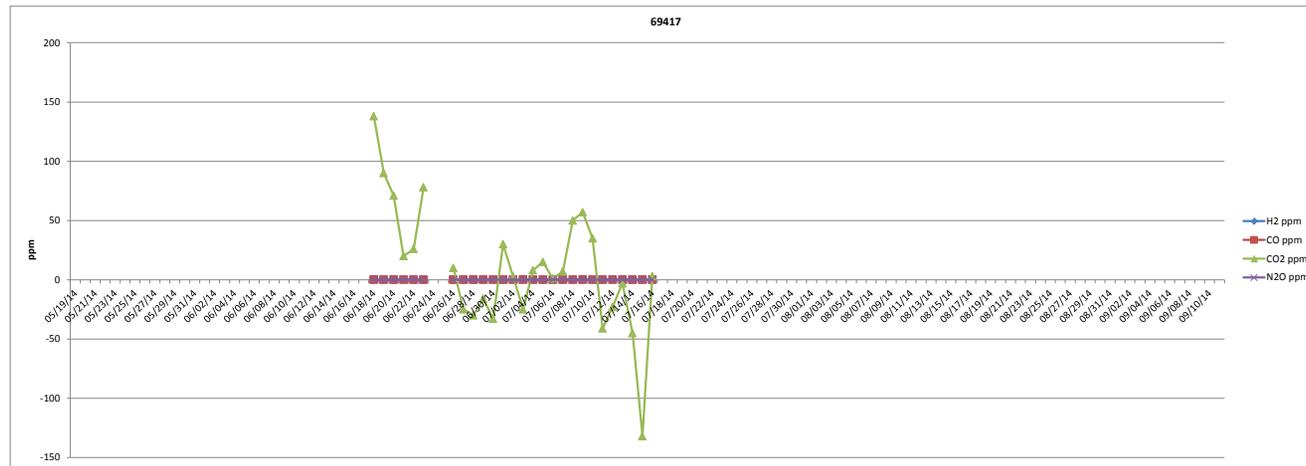


| Date | 69417 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
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| 06/08/14 | | | | |
| 06/09/14 | | | | |
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| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 0 | 0 | 138 | 0 |
| 06/19/14 | 0 | 0 | 90 | 0 |
| 06/20/14 | 0 | 0 | 71 | 0 |
| 06/21/14 | 0 | 0 | 20 | 0 |
| 06/22/14 | 0 | 0 | 26 | 0 |
| 06/23/14 | 0 | 0 | 78 | 0 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 0 | 0 | 10 | 0 |
| 06/27/14 | 0 | 0 | -25 | 0 |
| 06/28/14 | 0 | 0 | -30 | 0 |
| 06/29/14 | 0 | 0 | -16 | 0 |
| 06/30/14 | 0 | 0 | -33 | 0 |
| 07/01/14 | 0 | 0 | 30 | 0 |
| 07/02/14 | 0 | 0 | 3 | 0 |
| 07/03/14 | 0 | 0 | -25 | 0 |
| 07/04/14 | 0 | 0 | 8 | 0 |
| 07/05/14 | 0 | 0 | 15 | 0 |
| 07/06/14 | 0 | 0 | 1 | 0 |
| 07/07/14 | 0 | 0 | 7 | 0 |
| 07/08/14 | 0 | 0 | 50 | 0 |
| 07/09/14 | 0 | 0 | 57 | 0 |
| 07/10/14 | 0 | 0 | 35 | 0 |
| 07/11/14 | 0 | 0 | -41 | 0 |
| 07/12/14 | 0 | 0 | -23 | 0 |
| 07/13/14 | 0 | 0 | -3 | 0 |
| 07/14/14 | 0 | 0 | -45 | 0 |
| 07/15/14 | 0 | 0 | -132 | 0 |
| 07/16/14 | 0 | 0 | 3 | 0 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| 69417 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | | | | |
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| 08/02/14 | | | | |
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| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
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| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

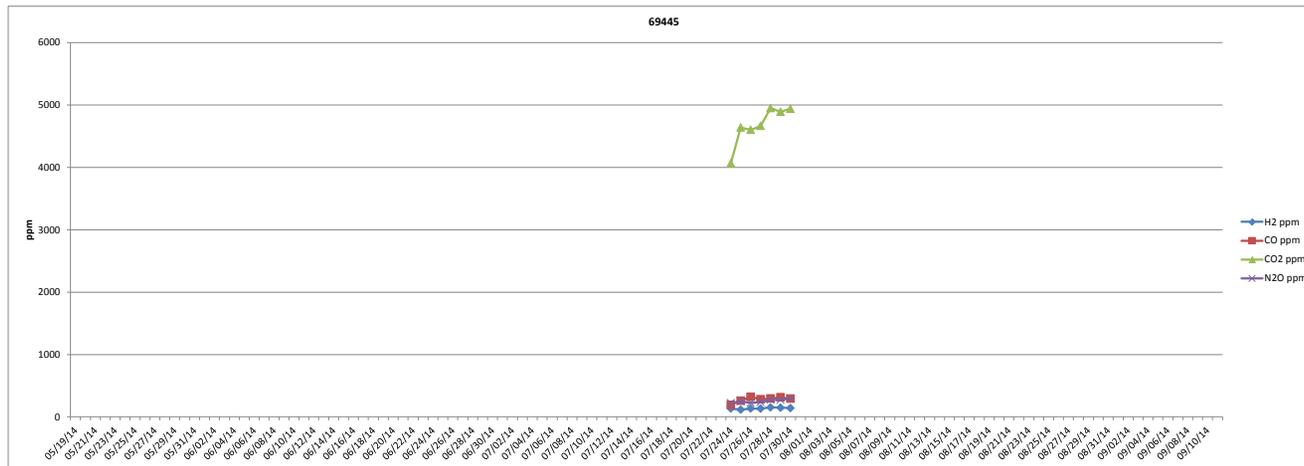
| | | | | |
|---------|---|---|------|---|
| Maximum | 0 | 0 | 138 | 0 |
| Minimum | 0 | 0 | -132 | 0 |



| Date | 69445 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
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| 05/27/14 | | | | |
| 05/28/14 | | | | |
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| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69445 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 133 | 192 | 4067 | 222 |
| 07/25/14 | 115 | 260 | 4642 | 250 |
| 07/26/14 | 133 | 322 | 4603 | 226 |
| 07/27/14 | 131 | 282 | 4667 | 237 |
| 07/28/14 | 151 | 295 | 4951 | 276 |
| 07/29/14 | 147 | 314 | 4892 | 271 |
| 07/30/14 | 141 | 293 | 4941 | 296 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
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| 09/11/14 | | | | |

| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 151 | 322 | 4951 | 296 |
| Minimum | 115 | 192 | 4067 | 222 |

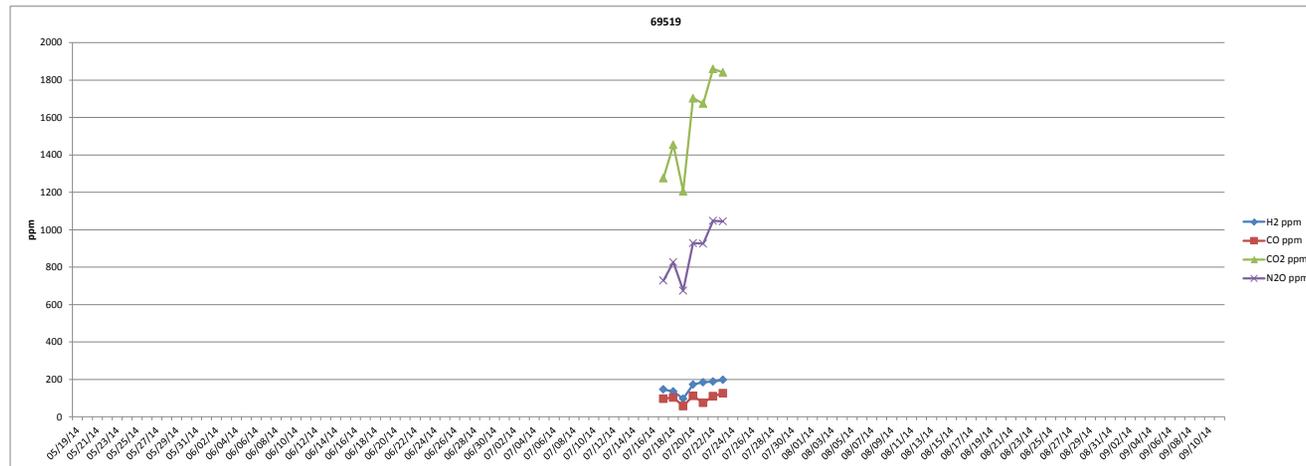


| Date | 69519 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
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| 07/11/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 147 | 97 | 1276 | 729 |
| 07/18/14 | 136 | 103 | 1454 | 827 |
| 07/19/14 | 97 | 58 | 1206 | 675 |

Headspace Gas Analysis Results for Container 68685

| 69519 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 173 | 112 | 1703 | 929 |
| 07/21/14 | 185 | 75 | 1675 | 926 |
| 07/22/14 | 189 | 110 | 1860 | 1048 |
| 07/23/14 | 198 | 126 | 1841 | 1045 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
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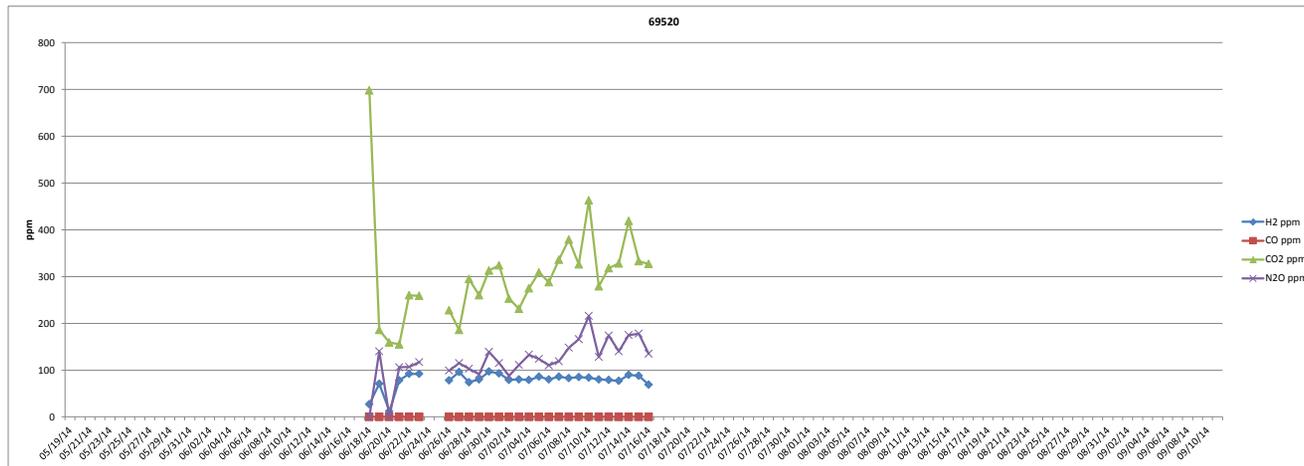
| | | | | |
|---------|-----|-----|------|------|
| Maximum | 198 | 126 | 1860 | 1048 |
| Minimum | 97 | 58 | 1206 | 675 |



| Date | 69520 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 27 | 0 | 698 | 0 |
| 06/19/14 | 71 | 0 | 186 | 140 |
| 06/20/14 | 12 | 0 | 159 | 0 |
| 06/21/14 | 78 | 0 | 155 | 106 |
| 06/22/14 | 92 | 0 | 260 | 107 |
| 06/23/14 | 92 | 0 | 259 | 117 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 78 | 0 | 228 | 99 |
| 06/27/14 | 96 | 0 | 186 | 115 |
| 06/28/14 | 74 | 0 | 295 | 103 |
| 06/29/14 | 80 | 0 | 260 | 91 |
| 06/30/14 | 97 | 0 | 313 | 139 |
| 07/01/14 | 93 | 0 | 324 | 115 |
| 07/02/14 | 79 | 0 | 253 | 88 |
| 07/03/14 | 80 | 0 | 231 | 111 |
| 07/04/14 | 79 | 0 | 275 | 133 |
| 07/05/14 | 86 | 0 | 309 | 124 |
| 07/06/14 | 80 | 0 | 288 | 110 |
| 07/07/14 | 86 | 0 | 336 | 119 |
| 07/08/14 | 83 | 0 | 379 | 148 |
| 07/09/14 | 85 | 0 | 326 | 166 |
| 07/10/14 | 84 | 0 | 463 | 216 |
| 07/11/14 | 80 | 0 | 279 | 128 |
| 07/12/14 | 79 | 0 | 318 | 174 |
| 07/13/14 | 77 | 0 | 328 | 140 |
| 07/14/14 | 90 | 0 | 419 | 175 |
| 07/15/14 | 88 | 0 | 333 | 178 |
| 07/16/14 | 69 | 0 | 327 | 135 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69520 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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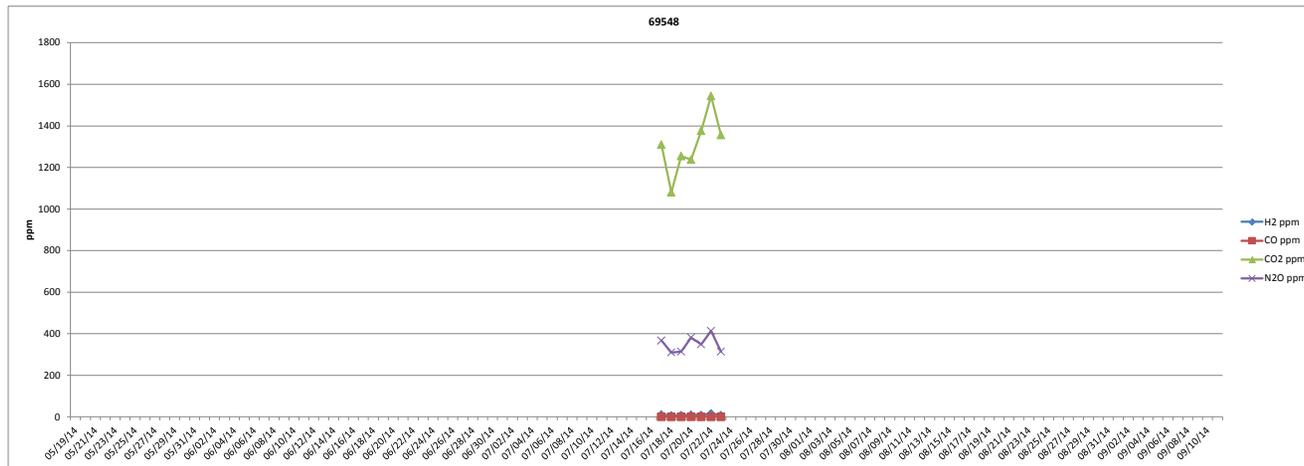
| | | | | |
|---------|----|---|-----|-----|
| Maximum | 97 | 0 | 698 | 216 |
| Minimum | 12 | 0 | 155 | 0 |



| Date | 69548 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 11 | 0 | 1310 | 367 |
| 07/18/14 | 7 | 0 | 1080 | 310 |
| 07/19/14 | 8 | 0 | 1255 | 314 |

| Date | 69548 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 10 | 0 | 1237 | 382 |
| 07/21/14 | 9 | 0 | 1376 | 349 |
| 07/22/14 | 16 | 0 | 1544 | 413 |
| 07/23/14 | 8 | 0 | 1356 | 314 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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|---------|----|---|------|-----|
| Maximum | 16 | 0 | 1544 | 413 |
| Minimum | 7 | 0 | 1080 | 310 |

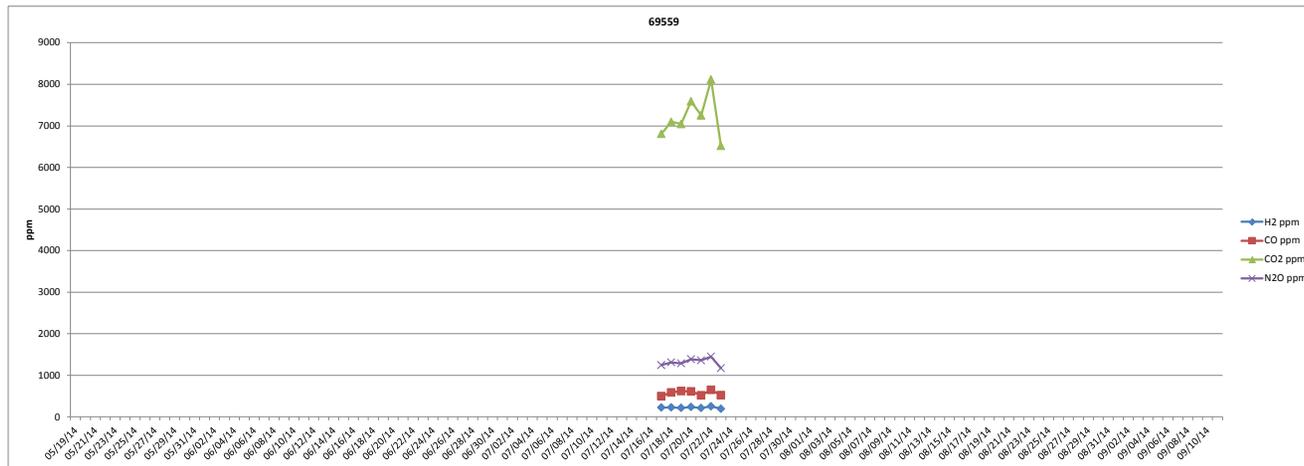


| Date | 69559 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 225 | 498 | 6809 | 1247 |
| 07/18/14 | 230 | 587 | 7097 | 1311 |
| 07/19/14 | 216 | 622 | 7043 | 1288 |

Headspace Gas Analysis Results for Container 68685

| 69559 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 237 | 613 | 7591 | 1387 |
| 07/21/14 | 214 | 517 | 7252 | 1360 |
| 07/22/14 | 253 | 649 | 8114 | 1450 |
| 07/23/14 | 196 | 520 | 6519 | 1170 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
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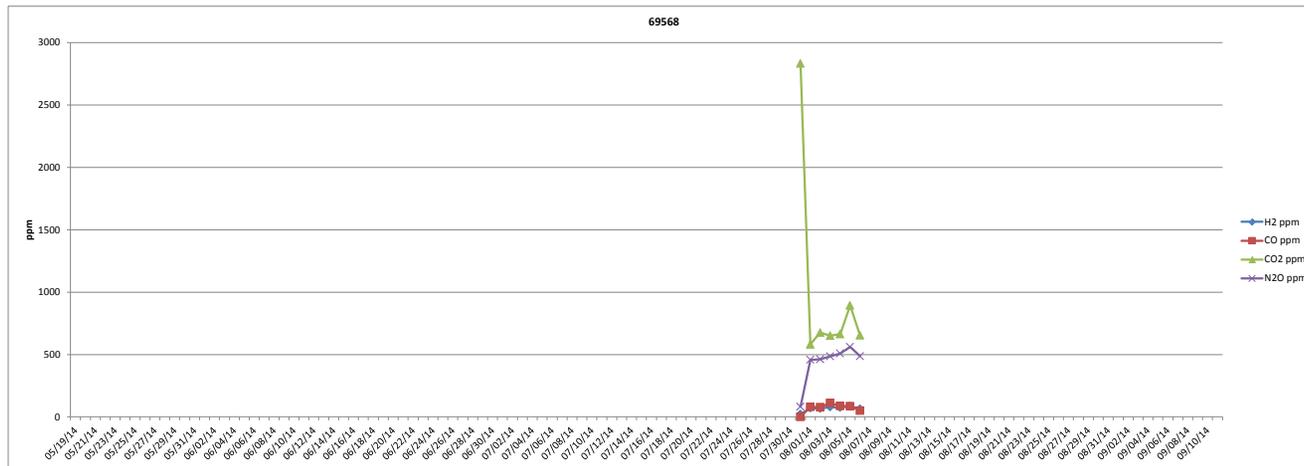
| | | | | |
|---------|-----|-----|------|------|
| Maximum | 253 | 649 | 8114 | 1450 |
| Minimum | 196 | 498 | 6519 | 1170 |



| Date | 69568 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 69568 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
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| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 23 | 0 | 2833 | 82 |
| 08/01/14 | 70 | 81 | 581 | 458 |
| 08/02/14 | 66 | 77 | 676 | 463 |
| 08/03/14 | 78 | 112 | 651 | 486 |
| 08/04/14 | 74 | 88 | 664 | 509 |
| 08/05/14 | 87 | 86 | 894 | 561 |
| 08/06/14 | 65 | 50 | 654 | 487 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
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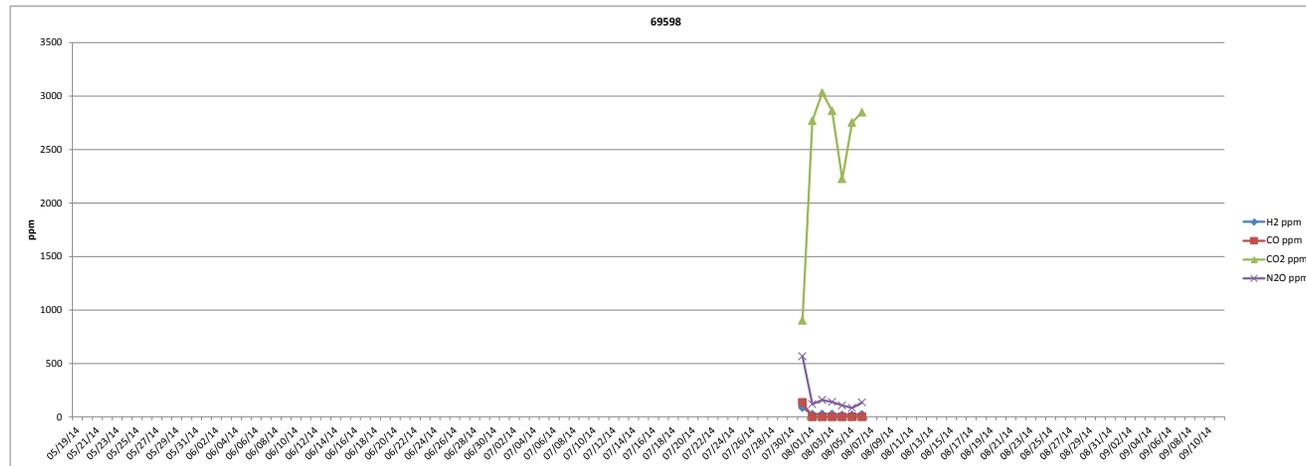
| | | | | |
|---------|----|-----|------|-----|
| Maximum | 87 | 112 | 2833 | 561 |
| Minimum | 23 | 0 | 581 | 82 |



| Date | 69598 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
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| 69598 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 85 | 135 | 902 | 567 |
| 08/01/14 | 25 | 0 | 2770 | 118 |
| 08/02/14 | 27 | 0 | 3032 | 159 |
| 08/03/14 | 27 | 0 | 2863 | 140 |
| 08/04/14 | 18 | 0 | 2226 | 106 |
| 08/05/14 | 20 | 0 | 2754 | 84 |
| 08/06/14 | 23 | 0 | 2849 | 135 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
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|---------|----|-----|------|-----|
| Maximum | 85 | 135 | 3032 | 567 |
| Minimum | 18 | 0 | 902 | 84 |

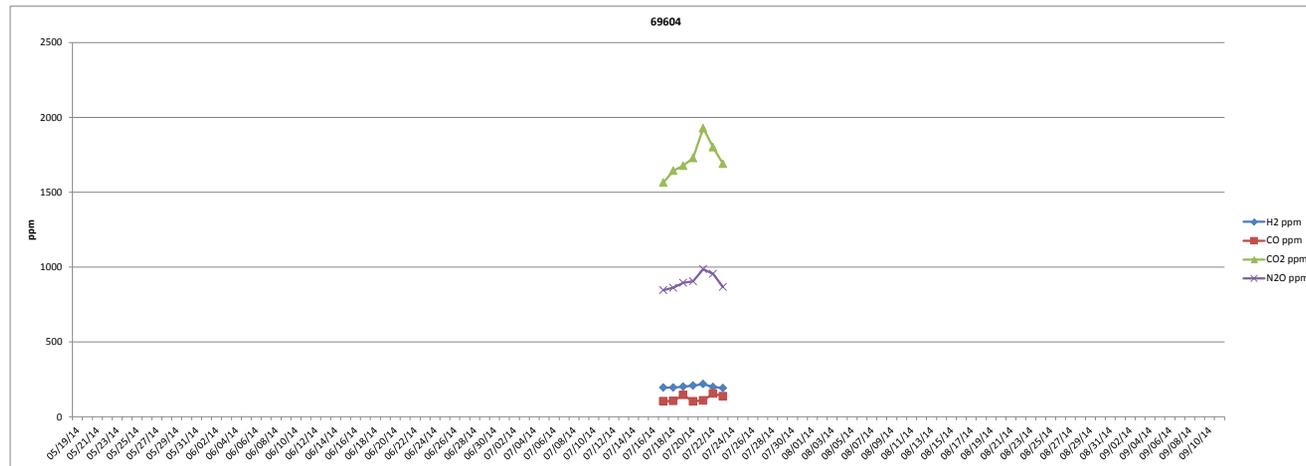


| Date | 69604 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
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| 05/22/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 196 | 105 | 1566 | 847 |
| 07/18/14 | 196 | 107 | 1645 | 863 |
| 07/19/14 | 202 | 147 | 1678 | 896 |

Headspace Gas Analysis Results for Container 68685

| Date | 69604 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 209 | 104 | 1730 | 906 |
| 07/21/14 | 220 | 110 | 1929 | 987 |
| 07/22/14 | 200 | 156 | 1802 | 956 |
| 07/23/14 | 193 | 138 | 1691 | 868 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
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| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 220 | 156 | 1929 | 987 |
| Minimum | 193 | 104 | 1566 | 847 |

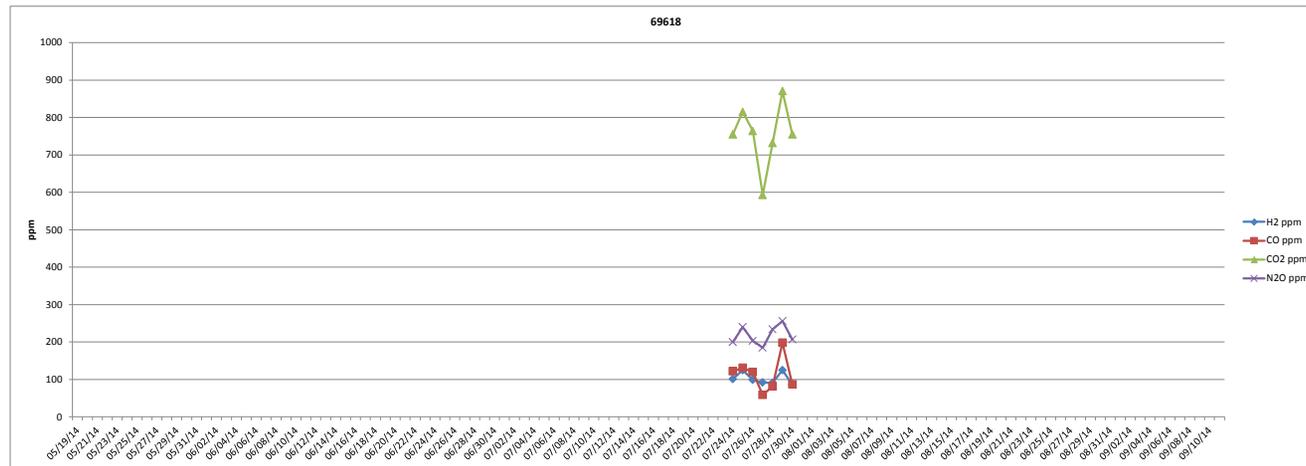


| Date | 69618 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
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| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| Date | 69618 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 101 | 122 | 755 | 200 |
| 07/25/14 | 125 | 131 | 815 | 240 |
| 07/26/14 | 99 | 120 | 764 | 203 |
| 07/27/14 | 92 | 59 | 593 | 185 |
| 07/28/14 | 91 | 82 | 732 | 234 |
| 07/29/14 | 125 | 198 | 871 | 256 |
| 07/30/14 | 86 | 87 | 755 | 207 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
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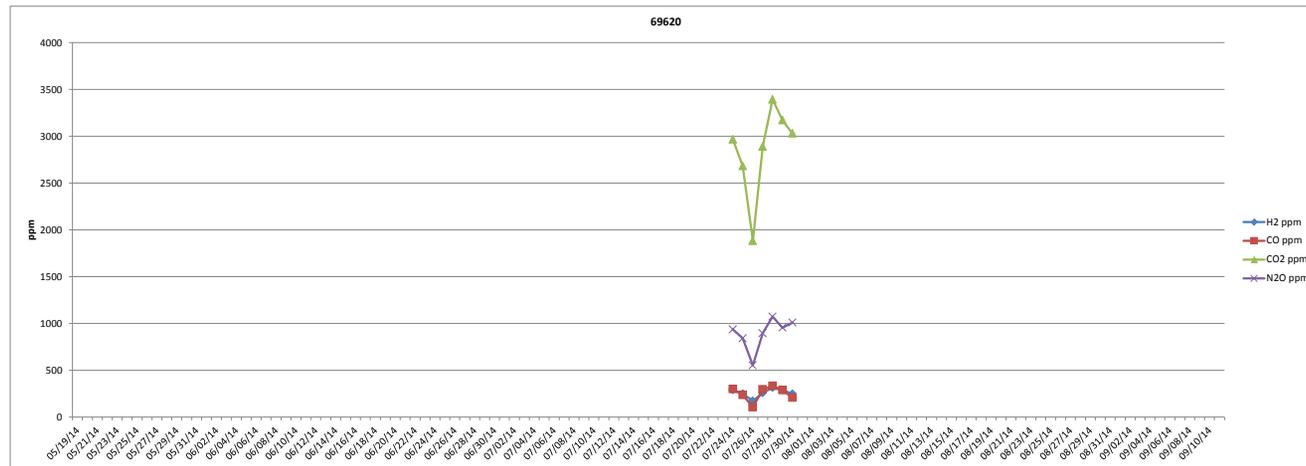
| | | | | |
|---------|-----|-----|-----|-----|
| Maximum | 125 | 198 | 871 | 256 |
| Minimum | 86 | 59 | 593 | 185 |



| Date | 69620 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
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| 07/19/14 | | | | |

| Date | 69620 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 287 | 299 | 2967 | 935 |
| 07/25/14 | 248 | 236 | 2682 | 840 |
| 07/26/14 | 171 | 105 | 1883 | 551 |
| 07/27/14 | 255 | 294 | 2890 | 895 |
| 07/28/14 | 313 | 332 | 3394 | 1072 |
| 07/29/14 | 287 | 288 | 3172 | 954 |
| 07/30/14 | 247 | 206 | 3031 | 1009 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
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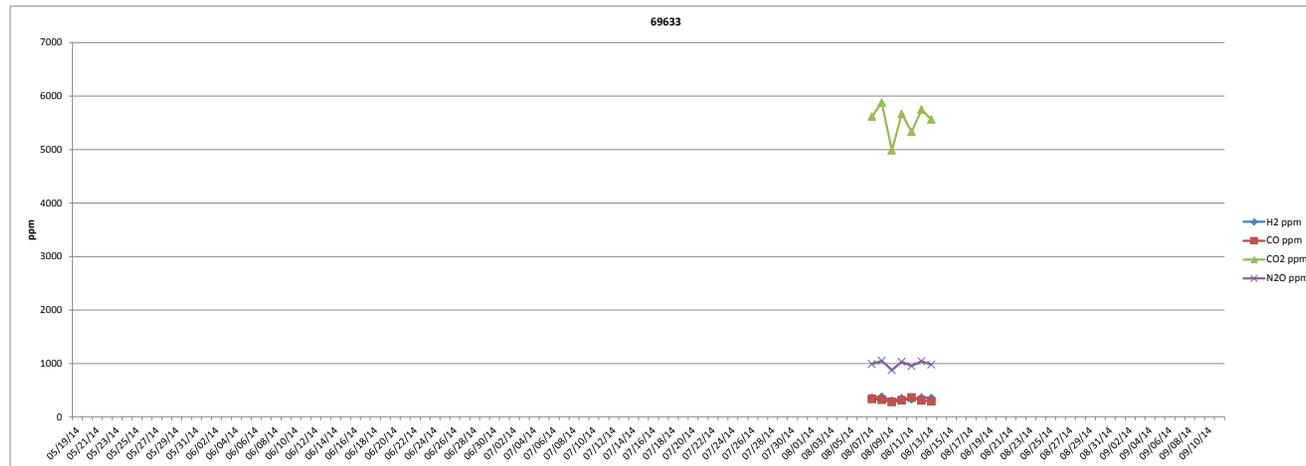
| | | | | |
|---------|-----|-----|------|------|
| Maximum | 313 | 332 | 3394 | 1072 |
| Minimum | 171 | 105 | 1883 | 551 |



| Date | 69633 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/19/14 | | | | |

| 69633 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
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| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 357 | 334 | 5617 | 989 |
| 08/08/14 | 375 | 321 | 5879 | 1050 |
| 08/09/14 | 302 | 278 | 4987 | 875 |
| 08/10/14 | 346 | 310 | 5669 | 1031 |
| 08/11/14 | 328 | 362 | 5332 | 951 |
| 08/12/14 | 362 | 308 | 5749 | 1041 |
| 08/13/14 | 351 | 290 | 5564 | 978 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
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| 08/30/14 | | | | |
| 08/31/14 | | | | |
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| 09/10/14 | | | | |
| 09/11/14 | | | | |

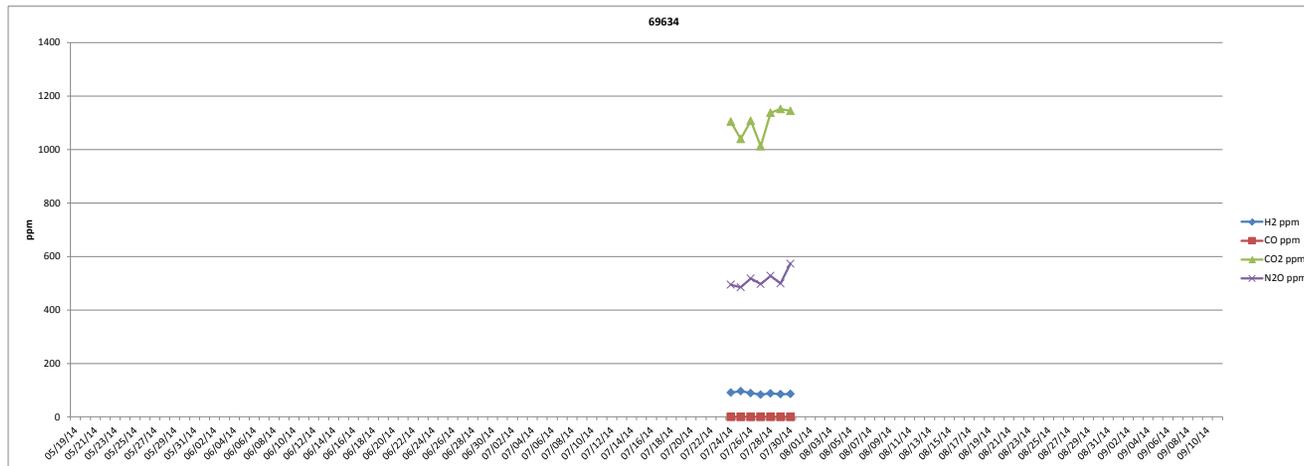
| | | | | |
|---------|-----|-----|------|------|
| Maximum | 375 | 362 | 5879 | 1050 |
| Minimum | 302 | 278 | 4987 | 875 |



| Date | 69634 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
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| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69634 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 91 | 0 | 1105 | 495 |
| 07/25/14 | 96 | 0 | 1040 | 485 |
| 07/26/14 | 89 | 0 | 1108 | 518 |
| 07/27/14 | 83 | 0 | 1013 | 497 |
| 07/28/14 | 88 | 0 | 1138 | 528 |
| 07/29/14 | 85 | 0 | 1152 | 499 |
| 07/30/14 | 86 | 0 | 1145 | 573 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
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| 08/31/14 | | | | |
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| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
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| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|----|---|------|-----|
| Maximum | 96 | 0 | 1152 | 573 |
| Minimum | 83 | 0 | 1013 | 485 |

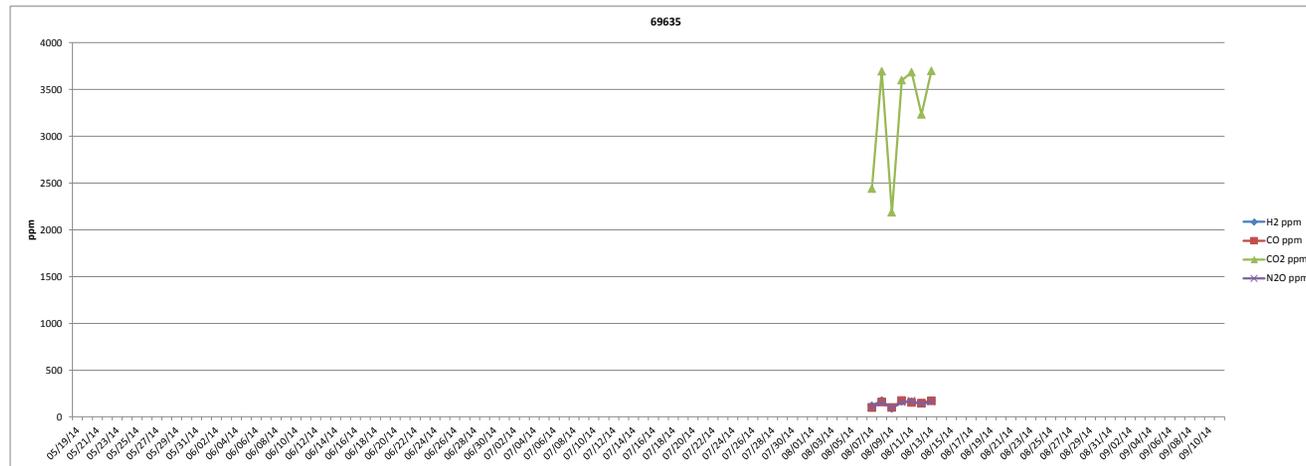


| Date | 69635 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
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| 05/30/14 | | | | |
| 05/31/14 | | | | |
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| 06/03/14 | | | | |
| 06/04/14 | | | | |
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| 06/11/14 | | | | |
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| 06/18/14 | | | | |
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| 06/21/14 | | | | |
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| 06/28/14 | | | | |
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| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
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| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| 69635 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | 118 | 99 | 2439 | 104 |
| 08/08/14 | 175 | 159 | 3694 | 153 |
| 08/09/14 | 89 | 100 | 2187 | 99 |
| 08/10/14 | 165 | 175 | 3599 | 158 |
| 08/11/14 | 162 | 154 | 3684 | 171 |
| 08/12/14 | 142 | 146 | 3233 | 137 |
| 08/13/14 | 173 | 172 | 3698 | 164 |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
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| 08/24/14 | | | | |
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| 08/26/14 | | | | |
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| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
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| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 175 | 175 | 3698 | 171 |
| Minimum | 89 | 99 | 2187 | 99 |

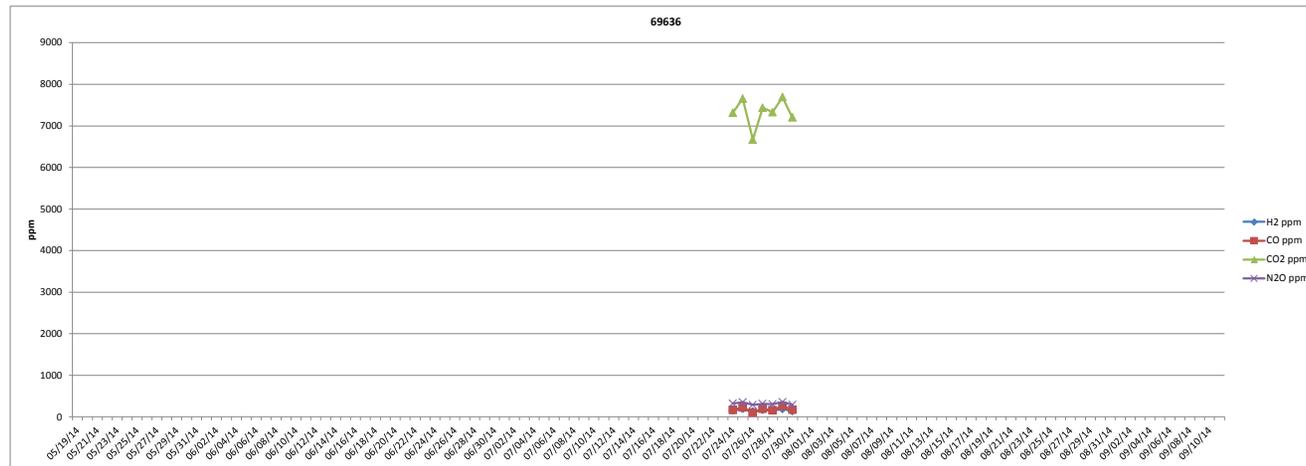


| Date | 69636 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
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| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
| 06/06/14 | | | | |
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| 06/11/14 | | | | |
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| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | | | | |
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| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
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| 06/24/14 | | | | |
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| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| Date | 69636 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 153 | 167 | 7317 | 323 |
| 07/25/14 | 192 | 227 | 7657 | 352 |
| 07/26/14 | 128 | 103 | 6668 | 288 |
| 07/27/14 | 170 | 195 | 7437 | 317 |
| 07/28/14 | 149 | 159 | 7330 | 304 |
| 07/29/14 | 188 | 261 | 7693 | 358 |
| 07/30/14 | 139 | 172 | 7202 | 293 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | | | | |
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| 08/31/14 | | | | |
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| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

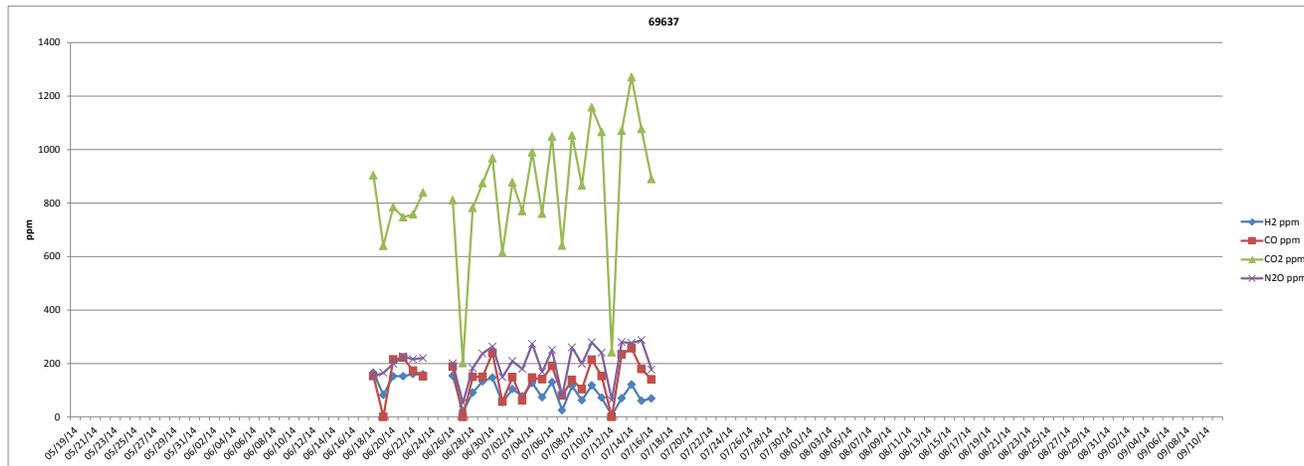
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 192 | 261 | 7693 | 358 |
| Minimum | 128 | 103 | 6668 | 288 |



| Date | 69637 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
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| 06/09/14 | | | | |
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| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 165 | 153 | 904 | 152 |
| 06/19/14 | 82 | 0 | 640 | 165 |
| 06/20/14 | 152 | 215 | 785 | 199 |
| 06/21/14 | 152 | 222 | 747 | 226 |
| 06/22/14 | 160 | 173 | 758 | 216 |
| 06/23/14 | 159 | 152 | 839 | 220 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 154 | 188 | 811 | 200 |
| 06/27/14 | 22 | 0 | 201 | 52 |
| 06/28/14 | 91 | 150 | 782 | 183 |
| 06/29/14 | 133 | 150 | 875 | 237 |
| 06/30/14 | 147 | 240 | 968 | 263 |
| 07/01/14 | 55 | 57 | 614 | 149 |
| 07/02/14 | 104 | 149 | 878 | 209 |
| 07/03/14 | 77 | 62 | 770 | 179 |
| 07/04/14 | 127 | 147 | 990 | 273 |
| 07/05/14 | 73 | 141 | 760 | 168 |
| 07/06/14 | 130 | 191 | 1049 | 250 |
| 07/07/14 | 25 | 80 | 641 | 78 |
| 07/08/14 | 116 | 138 | 1053 | 260 |
| 07/09/14 | 62 | 104 | 866 | 199 |
| 07/10/14 | 118 | 214 | 1158 | 279 |
| 07/11/14 | 72 | 153 | 1066 | 240 |
| 07/12/14 | 6 | 0 | 242 | 63 |
| 07/13/14 | 70 | 234 | 1070 | 280 |
| 07/14/14 | 121 | 257 | 1271 | 277 |
| 07/15/14 | 60 | 179 | 1077 | 287 |
| 07/16/14 | 69 | 140 | 890 | 177 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69637 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
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| 09/10/14 | | | | |
| 09/11/14 | | | | |

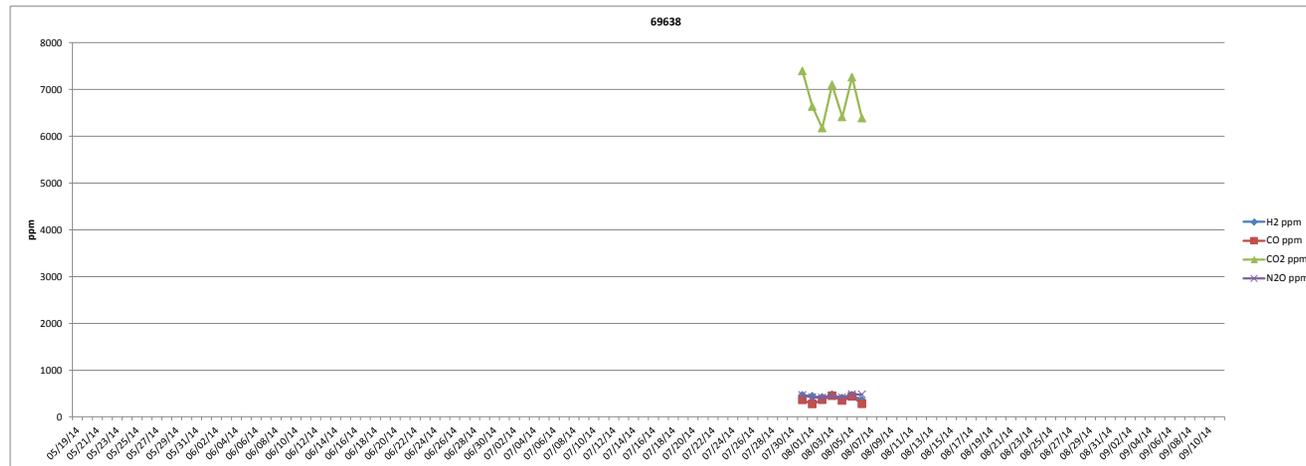
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 165 | 257 | 1271 | 287 |
| Minimum | 6 | 0 | 201 | 52 |



| Date | 69638 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
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| 06/06/14 | | | | |
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| Date | 69638 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 460 | 363 | 7394 | 464 |
| 08/01/14 | 441 | 275 | 6636 | 418 |
| 08/02/14 | 415 | 365 | 6173 | 409 |
| 08/03/14 | 472 | 451 | 7101 | 446 |
| 08/04/14 | 402 | 348 | 6412 | 415 |
| 08/05/14 | 462 | 437 | 7263 | 483 |
| 08/06/14 | 356 | 279 | 6386 | 479 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
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|---------|-----|-----|------|-----|
| Maximum | 472 | 451 | 7394 | 483 |
| Minimum | 356 | 275 | 6173 | 409 |

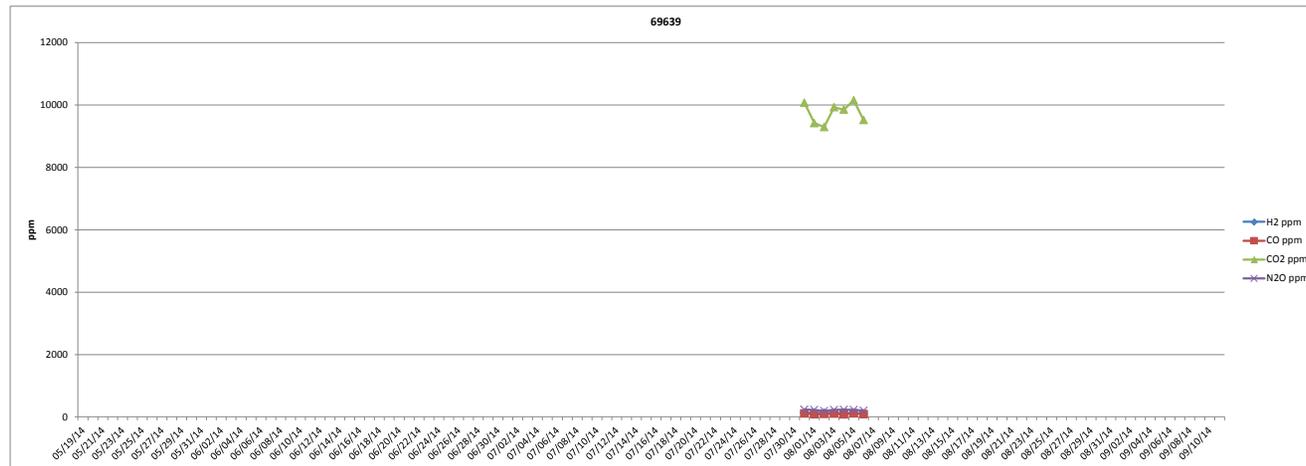


| Date | 69639 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
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| 07/19/14 | | | | |

Headspace Gas Analysis Results for Container 68685

| Date | 69639 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 134 | 109 | 10075 | 233 |
| 08/01/14 | 120 | 85 | 9422 | 227 |
| 08/02/14 | 131 | 96 | 9295 | 194 |
| 08/03/14 | 125 | 105 | 9930 | 226 |
| 08/04/14 | 125 | 80 | 9858 | 230 |
| 08/05/14 | 125 | 111 | 10155 | 226 |
| 08/06/14 | 112 | 89 | 9521 | 201 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
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| 09/03/14 | | | | |
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| 09/05/14 | | | | |
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| 09/11/14 | | | | |

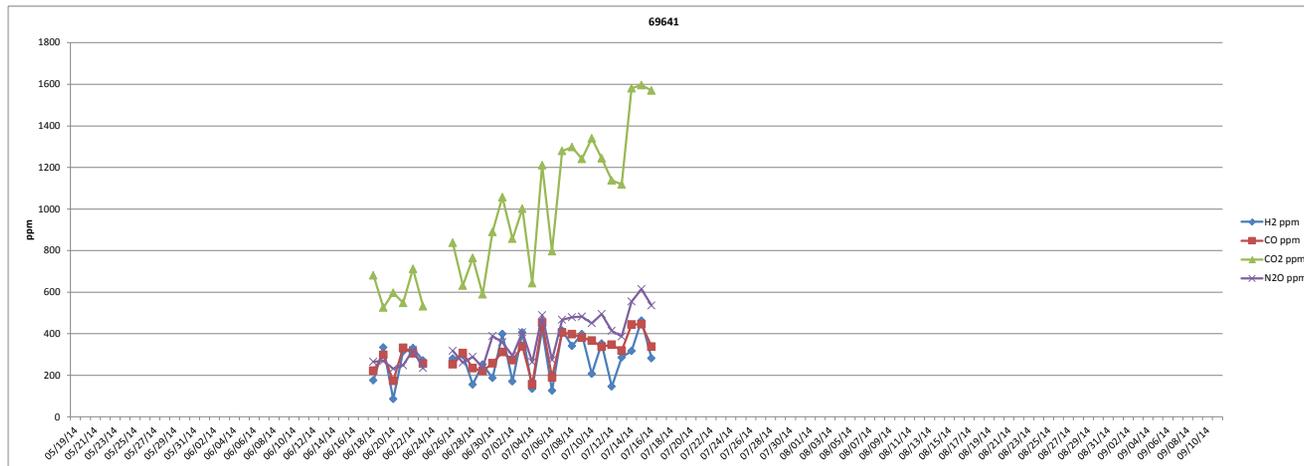
| | | | | |
|---------|-----|-----|-------|-----|
| Maximum | 134 | 111 | 10155 | 233 |
| Minimum | 112 | 80 | 9295 | 194 |



| Date | 69641 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
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| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 176 | 222 | 681 | 265 |
| 06/19/14 | 334 | 298 | 526 | 269 |
| 06/20/14 | 86 | 173 | 597 | 231 |
| 06/21/14 | 315 | 332 | 548 | 248 |
| 06/22/14 | 331 | 306 | 712 | 321 |
| 06/23/14 | 271 | 256 | 532 | 235 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 281 | 253 | 838 | 318 |
| 06/27/14 | 297 | 307 | 632 | 261 |
| 06/28/14 | 156 | 235 | 765 | 289 |
| 06/29/14 | 252 | 221 | 590 | 238 |
| 06/30/14 | 187 | 258 | 890 | 389 |
| 07/01/14 | 399 | 312 | 1057 | 359 |
| 07/02/14 | 171 | 273 | 857 | 294 |
| 07/03/14 | 406 | 340 | 1002 | 407 |
| 07/04/14 | 135 | 157 | 643 | 264 |
| 07/05/14 | 424 | 453 | 1211 | 489 |
| 07/06/14 | 126 | 190 | 797 | 274 |
| 07/07/14 | 416 | 406 | 1279 | 467 |
| 07/08/14 | 341 | 398 | 1298 | 479 |
| 07/09/14 | 398 | 381 | 1241 | 482 |
| 07/10/14 | 207 | 367 | 1340 | 451 |
| 07/11/14 | 353 | 337 | 1244 | 495 |
| 07/12/14 | 146 | 347 | 1138 | 414 |
| 07/13/14 | 286 | 319 | 1118 | 387 |
| 07/14/14 | 317 | 444 | 1581 | 555 |
| 07/15/14 | 463 | 446 | 1596 | 615 |
| 07/16/14 | 282 | 338 | 1570 | 536 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69641 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
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| 07/23/14 | | | | |
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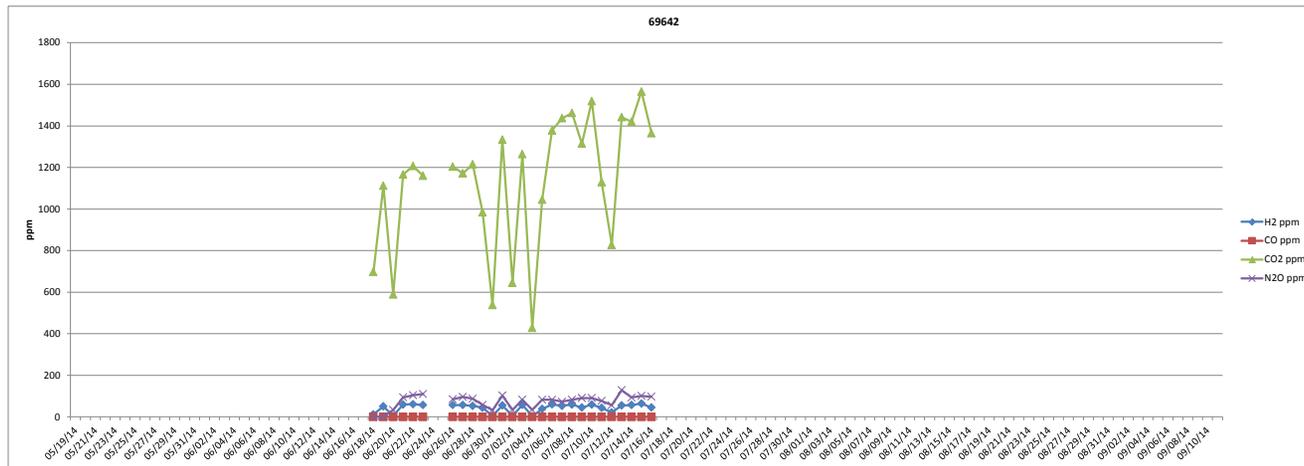
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 463 | 453 | 1596 | 615 |
| Minimum | 86 | 157 | 526 | 231 |



| Date | 69642 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | 12 | 0 | 698 | 0 |
| 06/19/14 | 51 | 0 | 1112 | 0 |
| 06/20/14 | 4 | 0 | 589 | 33 |
| 06/21/14 | 59 | 0 | 1166 | 94 |
| 06/22/14 | 61 | 0 | 1207 | 104 |
| 06/23/14 | 57 | 0 | 1160 | 110 |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | 57 | 0 | 1204 | 85 |
| 06/27/14 | 57 | 0 | 1172 | 96 |
| 06/28/14 | 53 | 0 | 1215 | 87 |
| 06/29/14 | 44 | 0 | 984 | 58 |
| 06/30/14 | 5 | 0 | 538 | 32 |
| 07/01/14 | 55 | 0 | 1334 | 103 |
| 07/02/14 | 5 | 0 | 645 | 34 |
| 07/03/14 | 58 | 0 | 1264 | 83 |
| 07/04/14 | 3 | 0 | 428 | 34 |
| 07/05/14 | 38 | 0 | 1045 | 82 |
| 07/06/14 | 60 | 0 | 1378 | 82 |
| 07/07/14 | 53 | 0 | 1437 | 73 |
| 07/08/14 | 59 | 0 | 1462 | 83 |
| 07/09/14 | 45 | 0 | 1315 | 91 |
| 07/10/14 | 59 | 0 | 1519 | 91 |
| 07/11/14 | 43 | 0 | 1129 | 77 |
| 07/12/14 | 21 | 0 | 827 | 56 |
| 07/13/14 | 55 | 0 | 1442 | 129 |
| 07/14/14 | 57 | 0 | 1420 | 93 |
| 07/15/14 | 64 | 0 | 1565 | 101 |
| 07/16/14 | 45 | 0 | 1365 | 97 |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |

| Date | 69642 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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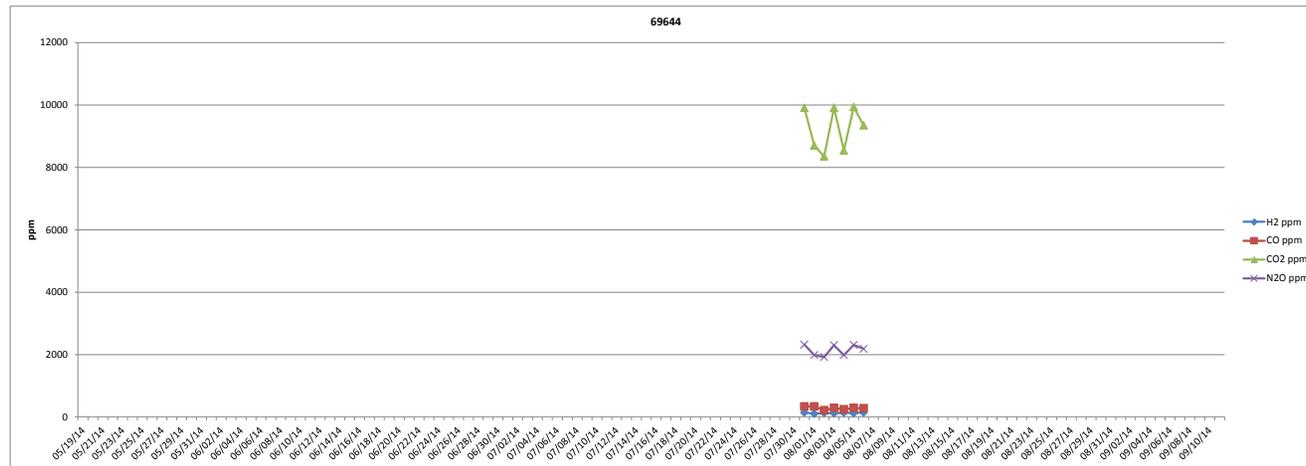
| | | | | |
|---------|----|---|------|-----|
| Maximum | 64 | 0 | 1565 | 129 |
| Minimum | 3 | 0 | 428 | 0 |



| Date | 69644 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/18/14 | | | | |
| 07/19/14 | | | | |

| 69644 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 138 | 336 | 9910 | 2316 |
| 08/01/14 | 100 | 336 | 8703 | 1980 |
| 08/02/14 | 127 | 212 | 8354 | 1916 |
| 08/03/14 | 114 | 290 | 9913 | 2299 |
| 08/04/14 | 133 | 244 | 8546 | 1986 |
| 08/05/14 | 119 | 287 | 9938 | 2306 |
| 08/06/14 | 139 | 277 | 9348 | 2182 |
| 08/07/14 | | | | |
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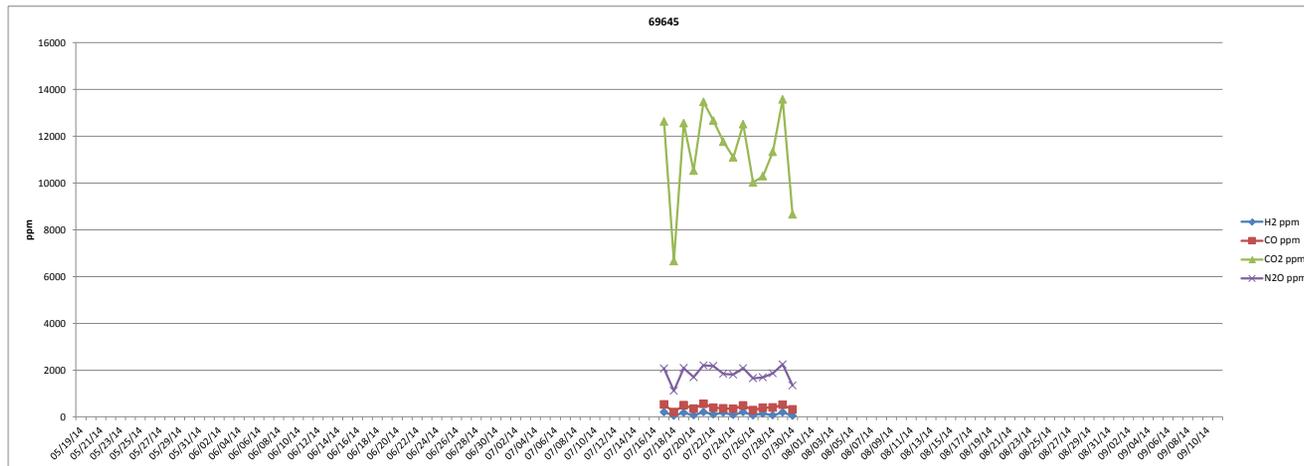
| | | | | |
|---------|-----|-----|------|------|
| Maximum | 139 | 336 | 9938 | 2316 |
| Minimum | 100 | 212 | 8354 | 1916 |



| Date | 69645 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 198 | 529 | 12633 | 2064 |
| 07/18/14 | 48 | 201 | 6662 | 1115 |
| 07/19/14 | 180 | 497 | 12558 | 2089 |

| 69645 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 73 | 349 | 10526 | 1697 |
| 07/21/14 | 207 | 560 | 13468 | 2200 |
| 07/22/14 | 107 | 390 | 12673 | 2178 |
| 07/23/14 | 182 | 361 | 11764 | 1844 |
| 07/24/14 | 84 | 345 | 11099 | 1811 |
| 07/25/14 | 206 | 488 | 12515 | 2079 |
| 07/26/14 | 67 | 286 | 10023 | 1654 |
| 07/27/14 | 147 | 389 | 10294 | 1691 |
| 07/28/14 | 72 | 400 | 11331 | 1862 |
| 07/29/14 | 193 | 520 | 13579 | 2240 |
| 07/30/14 | 52 | 316 | 8656 | 1343 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
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| | | | | |
|---------|-----|-----|-------|------|
| Maximum | 207 | 560 | 13579 | 2240 |
| Minimum | 48 | 201 | 6662 | 1115 |

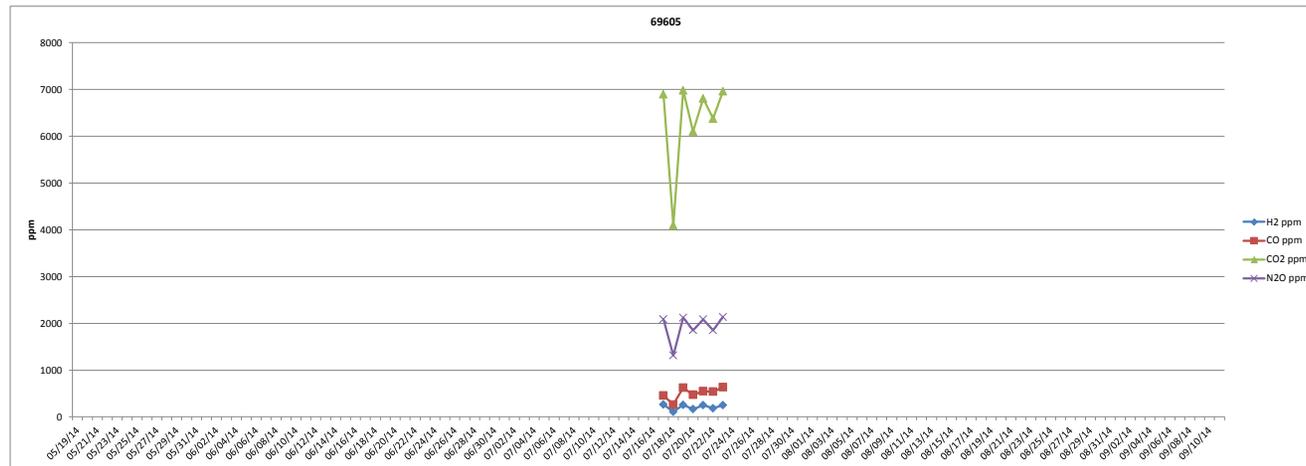


| Date | 93605 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
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| 05/22/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 264 | 457 | 6896 | 2087 |
| 07/18/14 | 109 | 263 | 4094 | 1314 |
| 07/19/14 | 258 | 625 | 6982 | 2122 |

Headspace Gas Analysis Results for Container 68685

| Date | 93605 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 166 | 473 | 6101 | 1855 |
| 07/21/14 | 252 | 551 | 6807 | 2085 |
| 07/22/14 | 183 | 540 | 6378 | 1852 |
| 07/23/14 | 250 | 636 | 6962 | 2136 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
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| | | | | |
|---------|-----|-----|------|------|
| Maximum | 264 | 636 | 6982 | 2136 |
| Minimum | 109 | 263 | 4094 | 1314 |

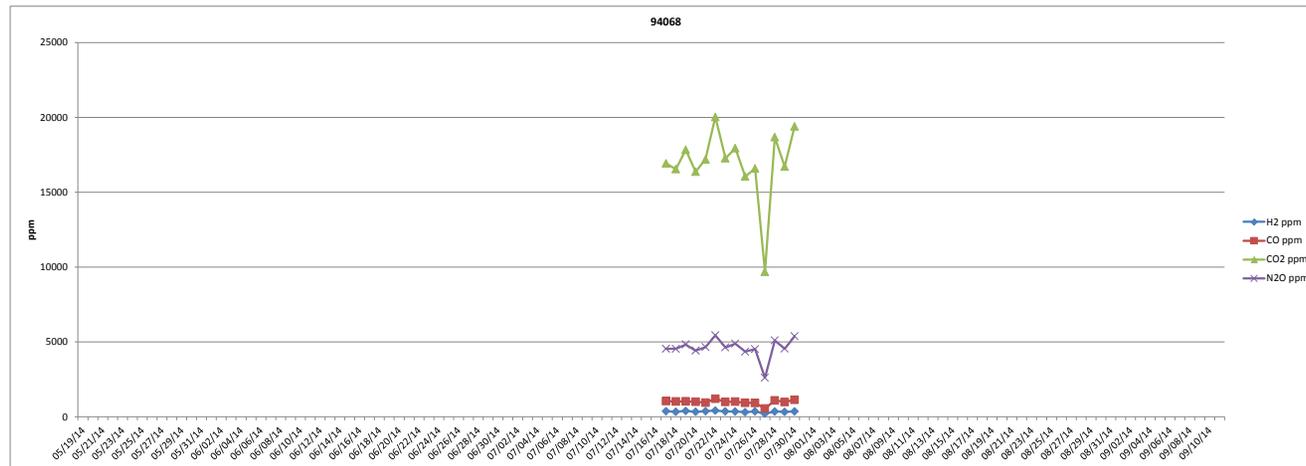


| Date | 94068 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 374 | 1059 | 16939 | 4550 |
| 07/18/14 | 343 | 1027 | 16553 | 4543 |
| 07/19/14 | 395 | 1035 | 17845 | 4838 |

Headspace Gas Analysis Results for Container 68685

| Date | 94068 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 342 | 1010 | 16381 | 4435 |
| 07/21/14 | 378 | 952 | 17205 | 4665 |
| 07/22/14 | 419 | 1210 | 20037 | 5448 |
| 07/23/14 | 365 | 1004 | 17277 | 4642 |
| 07/24/14 | 356 | 1017 | 17948 | 4897 |
| 07/25/14 | 314 | 944 | 16056 | 4356 |
| 07/26/14 | 368 | 932 | 16600 | 4523 |
| 07/27/14 | 216 | 555 | 9692 | 2615 |
| 07/28/14 | 359 | 1102 | 18690 | 5114 |
| 07/29/14 | 333 | 998 | 16720 | 4560 |
| 07/30/14 | 362 | 1142 | 19412 | 5386 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
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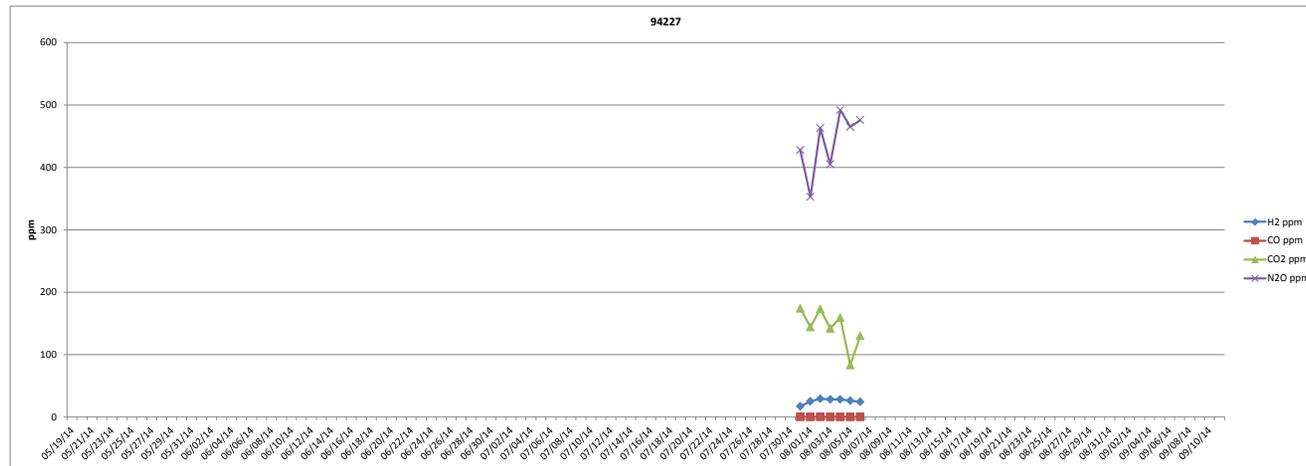
| | | | | |
|---------|-----|------|-------|------|
| Maximum | 419 | 1210 | 20037 | 5448 |
| Minimum | 216 | 555 | 9692 | 2615 |



| Date | 94227 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/19/14 | | | | |

| 94227 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 17 | 0 | 174 | 428 |
| 08/01/14 | 25 | 0 | 144 | 353 |
| 08/02/14 | 29 | 0 | 173 | 463 |
| 08/03/14 | 28 | 0 | 142 | 405 |
| 08/04/14 | 28 | 0 | 159 | 492 |
| 08/05/14 | 26 | 0 | 83 | 465 |
| 08/06/14 | 24 | 0 | 130 | 476 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
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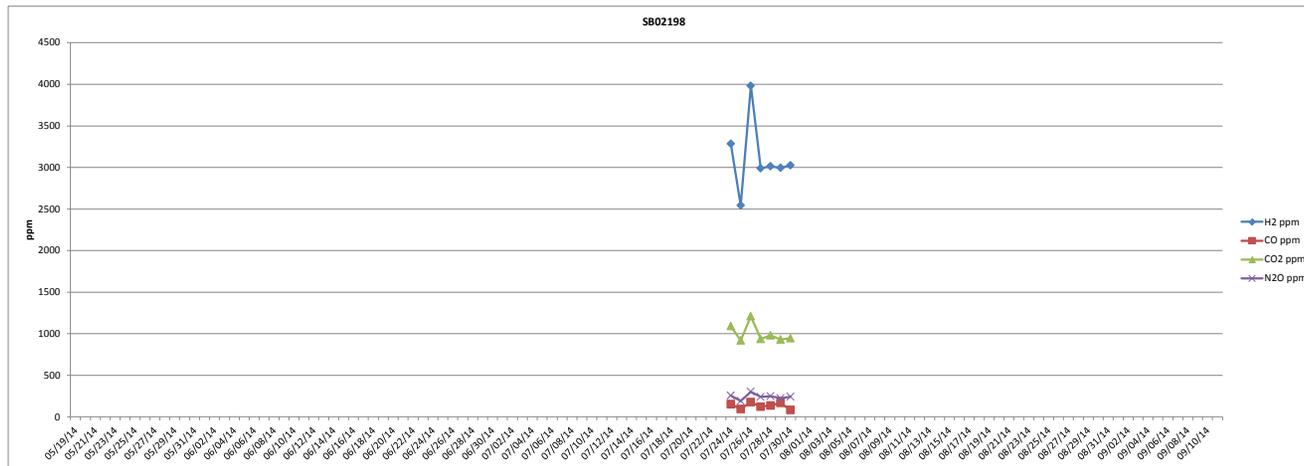
| | | | | |
|---------|----|---|-----|-----|
| Maximum | 29 | 0 | 174 | 492 |
| Minimum | 17 | 0 | 83 | 353 |



| Date | SB02198 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
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| SB02198 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 3285 | 153 | 1093 | 258 |
| 07/25/14 | 2543 | 94 | 920 | 192 |
| 07/26/14 | 3982 | 178 | 1212 | 304 |
| 07/27/14 | 2989 | 123 | 938 | 240 |
| 07/28/14 | 3014 | 137 | 982 | 250 |
| 07/29/14 | 2996 | 168 | 931 | 225 |
| 07/30/14 | 3026 | 83 | 947 | 243 |
| 07/31/14 | | | | |
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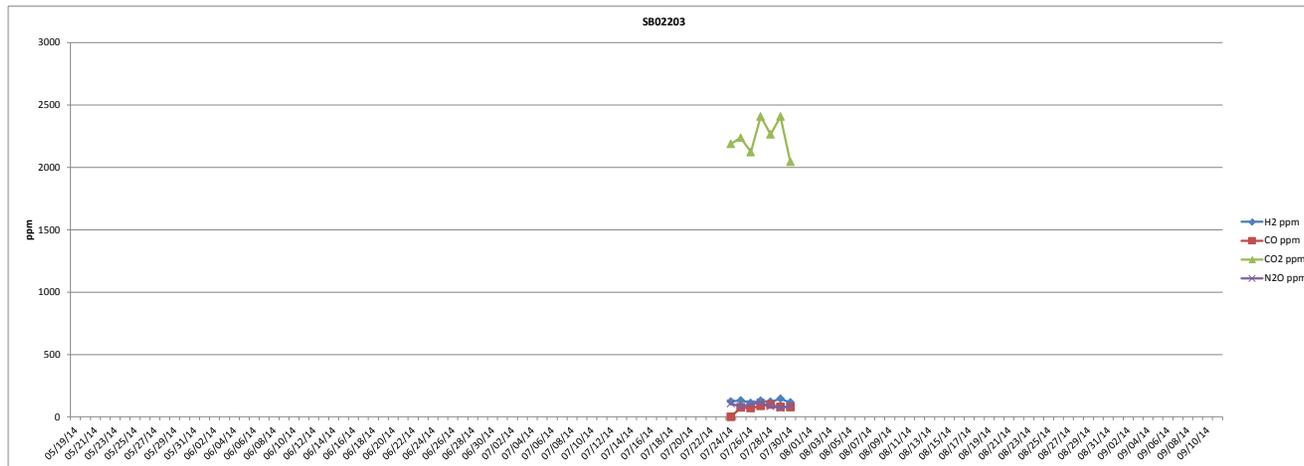
| | | | | |
|---------|------|-----|------|-----|
| Maximum | 3982 | 178 | 1212 | 304 |
| Minimum | 2543 | 83 | 920 | 192 |



| Date | SB02203 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| SB02203 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | 123 | 0 | 2189 | 108 |
| 07/25/14 | 132 | 75 | 2238 | 81 |
| 07/26/14 | 112 | 71 | 2123 | 102 |
| 07/27/14 | 130 | 88 | 2409 | 116 |
| 07/28/14 | 121 | 98 | 2265 | 85 |
| 07/29/14 | 145 | 80 | 2408 | 71 |
| 07/30/14 | 116 | 78 | 2045 | 86 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
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|---------|-----|----|------|-----|
| Maximum | 145 | 98 | 2409 | 116 |
| Minimum | 112 | 0 | 2045 | 71 |

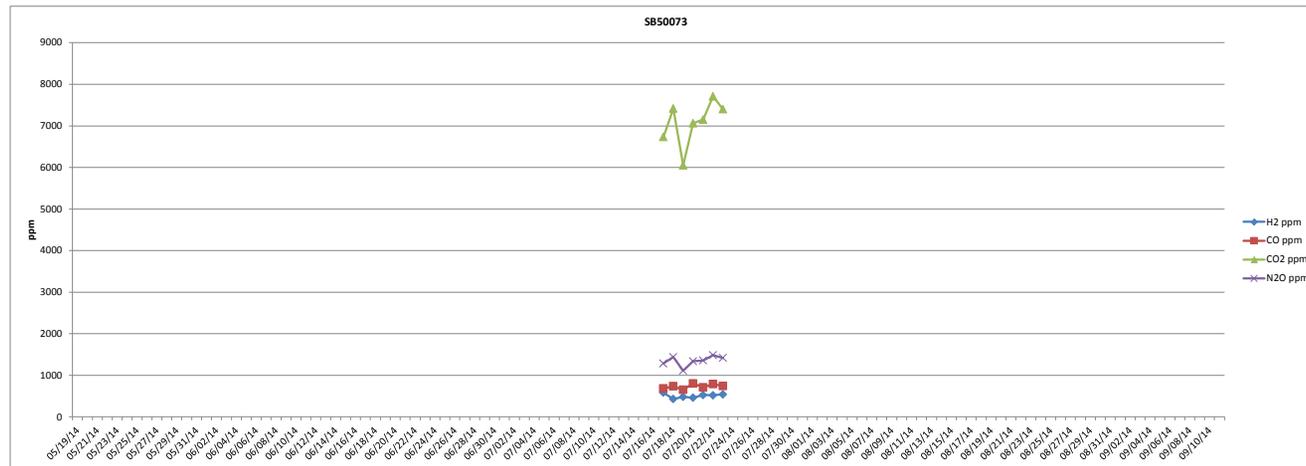


| Date | SB50073 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 585 | 684 | 6734 | 1284 |
| 07/18/14 | 429 | 739 | 7416 | 1438 |
| 07/19/14 | 481 | 653 | 6050 | 1112 |

Headspace Gas Analysis Results for Container 68685

| Date | SB50073 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 460 | 804 | 7063 | 1338 |
| 07/21/14 | 525 | 710 | 7150 | 1355 |
| 07/22/14 | 517 | 790 | 7709 | 1484 |
| 07/23/14 | 541 | 745 | 7402 | 1420 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
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|---------|-----|-----|------|------|
| Maximum | 585 | 804 | 7709 | 1484 |
| Minimum | 429 | 653 | 6050 | 1112 |

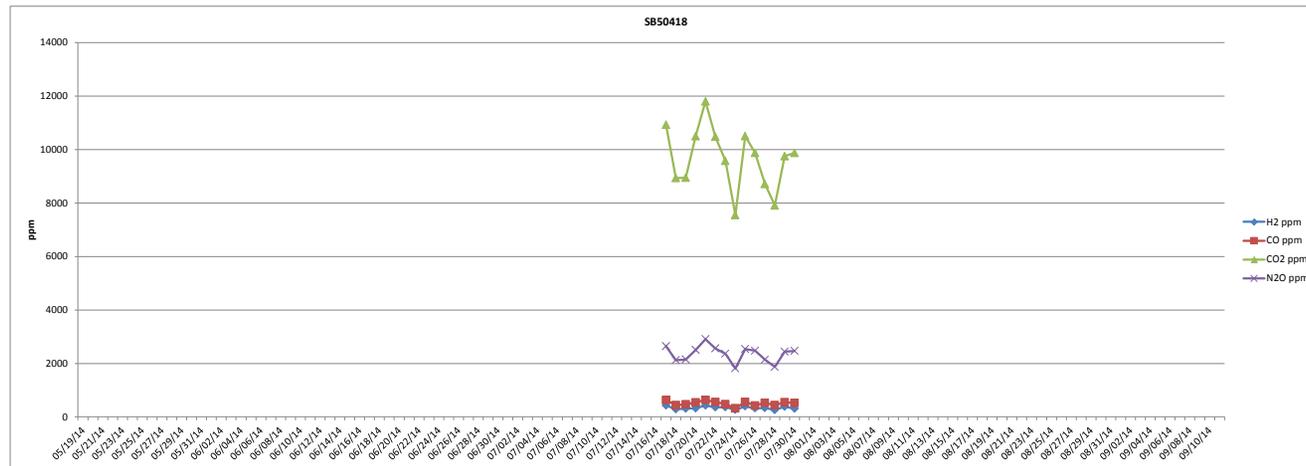


| Date | SB50418 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
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| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 428 | 630 | 10930 | 2646 |
| 07/18/14 | 290 | 439 | 8938 | 2126 |
| 07/19/14 | 311 | 470 | 8949 | 2150 |

Headspace Gas Analysis Results for Container 68685

| SB50418 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 324 | 543 | 10502 | 2504 |
| 07/21/14 | 431 | 635 | 11807 | 2910 |
| 07/22/14 | 360 | 556 | 10482 | 2566 |
| 07/23/14 | 364 | 474 | 9581 | 2363 |
| 07/24/14 | 266 | 323 | 7552 | 1815 |
| 07/25/14 | 398 | 558 | 10506 | 2542 |
| 07/26/14 | 325 | 426 | 9875 | 2474 |
| 07/27/14 | 335 | 525 | 8716 | 2140 |
| 07/28/14 | 257 | 438 | 7906 | 1870 |
| 07/29/14 | 386 | 545 | 9757 | 2444 |
| 07/30/14 | 314 | 522 | 9877 | 2469 |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
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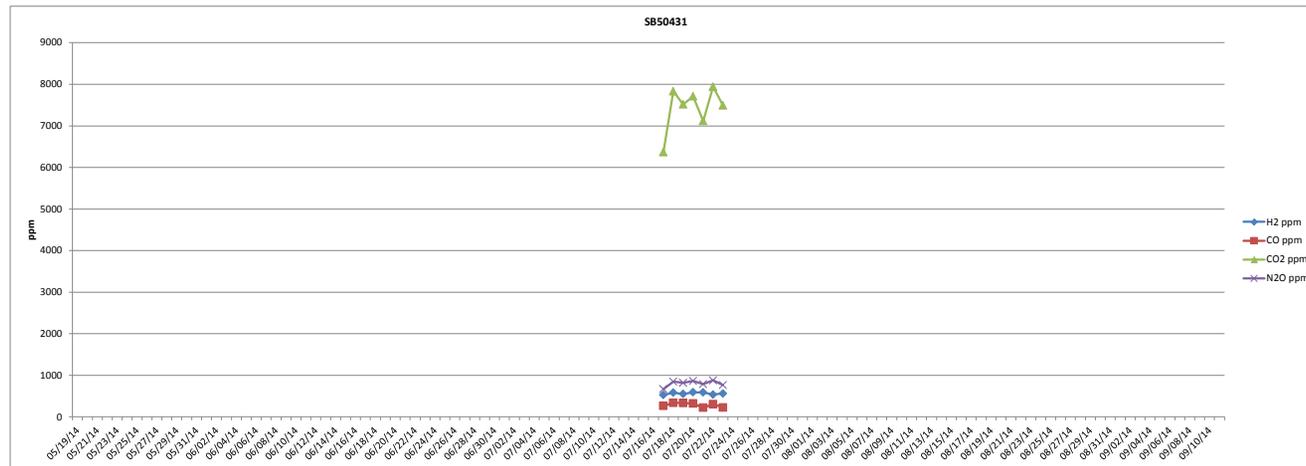
| | | | | |
|---------|-----|-----|-------|------|
| Maximum | 431 | 635 | 11807 | 2910 |
| Minimum | 257 | 323 | 7552 | 1815 |



| Date | SB50431 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 526 | 268 | 6369 | 670 |
| 07/18/14 | 585 | 338 | 7833 | 847 |
| 07/19/14 | 554 | 336 | 7517 | 818 |

| Date | SB50431 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 593 | 323 | 7711 | 864 |
| 07/21/14 | 590 | 222 | 7119 | 788 |
| 07/22/14 | 536 | 305 | 7943 | 877 |
| 07/23/14 | 563 | 227 | 7494 | 767 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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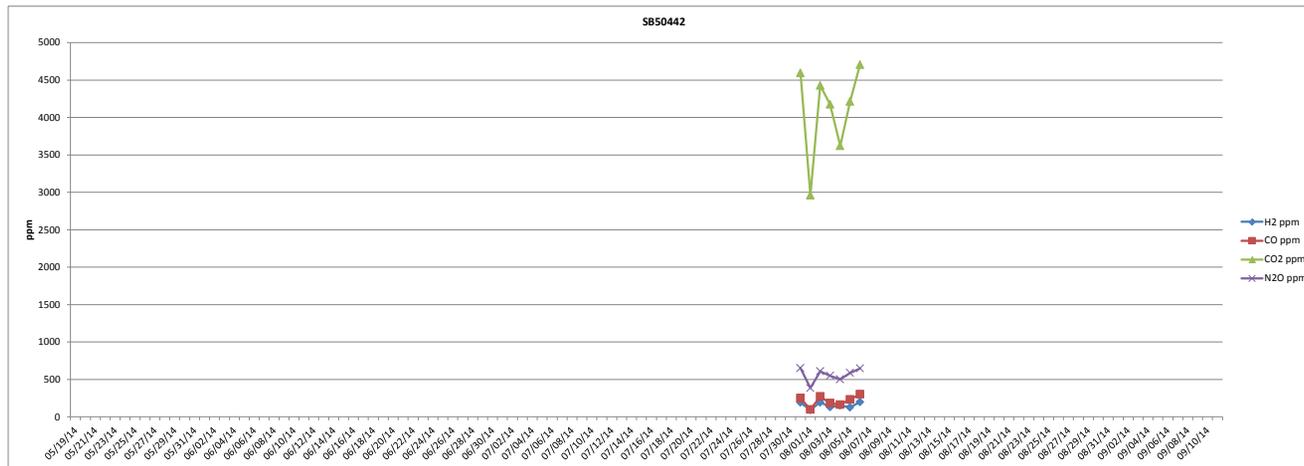
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 593 | 338 | 7943 | 877 |
| Minimum | 526 | 222 | 6369 | 670 |



| Date | SB50442 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| SB50442 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 193 | 251 | 4597 | 652 |
| 08/01/14 | 92 | 99 | 2963 | 386 |
| 08/02/14 | 194 | 273 | 4430 | 610 |
| 08/03/14 | 130 | 185 | 4176 | 551 |
| 08/04/14 | 155 | 164 | 3622 | 502 |
| 08/05/14 | 128 | 233 | 4215 | 589 |
| 08/06/14 | 199 | 304 | 4707 | 648 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
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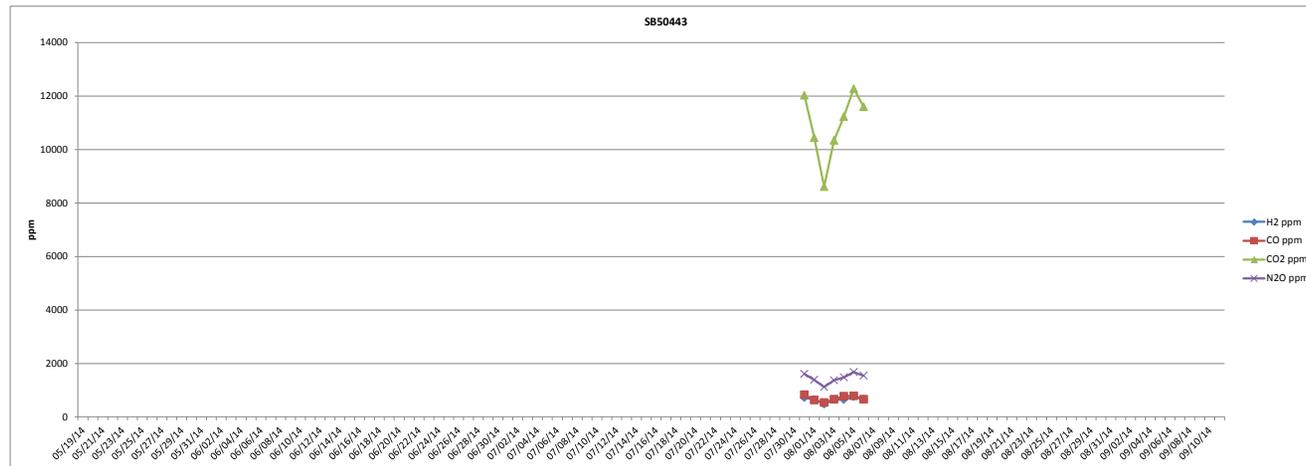
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 199 | 304 | 4707 | 652 |
| Minimum | 92 | 99 | 2963 | 386 |



| Date | SB50443 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| SB50443 | | | | |
|----------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | | | | |
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| 07/22/14 | | | | |
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| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 717 | 832 | 12029 | 1607 |
| 08/01/14 | 651 | 631 | 10445 | 1385 |
| 08/02/14 | 473 | 539 | 8610 | 1119 |
| 08/03/14 | 648 | 660 | 10346 | 1367 |
| 08/04/14 | 646 | 772 | 11235 | 1480 |
| 08/05/14 | 756 | 785 | 12279 | 1677 |
| 08/06/14 | 665 | 660 | 11608 | 1541 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
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|---------|-----|-----|-------|------|
| Maximum | 756 | 832 | 12279 | 1677 |
| Minimum | 473 | 539 | 8610 | 1119 |

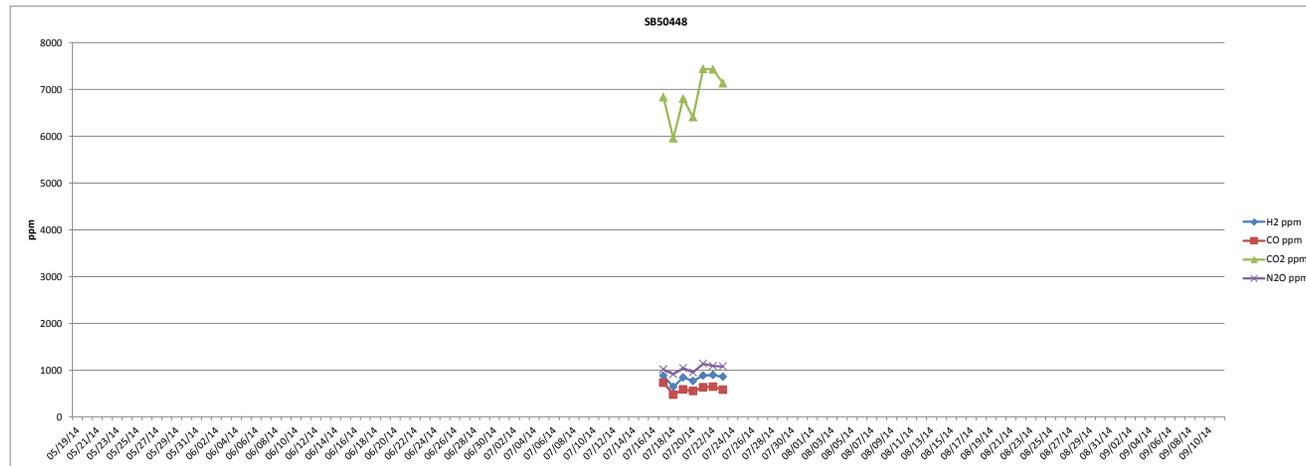


| Date | SB50448 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 878 | 732 | 6833 | 1015 |
| 07/18/14 | 641 | 474 | 5956 | 912 |
| 07/19/14 | 844 | 587 | 6802 | 1043 |

Headspace Gas Analysis Results for Container 68685

| Date | SB50448 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 768 | 553 | 6408 | 952 |
| 07/21/14 | 886 | 631 | 7439 | 1140 |
| 07/22/14 | 895 | 644 | 7427 | 1088 |
| 07/23/14 | 860 | 580 | 7132 | 1079 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
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| | | | | |
|---------|-----|-----|------|------|
| Maximum | 895 | 732 | 7439 | 1140 |
| Minimum | 641 | 474 | 5956 | 912 |

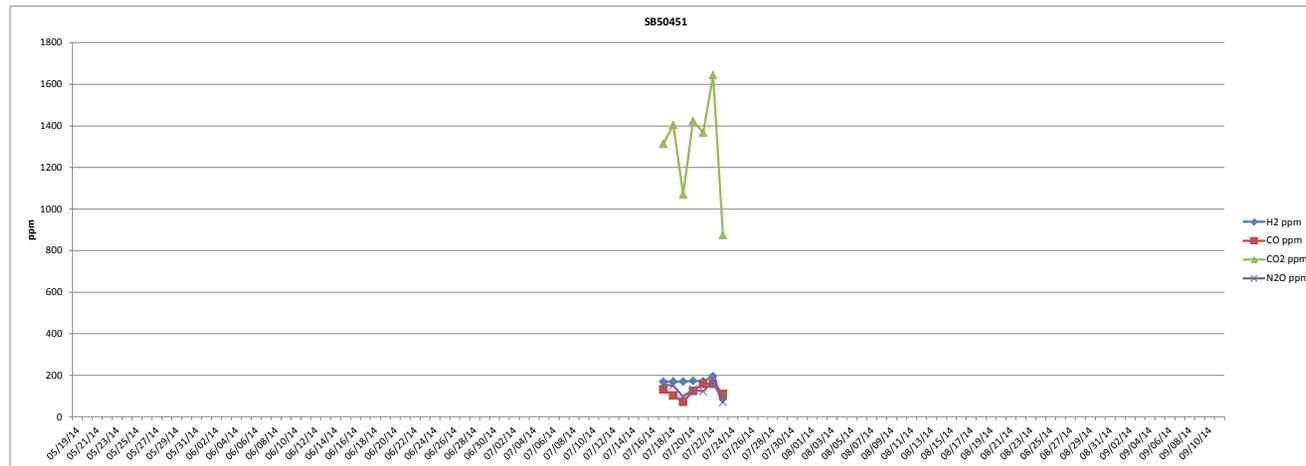


| Date | SB50451 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
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| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 169 | 132 | 1314 | 157 |
| 07/18/14 | 170 | 103 | 1404 | 150 |
| 07/19/14 | 170 | 72 | 1071 | 97 |

Headspace Gas Analysis Results for Container 68685

| Date | SB50451 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 173 | 125 | 1423 | 131 |
| 07/21/14 | 171 | 159 | 1368 | 123 |
| 07/22/14 | 196 | 159 | 1644 | 172 |
| 07/23/14 | 86 | 111 | 875 | 69 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
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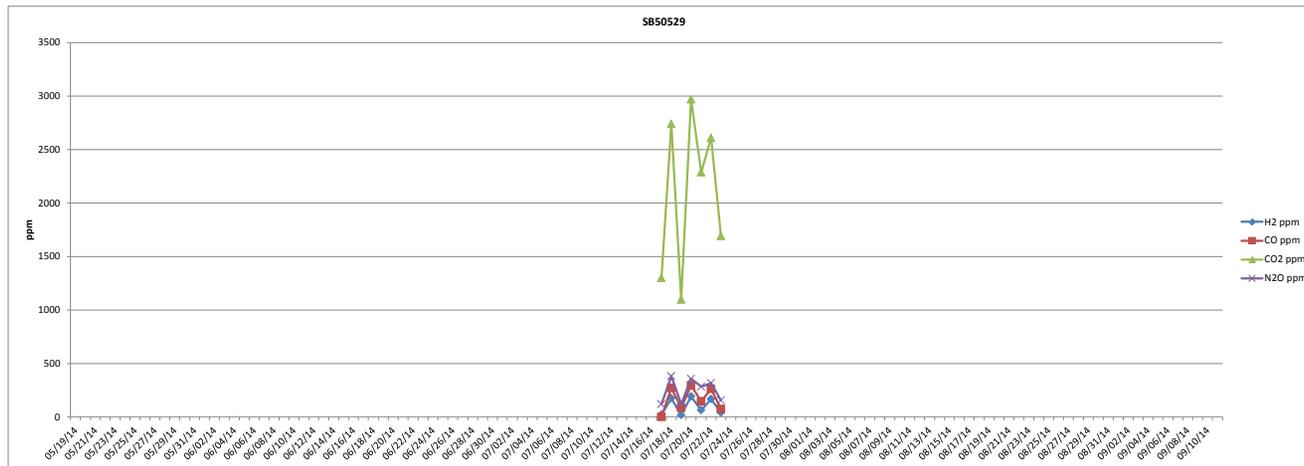
| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 196 | 159 | 1644 | 172 |
| Minimum | 86 | 72 | 875 | 69 |



| Date | SB50529 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
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| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | | | | |
| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |
| 07/16/14 | | | | |
| 07/17/14 | 21 | 0 | 1301 | 119 |
| 07/18/14 | 174 | 272 | 2741 | 381 |
| 07/19/14 | 18 | 87 | 1098 | 119 |

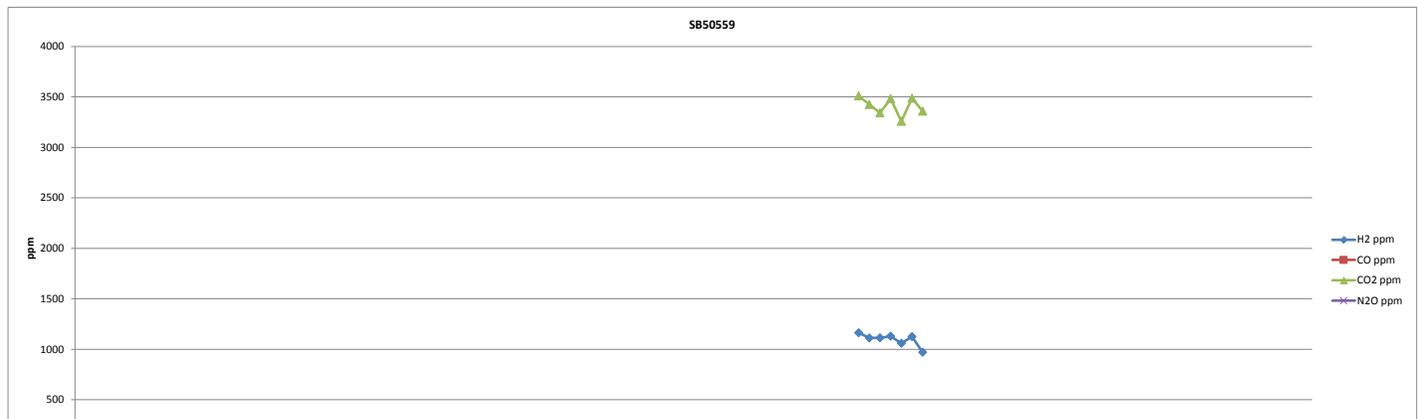
| Date | SB50529 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/20/14 | 192 | 294 | 2971 | 357 |
| 07/21/14 | 63 | 145 | 2289 | 282 |
| 07/22/14 | 167 | 263 | 2611 | 316 |
| 07/23/14 | 42 | 73 | 1693 | 155 |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | | | | |
| 08/01/14 | | | | |
| 08/02/14 | | | | |
| 08/03/14 | | | | |
| 08/04/14 | | | | |
| 08/05/14 | | | | |
| 08/06/14 | | | | |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
| 08/23/14 | | | | |
| 08/24/14 | | | | |
| 08/25/14 | | | | |
| 08/26/14 | | | | |
| 08/27/14 | | | | |
| 08/28/14 | | | | |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |

| | | | | |
|---------|-----|-----|------|-----|
| Maximum | 192 | 294 | 2971 | 381 |
| Minimum | 18 | 0 | 1098 | 119 |



| Date | SB50559 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 05/19/14 | | | | |
| 05/20/14 | | | | |
| 05/21/14 | | | | |
| 05/22/14 | | | | |
| 05/23/14 | | | | |
| 05/24/14 | | | | |
| 05/25/14 | | | | |
| 05/26/14 | | | | |
| 05/27/14 | | | | |
| 05/28/14 | | | | |
| 05/29/14 | | | | |
| 05/30/14 | | | | |
| 05/31/14 | | | | |
| 06/01/14 | | | | |
| 06/02/14 | | | | |
| 06/03/14 | | | | |
| 06/04/14 | | | | |
| 06/05/14 | | | | |
| 06/06/14 | | | | |
| 06/07/14 | | | | |
| 06/08/14 | | | | |
| 06/09/14 | | | | |
| 06/10/14 | | | | |
| 06/11/14 | | | | |
| 06/12/14 | | | | |
| 06/13/14 | | | | |
| 06/14/14 | | | | |
| 06/15/14 | | | | |
| 06/16/14 | | | | |
| 06/17/14 | | | | |
| 06/18/14 | | | | |
| 06/19/14 | | | | |
| 06/20/14 | | | | |
| 06/21/14 | | | | |
| 06/22/14 | | | | |
| 06/23/14 | | | | |
| 06/24/14 | | | | |
| 06/25/14 | | | | |
| 06/26/14 | | | | |
| 06/27/14 | | | | |
| 06/28/14 | | | | |
| 06/29/14 | | | | |
| 06/30/14 | | | | |
| 07/01/14 | | | | |
| 07/02/14 | | | | |
| 07/03/14 | | | | |
| 07/04/14 | | | | |
| 07/05/14 | | | | |
| 07/06/14 | | | | |
| 07/07/14 | | | | |
| 07/08/14 | | | | |
| 07/09/14 | | | | |
| 07/10/14 | | | | |
| 07/11/14 | | | | |
| 07/12/14 | | | | |
| 07/13/14 | | | | |
| 07/14/14 | | | | |
| 07/15/14 | | | | |

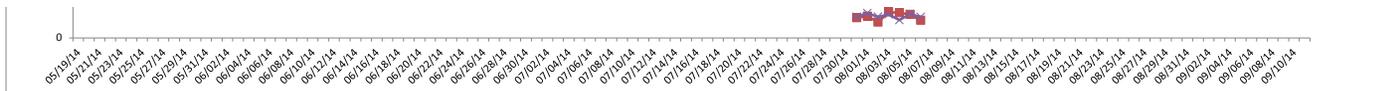
| Date | SB50559 | | | |
|----------|--------------------|--------|---------------------|----------------------|
| | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |
| 07/16/14 | | | | |
| 07/17/14 | | | | |
| 07/18/14 | | | | |
| 07/19/14 | | | | |
| 07/20/14 | | | | |
| 07/21/14 | | | | |
| 07/22/14 | | | | |
| 07/23/14 | | | | |
| 07/24/14 | | | | |
| 07/25/14 | | | | |
| 07/26/14 | | | | |
| 07/27/14 | | | | |
| 07/28/14 | | | | |
| 07/29/14 | | | | |
| 07/30/14 | | | | |
| 07/31/14 | 1163 | 200 | 3511 | 208 |
| 08/01/14 | 1112 | 215 | 3425 | 245 |
| 08/02/14 | 1113 | 156 | 3342 | 209 |
| 08/03/14 | 1130 | 256 | 3483 | 233 |
| 08/04/14 | 1059 | 249 | 3259 | 176 |
| 08/05/14 | 1125 | 233 | 3488 | 235 |
| 08/06/14 | 970 | 174 | 3359 | 208 |
| 08/07/14 | | | | |
| 08/08/14 | | | | |
| 08/09/14 | | | | |
| 08/10/14 | | | | |
| 08/11/14 | | | | |
| 08/12/14 | | | | |
| 08/13/14 | | | | |
| 08/14/14 | | | | |
| 08/15/14 | | | | |
| 08/16/14 | | | | |
| 08/17/14 | | | | |
| 08/18/14 | | | | |
| 08/19/14 | | | | |
| 08/20/14 | | | | |
| 08/21/14 | | | | |
| 08/22/14 | | | | |
| 08/23/14 | | | | |
| 08/24/14 | | | | |
| 08/25/14 | | | | |
| 08/26/14 | | | | |
| 08/27/14 | | | | |
| 08/28/14 | | | | |
| 08/29/14 | | | | |
| 08/30/14 | | | | |
| 08/31/14 | | | | |
| 09/01/14 | | | | |
| 09/02/14 | | | | |
| 09/03/14 | | | | |
| 09/04/14 | | | | |
| 09/05/14 | | | | |
| 09/06/14 | | | | |
| 09/07/14 | | | | |
| 09/08/14 | | | | |
| 09/09/14 | | | | |
| 09/10/14 | | | | |
| 09/11/14 | | | | |



Headspace Gas Analysis Results for Container 68685

| SB50559 | | | | |
|---------|--------------------|--------|---------------------|----------------------|
| Date | H ₂ ppm | CO ppm | CO ₂ ppm | N ₂ O ppm |

| | | | | |
|---------|------|-----|------|-----|
| Maximum | 1163 | 256 | 3511 | 245 |
| Minimum | 970 | 156 | 3259 | 176 |



Attachment 14

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |
| 7/17/2014 | None detected |
| 7/18/2014 | None Detected |
| 7/19/2014 | None Detected |
| 7/20/2014 | None Detected |
| 7/21/2014 | None Detected |
| 7/22/2014 | None Detected |
| 7/23/2014 | None Detected |
| 7/24/2014 | None detected |
| 7/25/2014 | None Detected |
| 7/26/2014 | None Detected |
| 7/27/2014 | None Detected |
| 7/28/2014 | None Detected |
| 7/29/2014 | None Detected |
| 7/30/2014 | None Detected |
| 7/31/2014 | None Detected |
| 8/1/2014 | None Detected |
| 8/3/2014 | None Detected |
| 8/4/2014 | None Detected |
| 8/5/2014 | None Detected |
| 8/6/2014 | None Detected |
| 8/7/2014 | None Detected |
| 8/8/2014 | None Detected |
| 8/9/2014 | None Detected |
| 8/10/2014 | None Detected |
| 8/11/2014 | None Detected |
| 8/12/2014 | None Detected |
| 8/13/2014 | None Detected |
| 8/14/2014 | None Detected |
| 8/15/2014 | None Detected |

| | |
|-----------|---------------|
| 8/16/2014 | None Detected |
| 8/17/2014 | None Detected |
| 8/18/2014 | None Detected |
| 8/19/2014 | None Detected |
| 8/20/2014 | None Detected |
| 8/21/2014 | None Detected |
| 8/22/2014 | None Detected |
| 8/23/2014 | None Detected |
| 8/24/2014 | None Detected |
| 8/25/2014 | None Detected |
| 8/26/2014 | None Detected |
| 8/27/2014 | None Detected |
| 8/28/2014 | None Detected |
| 8/29/2014 | None Detected |
| 8/30/2014 | None Detected |
| 8/31/2014 | None Detected |
| 9/1/2014 | None Detected |
| 9/2/2014 | None Detected |
| 9/3/2014 | None Detected |
| 9/4/2014 | None Detected |
| 9/5/2014 | None Detected |
| 9/6/2014 | None Detected |
| 9/7/2014 | None Detected |
| 9/8/2014 | None Detected |
| 9/9/2014 | None Detected |
| 9/10/2014 | None Detected |
| 9/11/2014 | None Detected |
| 9/12/2014 | None Detected |
| 9/13/2014 | None Detected |
| 9/14/2014 | None Detected |
| 9/15/2014 | None Detected |
| 9/16/2014 | None Detected |
| 9/17/2014 | None Detected |

| Date | Xylene Concentration (ppb) | Trimethylbenzene Concentration (ppb) |
|-----------|---|--------------------------------------|
| | Data reported below in ppb. Many of these results are <1ppm | |
| 7/24/2014 | 470 | 320 |
| 7/25/2014 | 710 | 480 |
| 7/26/2014 | 750 | 500 |
| 7/27/2014 | 630 | 450 |
| 7/28/2014 | 1040 | 750 |
| 7/29/2014 | 740 | 520 |
| 7/30/2014 | 760 | 530 |
| 7/31/2014 | 420 | 270 |
| 8/1/2014 | 800 | 550 |
| 8/3/2014 | 680 | 380 |
| 8/4/2014 | 1080 | 760 |
| 8/5/2014 | 870 | 470 |
| 8/6/2014 | 1130 | 820 |
| 8/7/2014 | 1060 | 790 |
| 8/8/2014 | 430 | 280 |
| 8/9/2014 | 490 | 330 |
| 8/10/2014 | 920 | 680 |
| 8/11/2014 | 450 | 280 |
| 8/12/2014 | 720 | 470 |
| 8/13/2014 | 820 | 550 |
| 8/14/2014 | 770 | 450 |
| 8/15/2014 | 790 | 490 |
| 8/16/2014 | 990 | 590 |
| 8/17/2014 | 590 | 430 |
| 8/18/2014 | 590 | 390 |
| 8/19/2014 | 600 | 410 |
| 8/20/2014 | 610 | 450 |
| 8/21/2014 | 600 | 320 |
| 8/22/2014 | 570 | 380 |
| 8/23/2014 | 640 | 430 |
| 8/24/2014 | 600 | 400 |
| 8/25/2014 | 520 | 350 |
| 8/26/2014 | 630 | 440 |
| 8/28/2014 | 730 | 540 |
| 9/2/2014 | 740 | 480 |
| 9/3/2014 | 640 | 390 |
| 9/4/2014 | 710 | 480 |
| 9/5/2014 | 560 | 420 |
| 9/6/2014 | 490 | 340 |
| 9/7/2014 | 550 | 360 |
| 9/8/2014 | 590 | 410 |
| 9/9/2014 | 670 | 570 |
| 9/10/2014 | 570 | 410 |
| 9/11/2014 | 600 | 420 |
| 9/12/2014 | 630 | 440 |

SB50522

| | | |
|-----------|-----|-----|
| 9/13/2014 | 820 | 570 |
| 9/14/2014 | 630 | 400 |
| 9/15/2014 | 640 | 440 |
| 9/16/2014 | 640 | 440 |
| 9/17/2014 | 690 | 490 |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | Not Analyzed |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

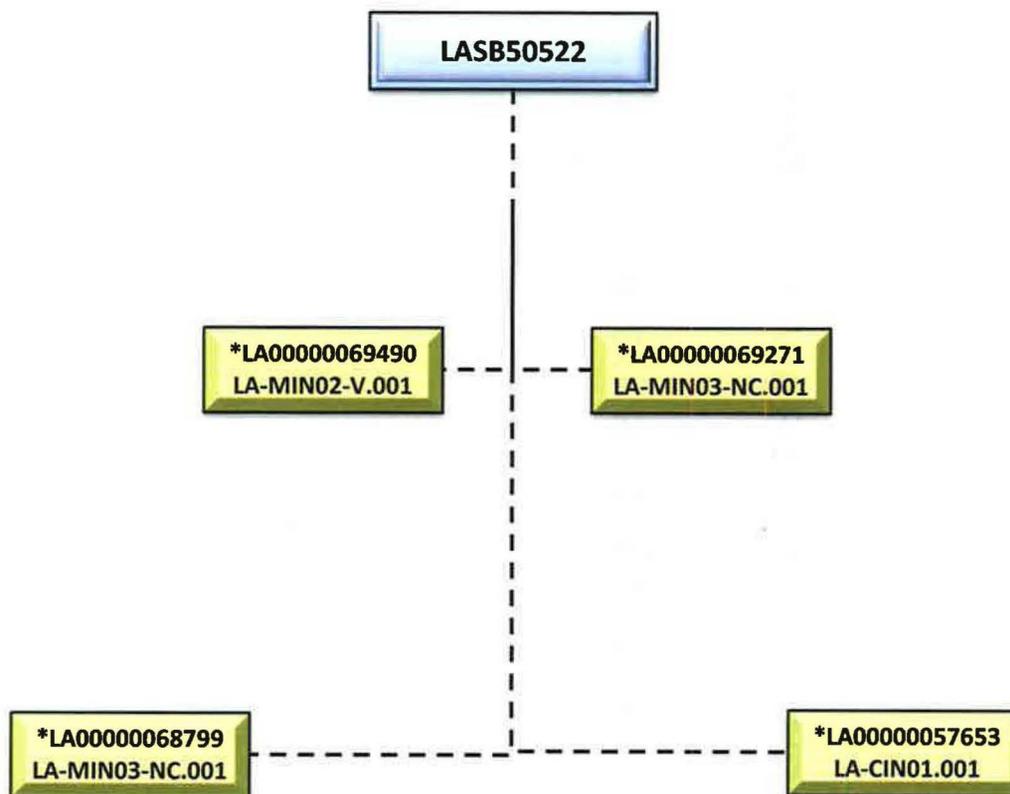
| Date | Compounds Detected (>1 ppm) |
|-----------|-----------------------------|
| 7/1/2014 | None detected |
| 7/2/2014 | None Detected |
| 7/3/2014 | None Detected |
| 7/4/2014 | None Detected |
| 7/5/2014 | None Detected |
| 7/6/2014 | None Detected |
| 7/7/2014 | None Detected |
| 7/8/2014 | None Detected |
| 7/9/2014 | None Detected |
| 7/10/2014 | None Detected |
| 7/11/2014 | None Detected |
| 7/12/2014 | None Detected |
| 7/13/2014 | None Detected |
| 7/14/2014 | None Detected |
| 7/15/2014 | None Detected |
| 7/16/2014 | None Detected |

Attachment 15

LASB50522 – STANDARD WASTE BOX

Flammable Gas Data

LASB50522 Genealogy



* Highlighted containers are packaged into LASB50522

LA00000069490 – 55 GALLON DRUM

LA-MIN02-V.001

InstName : Unit-2
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\140314C\
Data File : 69490.D
Acq On : 14 Mar 2014 10:31 am (#1); 14-Mar-14, 10:31:04 (#2)
Operator : NW
Sample :
Misc : 55 GALLON DRUM THROUGH FILTER (Sig #1); (Sig #2)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Mar 14 10:39:39 2014
Quant Method : C:\msdchem\1\METHODS\VOCGAS.M
Quant Title : Flammable Gas Analysis
QLast Update : Mon Aug 26 13:12:56 2013
Response via : Initial Calibration

| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|----------------------|-------|------|----------|--------|-------|----------|
| Internal Standards | | | | | | |
| 3) Fluorobenzene | 3.532 | 96 | 3209452 | 205.75 | ppmv | 0.01 |
| 15) Chlorobenzene-d5 | 5.848 | 117 | 2555935 | 177.50 | ppmv | -0.01 |
| Target Compounds | | | | | | |
| 1) Hydrogen | 1.612 | GC1 | 2058m | 273.70 | ppmv | Qvalue |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

LA00000069271 – 55 GALLON DRUM

LA-MIN03-NC.001

InstName : Unit-2

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\DATA\140213c\

Data File : 69271.D

Acq On : 13 Feb 2014 11:14 am (#1); 13-Feb-14, 11:13:39 (#2)

Operator : EL

Sample :

Misc : 55 Gal Drum Through Unobstructed,NucFil-019Ds (Sig #1); (Sig #2)

ALS Vial : 1 Sample Multiplier: 1

Quant Time: Feb 13 12:22:31 2014

Quant Method : C:\msdchem\1\METHODS\VOCGAS.M

Quant Title : Flammable Gas Analysis

QLast Update : Mon Aug 26 13:12:56 2013

Response via : Initial Calibration

| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) |
|----------------------------|-------|------|----------|--------|--------|----------|
| ----- | | | | | | |
| Internal Standards | | | | | | |
| 3) Fluorobenzene | 3.552 | 96 | 3083006 | 205.75 | ppmv | 0.03 |
| 15) Chlorobenzene-d5 | 5.858 | 117 | 2445381 | 177.50 | ppmv | 0.00 |
| Target Compounds | | | | | | |
| | | | | | Qvalue | |
| 1) Hydrogen | 1.630 | GC1 | 4169 | 554.45 | ppmv | 100 |
| 20) m and p-xylene | 6.021 | 106 | 1926009 | 234.68 | ppmv | 93 |
| 23) 1,2,4-Trimethylbenzene | 7.195 | 120 | 152771 | 20.26 | ppmv | 94 |
| ----- | | | | | | |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

VOCGAS.M Fri Jul 25 08:00:22 2014

LA00000068799 – 55 GALLON DRUM

LA-MIN03-NC.001

No Flammable Gas Analysis was performed

LA00000057653 – 55 GALLON DRUM

LA-CIN01.001

Quantitation Report (QT Reviewed)

InstName : FGA Unit 12

Data Path : C:\msdchem\1\DATA\131114c\

Data File : 57653.D

Acq On : 14 Nov 2013 1:50 pm (#1); 14 Nov 2013 1:49 pm (#2)

Operator : EL

Sample :

Misc : 55 Gallon Drum Through Filter, NucFil-013 (Sig #1); (Sig #2)

ALS Vial : 1 Sample Multiplier: 1

Quant Time: Nov 14 13:54:11 2013

Quant Method : C:\msdchem\1\METHODS\H2-CH4.M

Quant Title : Flammable Gas Analysis for Transportation Only

QLast Update : Thu May 23 08:37:45 2013

Response via : Initial Calibration

| Compound | R.T. | QIon | Response | Conc | Units | Dev(Min) | Qvalue |
|------------------|-------|------|----------|---------|-------|----------|--------|
| ----- | | | | | | | |
| Target Compounds | | | | | | | |
| 1) Hydrogen | 1.897 | GC1 | 418487 | 1467.08 | ppmv | | 100 |
| ----- | | | | | | | |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Attachment 16



memorandum

Weapons Experiments Division

To/MS: Bruce A. Robinson, CNP, MS H816,
robinson@lanl.gov

From/MS: David J. Funk, WX-DO, MS P942, ^{djf}djf@lanl.gov and
David L. Clark, NSEC, MS T001, dlclark@lanl.gov

Phone/Fax: 7-9659 / 5-2326

Symbol: WXDIV-14-1554

Date: December 19, 2014

SUBJECT: Hazards Associated with Legacy Nitrate Salt Waste Drums Managed under the Container Isolation Plan

At present, there are 29 drums of nitrate waste salts (oxidizers with potentially acidic liquid bearing RCRA characteristics D001 and D002) that are awaiting processing, specifically to eliminate these characteristics and to allow for ultimate disposition at WIPP. As a result of the Feb. 14th, 2014 drum breach at WIPP, and the subsequent identification of the breached drum as a product of LANL TRU waste disposition on May 15th, 2014, these 29 containers were moved into the Permacon in Dome 231 at TA-54 Area G, as part of the New Mexico Environment Department (NMED) approved container isolation plan. The plan is designed to mitigate hazards associated with the nitrate salt bearing waste stream. The purpose of this document is to articulate the hazards associated with un-remediated nitrate salts while in storage at LANL. These hazards are distinctly different from the Swheat-remediated nitrate salt bearing drums, and this document is intended to support the request to remove the un-remediated drums from management under the container isolation plan. Plans to remediate and/or treat both of these waste types are being developed separately, and are beyond the scope of this document.

Historical Generation of TRU Nitrate Salt Waste

Wastes contaminated with transuranic (TRU) isotopes have been generated at Los Alamos National Laboratory (LANL) since the 1940s in research and development activities for nuclear weapons, nuclear fuel, and related national security missions. Historically, radioactive waste was buried in shallow landfills called Material Disposal Areas (MDAs); Area G at TA-54 first received radioactive waste in 1957 and has served as the primary onsite radioactive waste management facility since 1959.

Nitrate salt wastes result from aqueous nitric acid processing to recover and purify plutonium.¹ After plutonium recovery, the resulting nitric acid solution contains a number of metal ions that result from the processing operations. These nitric acid solutions were concentrated through distillation until the nonvolatile salts in the evaporator were close to saturation. According to procedures, 500 to 600 L of feed was reduced to 10 to 25 L of “bottoms”. The hot evaporator “bottoms” were poured into a water-cooled tray and flash-crystallized, which precipitates primarily nitrate salts and leaves a liquid supernatant. After filtration, the salts were vacuum dried, which consisted of pulling air through the salts using house vacuum for approximately 15 minutes. The nitrate salts from the ion exchange processes were often washed with 3.3 M nitric acid to remove plutonium and ensure they met the Economic Discard Limit (EDL) for plutonium. However, nitrate salts derived from oxalate filtrates were not washed with bulk acid because it would accelerate decomposition of any oxalic acid present in the salts and could result in pressurization of the sealed 55-gallon drums containing the salts with oxalate.

The final composition of nitrate salts depends on the original process feed that was sent to the evaporator. The evaporator feed included ion-exchange effluent (both lean residue and chloride anion) and the filtrate from oxalate precipitation. The majority of LANL MIN02 wastes were derived from the ion exchange feed. Veazey et al documented the composition of the evaporator bottoms from each of these processes for waste batches produced between April 1992 and February 1994.² The solution concentrations³ of the major metal ions from the lean residue are shown in Table 1. Contaminated most often with plutonium and americium, these granular, off-white salts were packaged into plastic bags and placed in containers for temporary, retrievable, onsite storage until a permanent waste facility became available—the Waste Isolation Pilot Plant (WIPP). LANL has used evaporators to concentrate liquids that contain nitrate salts since operations began at the TA-55 Plutonium Processing Facility in 1979.¹ This specific type of TRU waste was generated until 1991, when LANL developed a process to solidify the evaporator bottoms in grout rather than dispose of the nitrate salt waste as granular salts.

¹ (a) Christensen, E. L.; Maraman, W. J. *Plutonium Processing at the Los Alamos Scientific Laboratory*; LA-3542; Los Alamos National Laboratory: Los Alamos, NM, 1969; (b) Christensen, E. L. *Plutonium Recovery at the Los Alamos Scientific Laboratory*; LA-UR-80-1168; Los Alamos National Laboratory: Los Alamos, NM, 1980.

² (a) Veazey, G. W. *TA-55 Evaporator Bottom Characterization*; Los Alamos National Laboratory: 1995. (b) Veazey, G. W.; Castaneda, A. *Characterization of TA-55 Evaporator Bottoms Waste Stream*; NMT-2:FY 96-13; Los Alamos National Laboratory: Los Alamos, NM, 1996.

³ We note that the supernatant fluid metal ion concentrations will not represent the ion concentrations of the precipitated salts, which will be dominated by those metal nitrates with the lowest solubility product.

Table 1. Important metal ion concentrations (median values) in evaporator bottoms from Veazey, et al.² (in g/l)

| | Ion Exchange | Oxalate Filtrate |
|----|--------------|------------------|
| Ca | 61 | 10.5 |
| Mg | 58.7 | 13.3 |
| K | 17.6 | 4.8 |
| Fe | 17.0 | 7.9 |
| Na | 7.4 | 23.9 |
| Al | 4.6 | 2.3 |
| Cr | 3.0 | 1.94 |
| Ni | 1.8 | 1.205 |
| Pb | 0.19 | 0.056 |

Nitrate salts are oxidizers, with the generally accepted DOT definition that they can promote or initiate combustion in other flammable materials. In general, oxidizers can:⁴

- Intensify combustion
- Widen the flammable range of flammable gases and liquids
- Lower the flashpoints and ignition temperatures of combustible materials so these materials ignite more readily

Typically, the increase in flammability results from either direct reaction of the oxidizer with a combustible material (fuel) or through the release of oxygen, which then stimulates the oxidation or combustion processes.

Thus, the principal hazard of an oxidizer is in its ability to stimulate or promote combustion, which requires fuel. In the case of legacy nitrate salts – those that have not been neutralized and remediated with Spilftyer and Swheat – these legacy salts were processed and stored in a configuration (lead-lined polyethylene liners placed inside of a 55 gallon steel drum) that eliminates this principal hazard. Without the presence of combustible material or fuel, the oxidizers cannot, in storage, lead to combustion. Thus, the un-remediated salts do not present the potential hazard of spontaneous combustion or enhanced combustion in their current configuration, and can be stored in any area in which combustible material is minimized and separated from the nitrate salt bearing containers, without fear of a release of radioactive materials through combustion processes.

⁴ University of Nebraska Lincoln Safe Operating Procedure: Oxidizer Hazards and Risk Minimization

The nitrate salts remediated with Swheat, however, pose just the opposite risk. In this case, the remediation process introduced combustible material (Swheat) to the drum, creating a fuel-oxidizer mixture with the potential for combustion, if heated either internally or externally. In fact, while the specific trigger or ignition of the breached WIPP drum (68660) is still being investigated, there is no question that the fuel oxidizer mixture ignited and burned causing the breach of the drum and releasing radioactive combustion products.

Continued storage of the remediated nitrate salt bearing waste according to the container isolation plan is prudent, to prevent an additional release if one of these drums were to ignite.

DJF:dv

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