

Legacy TRU Waste Disposal Plan Consultation Information

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1.0 Information Relevant to Definition

The Land Withdrawal Act (**LWA**) does not define or categorize waste as legacy waste. The LWA authorizes disposal of 6.2 million cubic feet (175,564 m³) of defense related transuranic (**TRU**) waste and categorizes waste only as Remote Handled (**RH**) and Contact Handled (**CH**) TRU waste. No other waste categories are described in the LWA.

The Permit does not define legacy waste but defines retrievably stored and newly generated waste in Permit Attachment C, Section C-0.

C-0 Introduction and Attachment Highlights

Retrievably stored waste is defined as TRU mixed waste generated after 1970 and before the New Mexico Environment Department (**NMED**) notifies the Permittees, by approval of the final audit report, that the characterization requirements of the WAP at a generator/storage site have been implemented. **Newly generated** waste is defined as TRU mixed waste generated after NMED approves the final audit report for a generator/storage site.

Waste management directive Department of Energy (**DOE**) O Order 435.1, implemented at generator/storage sites does not define legacy waste.

No formal legacy waste definition has been identified as it applies to the Waste Isolation Pilot Plant (**WIPP**). However, the DOE Office of Environmental Management (**EM**) mission statement is as follows:

The EM mission is to complete the safe cleanup of environmental legacy resulting from decades of nuclear weapons development and government-sponsored nuclear energy research. EM is responsible for managing and directing the cleanup of contaminated nuclear weapons manufacturing and testing sites across the United States. Integral to that responsibility is the need to safely disposition large volumes of nuclear waste, safeguard and prepare for disposition of nuclear materials that could be used in nuclear weapons, deactivate and decommission several thousand radiologically and chemically contaminated facilities no longer needed to support the Department of Energy's mission and remediate extensive surface and groundwater contamination.

The 1998 Record of Decision (**ROD**) for the DOE WIPP Disposal Phase indicates that waste destined for WIPP would include waste in storage and waste to be subsequently generated. The ROD, like the LWA, provides the DOE's decision to dispose of up to 175,600 cubic meters (6.2 million cubic feet) of TRU waste generated by defense related activities.

Currently, defense related TRU and TRU mixed waste are characterized, shipped, managed, stored and disposed at the WIPP in the same manner regardless of it being categorized by generator/storage sites as legacy or non-legacy.

Generator/storage sites schedule and plan waste shipments to WIPP in order to minimize risk to human health and the environment.

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2.0 Generator/Storage Sites Definitions

The Permittees consulted with representatives at DOE EM and National Nuclear Security Administration (**NNSA**) facilities at the generator/storage sites. NNSA programs at generator/storage sites typically do not define/categorize waste as legacy waste.

Note that the term “legacy waste” is typically not formally defined, but commonly used at generator/storage sites. Categorization is often differentiated by the terms “legacy” or “newly generated” waste. The information in Table 1 below is a summary of information obtained from generator/storage site consultations.

Table 1 Generator/storage site legacy waste definitions

Generator/Storage Site	*Definition/Date	Supplemental Information
Argonne National Laboratory	Not defined/present	NA
Hanford Site	All waste (retrieved, buried and/or generated) prior to June 2000 is considered legacy waste.	Hanford ceased production activities in the early 1990s and all of the TRU waste generated related to cleanup activities is added to the legacy waste inventory. This would include waste produced from the D&D of cold war facilities and waste recovered from underground waste sites.
Lawrence Livermore National Laboratory	Not defined/present	NA
Oak Ridge National Laboratory	Waste included in the Transuranic Waste Processing Center (TWPC) Site treatment Plan (STP) Waste generated prior to EM transition is referred to as “legacy” waste.	<i>Tennessee Department of Environment and Conservation (TDEC) STP Regulatory Agreement</i>
Savannah River Site	Waste characterized by the Central Characterization Program (CCP) prior to the 2014 WIPP event.	Internal Memo <ul style="list-style-type: none"> • DOE-SR direction (4-12-19)

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Los Alamos National Laboratory – N3B (EM)	All waste (retrieved, buried and/or generated) prior to October 1, 1999	Site Treatment Plan TRU waste generated related to cleanup activities is added to the legacy waste inventory. This would include waste produced from the D&D of cold war facilities and waste recovered from underground waste sites.
Los Alamos National Laboratory (NNSA)	Waste generated prior to October 1, 1999	Site Treatment Plan
Idaho National Laboratory	Stored waste generated on/prior to October 1995.	<ul style="list-style-type: none"> Waste subjected to the Idaho Settlement Agreement (ISA), is considered “legacy” waste. Waste generated during the processing of “legacy” waste, will also be included in definition. Special category of legacy waste: Subsurface Disposal Area, between 1950-1970.

*As defined by the generator sites this may or may not include future decontamination and decommissioning waste streams.

ANL (NNSA)

At the Argonne National Laboratory (**ANL**), the remaining RH TRU and CH TRU being generated currently is 100% of the stored inventories of those waste types. The ANL processes and generates these certifiable containers as if they were new-generation.

INL – Batelle Energy Alliance (BEA) (NE)

There is no legacy waste.

The Idaho National Laboratory (**INL**) does not currently store/possess any waste subject to the ISA. The last shipment of CH TRU ISA waste was sent to Advanced Mixed Waste Treatment Project (**AMWTP**) in December of 2013. The last shipment of RH TRU ISA waste was sent to Idaho Nuclear Technical and Engineering Center (**INTEC**) no later than August 2012. The INL does have mixed TRU waste subject to the Idaho STP.

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INL-AMWTP (EM)

Any radioactive waste stored as TRU waste on the INL with a generation date of October 1995 or earlier. This includes all waste that was retrieved from storage in the TSA, and all waste that was in storage as TRU in 1995. This volume was developed based upon an estimate of the number and types of containers that were thought to be present in the stored waste inventory in 1995 and was agreed to be approximately 65,000 cubic meters when the ISA was signed, but the actual volume exceeded 65,000 cubic meters. Only repackaged waste containers whose predominant contents or specific objects (e.g., polychlorinated biphenyl (**PCB**) capacitors) have a tie directly to a 1995 container are considered to be legacy containers. Containers with new items (e.g., filters, vacuums, personal protective equipment (**PPE**)) contaminated during processing of legacy waste are considered to be newly generated waste.

When much of the waste was shipped to INL for disposal, the Atomic Energy Commission (**AEC**)/DOE definition of TRU waste included any waste with an alpha activity concentration greater than 10 nCi/g as well as uranium-233 waste. The definition was changed in 1982 to include only materials contaminated with alpha-emitting TRU radionuclides having a half-life longer than 20 years, in concentrations of more than 100 nCi/g and to exclude all uranium isotopes. Therefore, a significant quantity of INL's waste has been determined to be mixed low level waste (**MLLW**), but it is still subject to the regulatory agreements referenced above.

A special category of "legacy" waste is the waste disposed at the Subsurface Disposal Area (**SDA**) between the 1950s and the 1970s. Again, much of this disposed waste would not meet the current definition of TRU waste, but TRU waste was disposed of at the SDA. This waste was not included in the 1995 estimates for INL stored TRU waste volume. In 2006, DOE and IDEQ agreed that a TRU subset of the SDA waste would be exhumed, characterized, packaged, and shipped to the WIPP facility. This waste is referred to as Targeted, SDA, ARP, or Agreement to Implement (**ATI**) waste. It is not subject to the requirements of the ISA or the INL STP (it is regulated under the 2006 ATI and the Comprehensive Environmental Response Compensation, and Liability Act (**CERCLA**)).

Hanford

Hanford ceased production activities in the early 1990's and all of the waste generated in the following years is related to cleanup activities. With the exception of some of the waste generated in the RL325 waste streams at Pacific Northwest National Laboratory (**PNNL**), all Hanford waste is considered legacy. All retrieved waste (even if repackaged), all retrievably stored waste (buried waste), and all waste generated prior to June of 2000 is considered legacy. Waste produced from the D&D of cold war facilities and waste recovered from underground waste sites is also legacy. Hanford also has numerous waste burial sites that don't have a ROD yet (pre-1970 waste sites other than 618-11) which will also be included in the inventory of legacy waste once a ROD is obtained.

LANL-N3B (EM)

The EM Los Alamos Field Office (**EM-LA**) is dedicated to the cleanup of legacy contamination left behind by nuclear weapons production and research during the Manhattan Project and Cold War era at Los Alamos National Laboratory (**LANL**) in New Mexico. EM-LA's cleanup mission includes legacy waste remediation and disposition, soil and groundwater remediation, and deactivation and decommissioning of excess buildings and facilities. Legacy waste is any

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radioactive waste stored or buried as TRU waste at LANL with a generation date prior to October 1, 1999. Waste produced from the D&D of cold war facilities and waste generated from legacy waste cleanup sites is also legacy. TRU waste generated on October 1, 1999 and later is the responsibility of the NNSA Los Alamos Field Office.

LANL (NNSA)

LANL does not have legacy waste.

LLNL

Lawrence Livermore National Laboratory (**LLNL**) does not have legacy waste.

ORNL-EM

Waste included in the TWPC STP.

ORNL UT-Battelle (SC)

Responsibility for managing enduring mission TRU waste from on-going Oak Ridge National Laboratory (**ORNL**) operations transitioned to SC/ORNL starting in 2018 as defined in the Site Treatment Plan for Mixed Waste on the U.S. Department of Energy Oak Ridge Reservation.

Waste generated prior to the EM transition that is managed by EM is referred to as “legacy” waste.

SRS

Per DOE-SR direction (4-12-19), “legacy” TRU waste was re-defined to include all TRU waste containers that had been characterized by CCP prior to the WIPP shutdown in 2014.

3.0 Considerations

The WIPP’s role is to support generator storage sites disposition of defense related TRU and TRU mixed waste. To do this the Permittees must maintain receipt, management, storage and disposal capability at the WIPP facility. The Permittees also provide waste characterization and transportation services. The Permittees typically schedule shipments as directed/requested by the generator storage sites. Planning and scheduling shipments depends on the availability of certified containers from the generator/storage sites.

Generator storage/sites address several challenges in certifying/preparing waste for shipment to the WIPP that impacts planning and scheduling. The most important daily challenge in characterization and shipping is ensuring compliance with the numerous WIPP transportation and complex Waste Acceptance Criteria (**WAC**) requirements. Some generator/storage sites have state agreements and milestones that must be considered (see examples listed in Table 2 below). In addition to retrievably stored legacy waste, generator/storage sites must address operations/related waste (e.g., newly generated waste) that is continuously generated pursuant to ongoing facility missions. The following are some examples of generator/storage site challenges that the Permittees must consider in legacy waste disposal in Panel 12 to the extent practicable. The time and resources required to address these challenges and ongoing generation of operations related waste needs to be considered in legacy waste disposal in Panel 12.

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Table 2 Generator/storage site challenges to be considered in disposing of legacy waste in Panel 12 to the extent practicable

Facility	Considerations
Argonne National Laboratory	Funding – No EM program. TRU waste disposition funding comes from overhead and not from a separate DOE-EM funded project.
Hanford Site	<p>Funding</p> <p>Hanford has several underground tanks, cribs, and trenches with waste that require retrieval and remediation and will be challenging due to the expected activity levels.</p> <p>Hanford is evaluating options for retrieval of buried waste.</p> <p>Tri-Party Agreement Milestones (Hanford Federal Facility Agreement and Consent Order, US EPA, DOE and WA State Dept of Ecology)</p> <p>https://www.hanford.gov/files.cfm/HFFACO.pdf</p> <p>Hanford is currently not shipping but planning to initiate certification activities in late CY26 in accordance with the Tri-Party Agreement. Waste shipments from Hanford will be ongoing beyond Panel 12 due to the volume of TRU waste and challenges described herein.</p> <p>The Tri-Party Agreement requires completion of offsite shipments of all TRU-mixed waste (in above ground storage as of June 30, 2009, and in retrievable storage) by late 2050. This does not address facility D&D waste to be generated. There are several tentatively planned D&D waste streams, but those are not currently generating any waste and do not yet have reliable projections-other than the longer-term strategic projections that are done for the Annual Transuranic Waste Inventory Report (ATWIR).</p> <p>Need to address treatment requirements of certain wastes</p> <p>Hanford is currently repackaging waste that is non-compliant for WIPP at a rate of 280 m³/year at the Perma-Fix Environmental Services (PFNW) facility. This usually packages into 60-90 Standard Waste Boxes (SWBs) due to size reduction.</p> <p>Hanford has numerous waste burial sites that don't have a ROD yet (pre-1970 waste sites other than 618-11) which will also be included in the inventory of legacy waste once a ROD is obtained.</p>
Lawrence Livermore National Laboratory	Has some large items to address (e.g., gloveboxes)

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<p>Oak Ridge National Laboratory</p>	<p>TWPC has a few CH and RH legacy waste containers containing potential pyrophoric/energetic materials, that require unique processing capabilities to be developed.</p> <p>TWPC has several CH and RH legacy waste containers that failed the enhanced Acceptable Knowledge (AK) reviews and require reprocessing.</p> <p>A small quantity of waste from the D&D projects may be TRU and require future processing, characterization, certification, and shipment to WIPP.</p> <p>Enduring mission (operations) related waste is also subject to regulatory commitments with TDEC in the Site Treatment Plan for Mixed Wastes on the U.S. Department of Energy Oak Ridge Reservation.</p> <p>The first certification campaign for ORNL enduring mission TRU waste will take place utilizing existing CCP resources at the TWPC. Long term strategies are to transition existing EM/UCOR TRU waste storage facilities to SC/UT-Battelle (UT-B) operations and establish additional infrastructure to support final certification and shipment loading activities.</p>
<p>Savannah River Site</p>	<p>RH Waste Disposition</p> <p>Shielded container availability</p> <p>RH borehole emplacement resumption</p> <p>State of South Carolina (SC) Settlement Agreement (8/31/20) to remove 9.5 MT of surplus plutonium from the state of SC by 12/31/36.</p> <p>https://www.scaq.gov/wp-content/uploads/2020/08/South-Carolina-Settlement-Agreement-Final-signed-8-28-20.pdf</p> <p>Addressing waste streams/containers to meet WIPP compliance requirements (e.g., enhanced AK per WIPP WAC/DSA)</p> <p>Storage limitations for CCO Generation</p>
<p>Los Alamos National Laboratory – N3B</p>	<p>Waste retrieval and processing</p> <p>Much of the waste at LANL is covered/buried (approximately 79%)</p> <p>Operations related waste</p> <p>Storage limitations</p> <p>May have some D&D waste in the future</p>

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	<p>Los Alamos National Laboratory Federal Facility Compliance Order Annual Site Treatment Plan</p> <p>https://www.env.nm.gov/hazardous-waste/wp-content/uploads/sites/10/2023/08/HWB-LANL-STP_Annual-Update_2023_Rev33_August-2023.pdf</p>
<p>Idaho National Laboratory</p>	<p>Agreements/Requirements to address</p> <ul style="list-style-type: none"> • 1995 Settlement Agreement • Agreement to implement, U.S. district court order dated May 25, 2006 • Supplemental agreement concerning conditional waiver of sections D.2.e and K.1 of 1995 settlement agreement (IDEQ website: (https://www.deq.idaho.gov/idaho-national-laboratory-oversight/1995-settlement-agreement/)) • Idaho National Laboratory and Idaho Cleanup Project Site Treatment Plan (https://idahoenvironmental.com/Documents/Community/INL-STP_R49.pdf) <p>Day to day processing challenges such as meeting WIPP complex compliance requirements and addressing container integrity issues:</p> <p>~9,200 containers are completing enhanced AK evaluations and are being certified.</p> <p>~6,000 super compacted waste containers require overpacking. Solutions are being researched.</p> <p>~1,000 require treatment in AMWTF or WMF-635 tent to become WIPP compliant. (e.g., address Basis of Knowledge (BoK), Crit Cleanouts, FGA, High Dose, High Fissel Gram Equivalent (FGE), Impenetrable, Layer of Confinements, Mercury, Liquids, Direct Feed, & PCB Contaminated, etc.)</p> <p>Difficult Waste:</p> <p>Potentially commingled organic and inorganic wastes. ~7,100 Sludge Repackaging Project (SRP) containers are being evaluated to determine if organic and inorganic waste were comingled during the SRP. This is ISA waste. Potentially comingled waste will have to be addressed and potentially treated</p> <p>Containers Requiring Treatment</p> <ul style="list-style-type: none"> • ~2,700 containers failed BoK Oxidizer testing due to ammonium nitrate

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	i. Potentially treatment option is cementation using magnesia cement with a lower pH value to support the WIPP Performance Assessment.
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