



August 29, 2016

Sasha Gerhard  
USEPA, Office of Resource Conservation & Recovery  
Program Implementation & Information Division, 5306P  
Washington, DC 20460

**SENT BY ELECTRONIC MAIL**

RE: Demilitarization of Depleted Uranium by OB/OD

Dear Sasha,

Thank you for confirming that U.S. Department of Energy (USDOE) sites will be included in your current and ongoing evaluation of the environmental, ecological and human health impacts of open burning/open detonation (OB/OD) and that it shouldn't be a problem to add radiological waste as a type of contamination found at these sites. Following is information that we prepared for EPA to support consideration of depleted uranium, constituents (mixed waste), low-level radioactive wastes and other high risk energetic wastes in its evaluation.

In general, EPA maintains that certain energetic wastes should be excluded from routine OB/OD treatment because of the potential for extremely toxic releases or availability of alternative treatment technologies.<sup>1</sup> Examples of these prohibited items include the following: small arms ammunition up to 50 caliber, chemical agent munitions, riot-control munitions, white/red phosphorous, incendiaries (e.g., napalm), colored smokes, and depleted uranium (DU) munitions.<sup>2</sup>

When DU munitions and wastes are burned, depleted uranium oxides are created in the form of dust that can be inhaled or contaminate wounds. The aerosol produced during impact and combustion of depleted uranium munitions can potentially contaminate wide areas around the impact sites or can be inhaled by civilians and military personnel.<sup>3</sup>

As the stockpile of DU munitions ages, it will become necessary to safely disassemble the munitions, removing all explosive/combustible components and recovering other components for recycling. Cross-contamination of components is a consideration. For example, the cartridge design of certain DU ordnance where the DU penetrator rod is in direct contact with the propellant charge, there is potential for DU migration onto the propellant.<sup>4</sup>

However, despite these policies and inherent risks, demilitarization and treatment of depleted uranium by OB/OD has and is occurring at federal facilities. Following are examples:

**USDOE Los Alamos National Laboratory, NM**

OB/OD activities at Los Alamos National Laboratory (LANL) currently operate under interim status as the facility has not completed the RCRA permitting process.<sup>5</sup> Of particular concern, no

operating conditions were found limiting the number of OB/OD events per year or limiting the total amount of hazardous waste that may be treated per year. In terms of quantity, the only limiting factor is the capacity of each unit. Events may occur as frequently as once per hour at each unit.

The waste streams treated at the Open Detonation units at LANL include excess explosives. This waste stream includes large, laboratory sized, or small amounts of excess conventional explosives, developmental energetic materials, or novel formulations. Explosives may be in the form of flakes, granules, crystals, powders, pressings, plastic bonded, putties, rubberized solids, extrudable solids, or liquids. Developmental energetic materials are synthesized in small quantities in high explosives chemical labs. Explosives infrequently contain barium or ammonium nitrate mixed with more than 0.2% combustible substances.<sup>6</sup>

Approximately 3 to 7% of the explosives in this waste stream at LANL contain depleted uranium. Other materials that may be present in this waste stream include plastic bags, wrapping, and casings; cardboard and paper; and fiberboard containers. A fraction of the waste stream may contain metals such as aluminum, brass, steel, stainless steel, and copper. This waste stream represents 50% to 90% of explosives waste treated by open detonation.<sup>7</sup>

In recent years, approximately 5% of all of the explosives waste treated by open detonation at LANL contained depleted uranium.

There are a significant number of unpermitted (interim status) OB/OD sites at LANL including TA-39-8 at 2,000 pounds/detonation, TA-39-6 at 1,000 pounds/detonation and TA-39-57 at 1,000 pounds/detonation.

TA-14 (Q Site) is one of 14 firing areas at LANL.<sup>8</sup> Tests are conducted on explosives charges to investigate fragmentation impact, explosives sensitivity, and thermal responses of new high explosives. This site is currently permitted to treat waste through open detonation or open burning under the Resource Conservation and Recovery Act (RCRA).<sup>9</sup> Air emissions from High Explosives Firing Site operations at LANL include depleted uranium and beryllium.<sup>10</sup>

Active RCRA open *burning* sites operating under interim status include TA-14-23 with a capacity of 50 pounds high explosives/event.<sup>11</sup> The facility reports that there are no experiments or activities at LANL that would involve the burning of depleted uranium.<sup>12</sup> However, no operating conditions were found expressly prohibiting the treatment of depleted uranium, constituents (mixed waste), and low-level radioactive wastes at this and other units.

The U.S. Department of Energy and University of California previously pursued two air permits to conduct open air burning of depleted uranium (as much as 1,584 pounds/year), high explosives, diesel fuel, wood and other wastes at LANL. In response to pressure from three activist organizations – Concerned Citizens for Nuclear Safety (CCNS), Tewa Women United and the Embudo Valley Environmental Monitoring Group – the permits were ultimately cancelled in 2006.<sup>13</sup>

## **USDOE Pantex Plant, TX**

On June 3, 2014, the Texas Commission on Environmental Quality (TCEQ) issued a RCRA permit which includes a provision allowing for the Open Burn/Open Detonation (OB/OD) of energetics to the 16,000-acre Pantex Plant near Amarillo, Texas. There are approximately 10 operating burn trays/explosive burning pans. These units have no secondary containment, according to the permit. The facility also has a flash chamber with a capacity of 200 cubic yards that is also

permitted for treatment of hazardous waste. The Flash Furnace also has no secondary containment.

The Pantex facility is not considered a Major Source pursuant to the Clean Air Act and therefore does not have a Title V permit, according to TCEQ. A flexible air permit allows an operator more flexibility in managing his operations by staying under an overall emissions cap or individual emission limitation, according to TCEQ.<sup>14</sup>

Operating conditions associated with the 2009 flexible permit issued by TCEQ caps the amount of waste that may be treated by open burning and flashing at Pantex. The amount of energetic materials that may be thermally processed in total for these units is limited to 200 tons per year.

Among the routine operations at Pantex that release radionuclides to the environment include sanitization of components at the Burning Ground and Firing Sites. Sanitization is defined here as the irreversible modification or destruction of a component or part of a component of a nuclear weapon, device, trainer or test assembly, as necessary, to prevent revealing classified or otherwise controlled information, as required by the Atomic Energy Act of 1954, as amended.<sup>15</sup>

The facility estimates that approximately 0.1% of the radiological air emissions from the Pantex Plant facility are produced by sanitization activities conducted at the Burning Ground and Firing Sites.<sup>16</sup> There is no enforceable limit on the amount of flammables and supplemental fuels that may be added to facilitate treatment at burning pans, trays and firing sites. The amount of hazardous waste that may be treated by static firing is also unlimited.<sup>17</sup>

## **Examples of Legacy (former) OB/OD Units with Depleted Uranium Contamination**

---

### **Lake City Army Ammunition Plant, MO**

During the 1960s and 1970s, Lake City Army Ammunition Plant in Missouri developed, test-fired, and demilitarized munitions that contained licensed radioactive source material as well as non-radioactive munitions. Testing and demilitarization activities involved firing munitions into sand-filled structures called “bullet catchers.” Residual solid wastes from these operations (e.g., spent bullet catcher sand, metal debris, munitions constituents, and potential unexploded ordnance [UXO]) were deposited in an area north of the firing range, which became known as “Area 10.” In addition to depleted uranium, the waste also exhibited concentrations of leachable lead considered to be hazardous, as well as radioactive UXO.<sup>18</sup>

### **Picatinny Arsenal, NJ**

According to a 2003 study<sup>19</sup> by the U.S. Army at Picatinny Arsenal, sampling at the facility’s Open Detonation Area identified depleted uranium in the surface and subsurface soil at levels sufficient to pose a risk to groundwater. Picatinny demilitarization personnel use the open detonation pit area and adjacent detonation areas on a regular basis but no longer treat radioactive materials at this RCRA-approved site, according to the U.S. Nuclear Regulatory Commission.<sup>20</sup>

### **Iowa Army Ammunition Plant, IA**

Historical records confirm the presence of depleted uranium in at least a portion of the waste burned or disposed in the Explosive Detonation Area (EDA) by the Atomic Energy Commission.<sup>21</sup>

“The EDA is comprised of the East and West Burn Pad areas. Those areas were remediated by soil and ash removal from 1998 to 2000 and are reported to presently represent a low potential

for contamination. Within the EDA, the East Burn Pad site was utilized, prior to 1982, for purposes that included the burning or flashing of explosives-contaminated metal, including depleted uranium (DU), to remove the explosives residues. There is a possibility that not all of the potentially DU-contaminated ash was removed and residual ash may contribute to surface water and groundwater contamination.”<sup>22</sup>

OB/OD activities at Iowa Army Ammunition Plant currently operate under interim status as the facility has not completed the RCRA permitting process.<sup>23</sup>

## **Other High Risk OB/OD Wastes (Hexachloroethane)**

---

### **USDOE National Security Site (NNSS), NV**

According to the 2015 RCRA Part B Permit Application: “The Explosive Ordnance Disposal Unit (EODU), located in Area 11 of the Nevada National Security Site (NNSS)<sup>24</sup>, is an explosive detonation unit for the treatment of onsite generated waste explosives that are hazardous waste as defined under Title 40 Code of Federal Regulations (CFR) Part 261.23(a)(6), (7), and (8), and also 40 CFR 265.832. The EODU began operations on May 12, 1965, for the open burning and detonation of waste explosives. Open burning of waste explosives was discontinued in the 1980s. In May 1995, the Nevada Division of Environmental Protection (NDEP) issued a Resource Conservation and Recovery Act (RCRA) Permit (NEV HW0009) to the U.S. Department of Energy, Nevada Operations Office (DOE/NV) for the thermal treatment of waste explosives at the EODU. This unit is currently operated according to the RCRA Part B Permit (NEV HW0101), the NNSS Class II Air Quality Operating Permit (AP9711-2557), U.S. Department of Energy Orders, and other applicable Federal and State regulations.”<sup>25</sup>

The EODU has an annual operations capacity of 4,123 pounds of waste explosive. The process design capacity of the EODU is approximately 100 pounds/hour.<sup>26</sup>

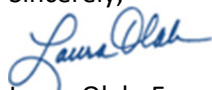
The EODU is open detonation on an earthen pad. The facility is allowed to detonate a maximum of 100 pounds of approved waste at a time, not to exceed one detonation event per hour. Wastes that may be treated by open detonation are limited to commercially manufactured explosives, small arms ammunition, blasting caps, black powder and “smoke pots (hexachloromethane) [sic]”.

Zinc oxide (military designation, HC or HC smoke) is a chemical warfare obscurant that contains equal percentages of zinc oxide and hexachloroethane, with approximately 7% grained aluminum. The material is formulated for use in smoke pots, smoke grenades, and artillery rounds. Depending on the intensity of the exposure, a wide range of clinical effects occurs; exposures as brief as 1 minute may lead to death.<sup>27</sup>

The facility reports that no radioactive or radioactive-contaminated materials are accepted or detonated at the EODU.<sup>28</sup>

Thank you for your consideration of our comments.

Sincerely,



Laura Olah, Executive Director

## ENDNOTES

- <sup>1</sup> [https://trainex.org/web\\_courses/subpart\\_x/TopicSearch%20pdf%20files/Region%203%20OBOD/PDF%206988-Text%20final.pdf](https://trainex.org/web_courses/subpart_x/TopicSearch%20pdf%20files/Region%203%20OBOD/PDF%206988-Text%20final.pdf), U.S. Environmental Protection Agency, page 2-4.
- <sup>2</sup> [https://trainex.org/web\\_courses/subpart\\_x/TopicSearch%20pdf%20files/Region%203%20OBOD/PDF%206988-Text%20final.pdf](https://trainex.org/web_courses/subpart_x/TopicSearch%20pdf%20files/Region%203%20OBOD/PDF%206988-Text%20final.pdf) U.S. Environmental Protection Agency, page 2-4.
- <sup>3</sup> Mitsakou C., Eleftheriadis K., Housiadas C., Lazaridis M. Modeling of the dispersion of depleted uranium aerosol April 2003. <http://www.osti.gov/scitech/servlets/purl/39597> and [http://fhp.osd.mil/du/pdfs/1999279\\_0000010.pdf](http://fhp.osd.mil/du/pdfs/1999279_0000010.pdf), reference 23.
- <sup>4</sup> <https://www.epa.gov/hwpermitting/list-example-hazardous-waste-permits-open-burning-and-open-detonation>.
- <sup>5</sup> Department of Energy/National Nuclear Security Administration, Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0 (LA-UR-11-03642), submitted to the New Mexico Hazardous Waste Bureau (NMWD-HWB) July 19, 2011, Attachment J, *Alternatives Assessment for Open Detonation Waste Treatment Activities at Los Alamos National Laboratory*.
- <sup>6</sup> Department of Energy/National Nuclear Security Administration, Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0 (LA-UR-11-03642), submitted to the New Mexico Hazardous Waste Bureau (NMWD-HWB) July 19, 2011, Attachment J, *Alternatives Assessment for Open Detonation Waste Treatment Activities at Los Alamos National Laboratory*.
- <sup>7</sup> Department of Energy/National Nuclear Security Administration, Los Alamos National Laboratory Permit Modification Request for Open Detonation Units at Technical Areas 36 and 39 (TA-36-8 & TA-39-6), Revision 0 (LA-UR-11-03642), submitted to the New Mexico Hazardous Waste Bureau (NMWD-HWB) July 19, 2011, Attachment J, *Alternatives Assessment for Open Detonation Waste Treatment Activities at Los Alamos National Laboratory*.
- <sup>8</sup> Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico, "Table 2-2 Overview of Los Alamos National Laboratory Technical Areas and Activities," EIS-0380, May 2008, p. 2-14.
- <sup>9</sup> Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico, "Table 2-2 Overview of Los Alamos National Laboratory Technical Areas and Activities," EIS-0380, May 2008, p. 2-14.
- <sup>10</sup> DOE (U.S. Department of Energy), 1999a, Site-Wide Environmental Impact Statement for Continued Operation of the Los Alamos, New Mexico, DOE/EIS-0238, Albuquerque Operations Office, Albuquerque, New Mexico, January as cited in Draft Site-Wide EIS for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/IES-0308D, June 2006.
- <sup>11</sup> Los Alamos National Laboratory, Hazardous Waste Permit, November 2010, Table J-1, Action Portion of the Facility, [https://www.env.nm.gov/HWB/documents/Attachment\\_J.pdf](https://www.env.nm.gov/HWB/documents/Attachment_J.pdf).
- <sup>12</sup> Final Site-Wide Environmental Impact Statement for Continued operation of the Los Alamos National Laboratory, Los Alamos, New Mexico, DOE/EIS-0380, May 2008, page 1-45.
- <sup>13</sup> CCNS, Open Burning and Open Detonation Permits Canceled, DOE and UC Request Cancellation of Open Burning Permits at LANL, July 11, 2006. <http://www.nuclearactive.org/docs/OBODindex.html>
- <sup>14</sup> In 2009, the U.S. Environmental Protection Agency proposed striking down the so-called flexible air permits issued by the Texas Commission on Environmental Quality, saying they violate the Clean Air Act. More at <http://www.wsj.com/articles/SB10001424052748703426004575339140408652292>
- <sup>15</sup> U.S. Department of Energy/National Nuclear Security Administration, Site Environmental Report, Pantex Plant, 2013.
- <sup>16</sup> U.S. Department of Energy/National Nuclear Security Administration, Site Environmental Report, Pantex Plant, 2013.
- <sup>17</sup> Texas Committee on Environmental Quality, J.A. Garza, e-mails correspondence to Laura Olah, 8/18/2016.
- <sup>18</sup> U.S. Department of Defense, Proposed Plan for No Further Remedial Action With Land Use Controls LCAAP Area 10 Sand Piles, July 2009.
- <sup>19</sup> [http://njhighlandscoalition.org/updown/SAFER%20EA/Shaw%202003\\_Groundwater%20Assessment%20Report%20-%20Copy.pdf](http://njhighlandscoalition.org/updown/SAFER%20EA/Shaw%202003_Groundwater%20Assessment%20Report%20-%20Copy.pdf).
- <sup>20</sup> <http://www.nrc.gov/info-finder/decommissioning/complex/picatinny-arsenal.html>.
- <sup>21</sup> U.S. Army Corps of Engineers, Summary of the Radiological Survey Findings for The Iowa Army Ammunition Plant Explosive Disposal Area, Inert Disposal Area, Demolition Area / Deactivation Furnace, and Line 1 Former Waste Water Impoundment Area, June 6, 2006.
- <sup>22</sup> Agency for Toxic Substances and Disease Registry, Health Consultation, Environmental Pathway Evaluation for Beryllium and Depleted Uranium, Iowa Army Ammunition Plant, EPA FACILITY ID: IA7213820445, December 9, 2003.
- <sup>23</sup> <https://www.epa.gov/hwpermitting/list-example-hazardous-waste-permits-open-burning-and-open-detonation>.
- <sup>24</sup> Full title: US Department of Energy National Nuclear Security Administration / Nevada Field Office Nevada National Security Site (US DOE NNSA/NFO NNSS).
- <sup>25</sup> RCRA Part B Permit Application, Nevada National Security State for Waste Management Activities at the NNSA Explosive Ordnance Disposal Unit, October 2015.
- <sup>26</sup> RCRA Part B Permit Application, Nevada National Security State for Waste Management Activities at the NNSA Explosive Ordnance Disposal Unit, October 2015.
- <sup>27</sup> <http://www.bvsde.ops-oms.org/tutorial1/fulltex/armas/textos/chebio/chebio.pdf>.
- <sup>28</sup> RCRA Part B Permit Application, Nevada National Security State for Waste Management Activities at the NNSA Explosive Ordnance Disposal Unit, October 2015.