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TRU Waste Inventory Collection and Work-Off Plans for the Centralization of TRU Waste Characterization/Certification at INL—On Your Mark—Get Set - 9410

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ABSTRACT

The U.S. Department of Energy (DOE) amended the Record of Decision (ROD) for the *Waste Management Program: Treatment and Storage of Transuranic Waste* to centralize transuranic (TRU) waste characterization/certification from fourteen TRU waste sites. This centralization will allow for treatment, characterization and certification of TRU waste from the fourteen sites, thirteen of which are sites with small quantities of TRU waste, at the Idaho National Laboratory (INL) prior to shipping the waste to the Waste Isolation Pilot Plant (WIPP) for disposal.

Centralization of this TRU waste will avoid the cost of building treatment, characterization, certification, and shipping capabilities at each of the small quantity sites that currently do not have existing facilities. Advanced Mixed Waste Treatment Project (AMWTP) and Idaho Nuclear Technology and Engineering Center (INTEC) will provide centralized shipping facilities, to WIPP, for all of the small quantity sites. Hanford, the one large quantity site identified in the ROD, has a large number of waste in containers that are overpacked into larger containers which are inefficient for shipment to and disposal at WIPP. The AMWTP at the INL will reduce the volume of much of the CH waste and make it much more efficient to ship and dispose of at WIPP. In addition, the INTEC has a certified remote handled (RH) TRU waste characterization/certification program at INL to disposition TRU waste from the sites identified in the ROD.

INTRODUCTION

The Waste Isolation Pilot Plant (WIPP) opened on March 26, 1999, becoming the nation's first deep geologic repository for the permanent disposal of defense-generated transuranic (TRU) waste. In May 1998, the U. S. Environmental Protection Agency (EPA) certified WIPP and recertified WIPP in March 2006. The knowledge of TRU waste inventory is fundamental to packaging, transportation, disposal strategies, resource allocation, and is also imperative when working in a regulatory framework.

DOE TRU waste generation has occurred at 39 sites across the country 7 large-quantity and 32 small-quantity sites (see figure 1.0 LANL, 2008). Sixteen of these sites (one large site and 15 small quantity sites) have emplaced their waste at WIPP, found other disposition pathways for the waste, or have transferred the waste to other sites for further disposition. Babcock and Wilcox (BL) (the site did not pursue a defense determination on older waste so they were de-inventoried) United States Army Materiel Command (USAMC), Knolls Atomic Power Laboratory – Nuclear Fuels Service (KAPL-NFS), and Lawrence Berkeley National Laboratory (LBNL) have been de-inventoried once, but have identified additional waste after the originally

identified waste was removed from the site. TRU waste is currently retrievably stored at 23 sites throughout the DOE Complex. There have been 6340 shipments of TRU waste to WIPP for emplacement since WIPP's opening (DOE, 2008).

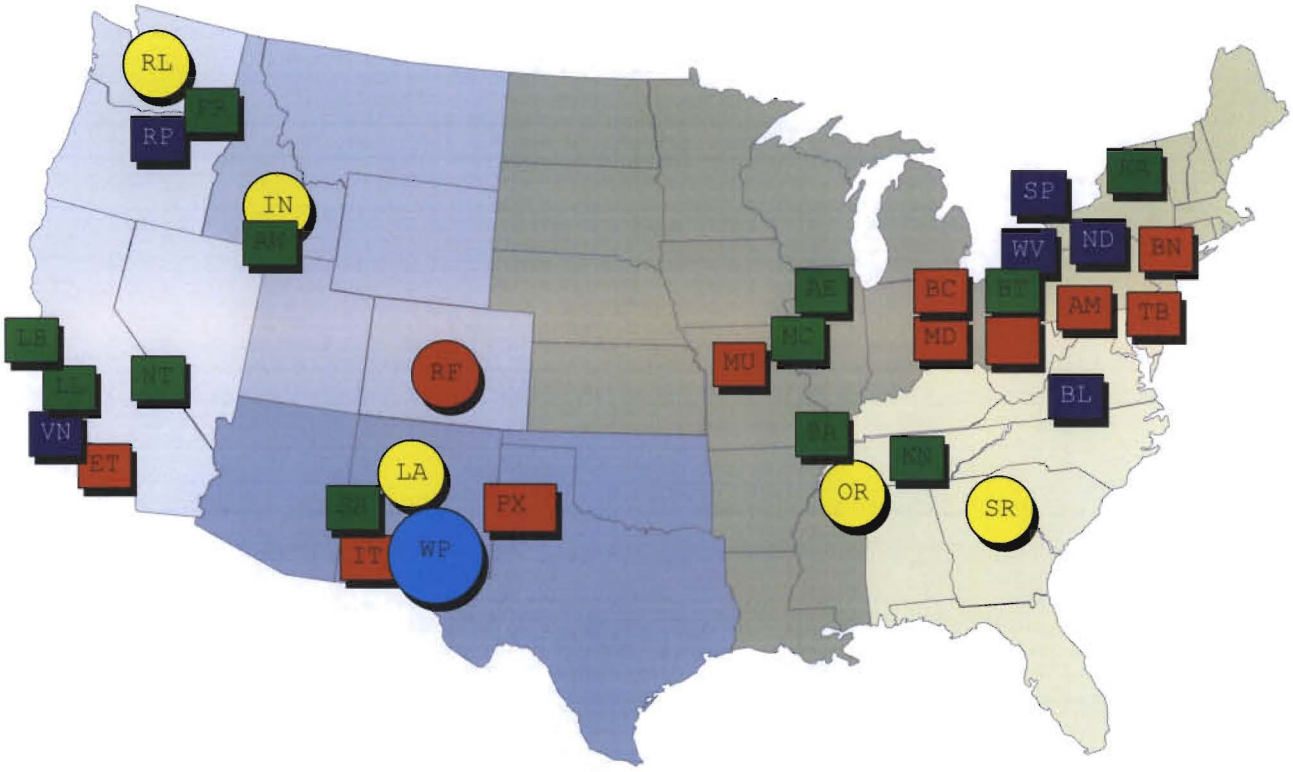

Fig. 1.0 Current Status of Generator Sites (LANL, 2008)

Yellow – Large Quantity Site Green – Small Quantity Site Red – Sites that are de-inventoried of TRU waste
Blue – Potential TRU Waste Site

AL Ames Laboratory
AE Argonne National Laboratory
AM ARCO Medical Products—shipped to OSRP
AW Material and Fuels Complex (MFC)
BC Battelle Columbus Laboratories (BCL)—shipped to RL and SR
BL Babcock and Wilcox Nuclear Energy Services (Potential) —(*de-inventoried but has identified new TRU waste)
BN Brookhaven National Laboratory—shipped to OSRP
BT Bettis Atomic Power Laboratory (BAPL)
ET Energy Technology Engineering Center—shipped to RL
FM Fernald Environmental Management Project—shipped to OSRP
FR Framatome (AREVA)
IN Idaho National Laboratory
IT Inhalation Toxicology Research Institute (ITRI) (known as Lovelace Respiratory Research Institute) - shipped to SA
KA Knolls Atomic Power Laboratory

KN Knolls Atomic Power Laboratory-Nuclear Fuels Services—(*de-inventoried but has identified additional TRU waste)
LA Los Alamos National Laboratory
LB Lawrence Berkeley Laboratory (LBL) —(*de-inventoried but has identified additional TRU waste)
LL Lawrence Livermore National Laboratory (LLNL)
MC U.S. Army Materiel Command (USAMC) —(*de-inventoried but has identified additional TRU waste)
MD Mound Plant – shipped to SR
MU University of Missouri Research Reactor—shipped to AE, then to WIPP
ND Nuclear Radiation Development Site, Inc. (Potential)
NT Nevada Test Site (NTS)
OR Oak Ridge National Laboratory
PA Paducah Gaseous Diffusion Plant
PX Pantex Plant—shipped to LA
RF Rocky Flats Environmental Technology Site—shipped to WIPP
RL Hanford Site (Richland Operations Office)
RP Hanford Site (Office of River Protection) (Potential)
SA Sandia National Laboratories
SP Separations Process Research Unit (Potential)
SR Savannah River Site (SRS)
TB Teledyne Brown Engineering—shipped to RF
VN General Electric Vallecitos Nuclear Center (Potential)
WV West Valley Demonstration Project (Potential)
WP Waste Isolation Pilot Plant

TRU WASTE INVENTORY

Knowledge of the TRU waste inventory is one of the most important factors for making this centralization option a success. The Carlsbad Field Office (CBFO) needs to know the volumes, the radiological properties, and the non-radiological properties of the waste at each site for disposal purposes.

The inventory is now collected on an annual basis by the Inventory Team. Each year, the Carlsbad Field Office's (CBFO) Recertification Manager requests an update to the inventory. The Inventory Team provides each TRU waste site with their previous year's data on a Microsoft® Excel spreadsheet (referred to as a template). The team works with each site individually to make sure that all the information is provided. After each site has responded with their updated templates, the inventory team enters the data into the Comprehensive Inventory Database (CID), a fully qualified and compliant CBFO Quality Assurance Program database. After the data are entered, an internal independent review is done by a team member that did not enter the data to verify that the data from the template are entered correctly. After this internal verification is complete, individual TRU waste site validation reports are prepared and sent to each TRU waste site manager or designee for their signature. A DOE signature means that the data that the site provided are the data entered and the data are the sites's best estimate. Some TRU waste sites do not have site DOE personnel. For example, USAMC, Areva (formerly

Framatome), and Nuclear Radiation Development Site (NRD) require DOE/Headquarters (HQ) to validate the inventory at these sites.

CENTRALIZATION OPTION

The U.S. Department of Energy amended the Record of Decision (ROD) for the *Waste Management Program: Treatment and Storage of Transuranic Waste,* on February 27, 2008. The intent of the amendment is to allow the transport of TRU waste from fourteen TRU waste sites to the Idaho National Laboratory for treatment and characterization prior to shipment to the WIPP for disposal. The centralization of treatment, characterization and certification will serve three purposes:

1. Utilize the full capability of the AMWTP at the Idaho National Laboratory
2. Avoid the costs of building treatment and characterization capabilities and establishing certification programs at TRU waste sites that currently do not have them
3. Reduce the nation's defense-related TRU waste footprint

DOE/Headquarters issued contact-handled packaging instructions for the TRU waste site's to implement before packaging their TRU waste for transfer to the INL for characterization and certification. The waste must be packaged to meet transportation requirements, the INL acceptance criteria, as well as the WIPP acceptance criteria.

The TRU waste sites named in the ROD were prioritized into time periods so that planning could begin for the CBFO and for the sites to begin to package their waste and to meet milestones and agreements. These time frames are: 1) FY09 – FY11, sites that are near term and ready, 2) FY12 – FY13, sites that need additional information, and 3) FY14 – FY15, sites further out with no drivers or will generate waste later.

A Work-Off Plan will be developed for each individual site. A Work-Off Plan may contain the following information:

- **Background**
  A brief description of the sites major mission(s), current status of TRU waste activities, location, dates of operation, etc. These descriptions help with the defense determination. Identifying missions, dates of operation, locations, and, activities help create a timeline in the AK report. The AK report can establish a defense link if the documentation can supported.

- **Inventory**
  The TRU waste inventory includes the total volume, number of waste streams, number and volume and type of containers, waste material parameters, radionuclides, hazardous chemicals, etc. Each site identifies their contact handled (CH) and remote handled (RH) waste streams. The inventory identifies if the waste is compliantly packaged. If the containers are packaged correctly they are considered WIPP shippable. If the containers are not packaged compliantly, the site is requested to describe the repackage cause and

the new container the waste will be repackaged into. The inventory tracks waste stream movement. Waste streams may move from one waste stream to another based on characterization data.

- **Status of Acceptable Knowledge and Defense Determinations**
  Describe status of AK and defense determination status. The AK report can establish a defense link if the documentation can supported. Sites that do not have an approved Defense Determination will either need to prepare and submit a formal Defense Determination. If however, a sites defense determination can be defended in the AK report, a formal submission is not required.

- **Drivers**
  Regulatory drivers or milestones are identified by the site to ensure that they are incorporated in the Work-Off Plan. Many of the sites have regulatory drivers or milestones that conflict with de-inventory shipping schedules.

- **Assumptions**
  Each site lists assumptions that they have made or that we are making in terms of disposition for their waste. An example could be a timeframe to begin to repackage waste.

- **Issues**
  Defense determinations are needed by some of the sites before their waste can come to WIPP. For example, Nuclear Radiation Development and Babcock and Wilcox (BL) will need to go through a formal defense determination before their waste can go to WIPP.

  Once the Work-Off Plans are in place, the sites can begin assisting the AK team in document collection for AK reports. Sites will need to submit the documents for site classification review. These reviews can take long periods of time to complete and require extensive resources. AK documents should be collected early in the process to allow enough time for reviews.

  Several sites have difficult waste that either requires a permit modification or a new shipping container to handle the size of the waste. Bettis has large neutron sources that will require a permit modification. Several sites have large spheres that will require size reduction or a new shipping container.

Actions/ Schedule

Each site, mentioned in the ROD, will be requested to provide a proposed schedule to prepare their TRU waste for transport to INL. The Centralized Characterization Project (CCP) is an organization that assists sites with all aspects of waste characterization and shipping. As the sites are preparing their waste for shipping, the CCP will assist in any or all aspects of the process as needed.

CONCLUSION

The centralization for characterization and certification of the small quantity sites and the waste from Hanford, mentioned in the ROD, will reduce the defense TRU waste footprint throughout the DOE complex; save taxpayer dollars; and fully utilize AMWTP and their resources. The map in Figure 2 shows what the new DOE footprint will look like once the centralization for characterization and certification is complete.

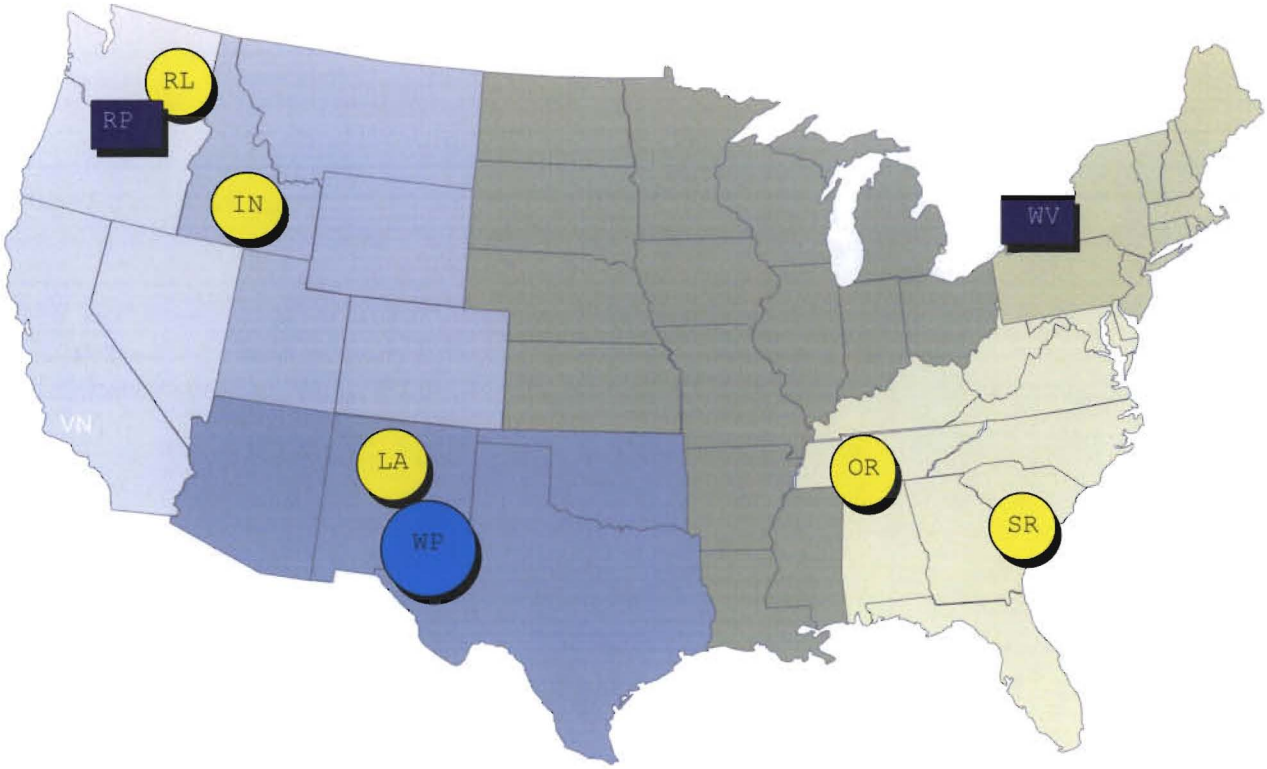

Figure 2: The New DOE Complex after the Centralization for Characterization and Certification (LANL, 2008)

Yellow – Large Quantity Site Red – Sites that are de-inventoried of TRU waste Blue – Potential TRU Waste Site

IN Idaho National Laboratory
LA Los Alamos National Laboratory
OR Oak Ridge National Laboratory
RL Hanford Site (Richland Operations Office)
RP Hanford Site (Office of River Protection) (Potential)
SR Savannah River Site (SRS)

WV West Valley Demonstration Project (Potential)
WP Waste Isolation Pilot Plant

REFERENCES

LANL-CO 2008. *Annual Transuranic Waste Inventory Report–2008*, Revision 0, LANL – CO, Carlsbad, NM

U.S. Department of Energy (DOE) 2008. *WIPP Waste Information System* (WWIS), Query for TRU Waste Shipments Thru 12/31/2007. Carlsbad, NM: Carlsbad Field Office.