

FACILITY TOUR  
April 23, 2008

- **Tour Stop 1: CHMB**

On the right is the Contact Handled Waste Marshalling Building (CHMB). This facility has been recently constructed and serves two purposes. The primary purpose for the facility is to provide storage of CH waste drums which have been processed for disposal at WIPP. Shipments to WIPP are expected to be conducted on a campaign basis, and drums which have had processing completed are stored here until shipping campaigns occur. WIPP/CCP will set up the mobile loading unit in the parking lot for loading the TRUPACT II shipping containers.

The second purpose for this facility is to stage waste drums that have been transferred from Bechtel Jacobs for processing at the TWPC. This facilitates waste transfers to the TWPC by allowing for segregation and staging of waste populations to be processed. Drums of waste are moved between the Processing Building and the CHMB by fork truck.

The facility has a capacity of about 1200 drums. It has a wet pipe fire protection system and is permitted under the site's RCRA permit.

We will now continue to the Processing Building.

- **Tour Stop 2: Control Room – RWP Brief, Dosimetry, Pick up Escorts**

We will now exit the vehicles and assemble for our required safety briefing to enter the facility. EnergX employees will be providing the briefing on the Radiological Work Permit. Please listen to the briefing for important safety information. You also must be logged into the RWP. Dosimetry will be worn by our escorts, so you will not need to wear any. Instead, the escort's dosimetry will be read and will provide the dose data for each person in the group.

Once the safety briefing has been completed, we will begin the tour. The three groups will be split, and will start the tour in different areas; however, all groups will visit the entire facility.

Our EnergX escorts have been instructed to accompany the groups and assure that groups remain safe during the tour. They have been instructed to not answer any questions about the facilities or operations. They will provide guidance and instruction

during the tour in the event of any incident and will assist with monitoring out through the Personnel Contamination Monitors.

### ***GROUP "A" START POINT***

- **Tour Stop 3: CH Waste Receiving Area**

We are now standing in the CH Waste Receiving Area. CH waste, which may be contained either in drums or boxes, is delivered, by BJC, to this location by truck. Waste containers are monitored to confirm they are not contaminated, to record their radioactive dose readings and to confirm the containers are those that had been requested. In addition the containers are logged into the facilities inventory tracking system prior to being unloaded from the trailer and taken into the CHSA.

We will now go into the CHSA.

- **Tour Stop 4: CH Staging Area**

We are now standing in the Contact Handled Staging Area. This building is limited to a capacity of about 200 drums by the DSA and the RCRA permit. Drums and boxes are staged here for processing in the facility. In addition, drummed waste receives Non-Destructive Assay (NDA) and Non-Destructive Examination (NDE) here in this building. Both NDA and NDE activities are conducted by CCP with drum movements provided by the facility contractor. NDA analysis consists of assay by two methods: Integrated Passive-Active Neutron and Segmented Gamma Scan. This assay takes approximately 1 hour to perform. The NDA analysis is used to determine whether the waste is TRU or LLW, as well as to obtain data for final certification of the waste for disposal. If the waste is determined to be LLW, Acceptable Knowledge is utilized to determine if the container includes RCRA constituents and is therefore mixed-LLW (MLLW). If it is MLLW then macroencapsulation will be required for disposal at NTS. NDE uses X-rays to look inside the containers to determine the presence or absence of liquids, unvented containers, and other items that may need special consideration during processing. All incoming drums are examined, and the data is used to determine whether the drum requires repackaging in the glovebox to perform visual examination or treatment of the waste.

Drums may also be required to enter the glovebox for repackaging if the drums do not meet specification for WIPP disposal. If the drums are WIPP compliant and contain no items that are identified as prohibited by WIPP, further processing of the waste in the processing building may not be required.

NDA and NDE can only be used for drums up to 85 gals. Boxed waste must first be taken into the facility Box Breakdown Area (BBA), and the waste repackaged into drums. After

the waste is drummed out of the BBA, each drum is taken to the CHSA to be NDAd to determine the radioactive content and whether the drum is TRU or LLW/MLLW .

We'll now proceed to view the Macroencapsulation Building.

- **Tour Stop 5: Macroencapsulation Area**

This is the Macroencapsulation building. Mixed Low-Level waste drums are brought here to be macroencapsulated to comply with Land Disposal Restrictions for disposal. The macroencapsulation container consists of a steel box with a polyethylene interior liner. Six drums are placed in each macroencapsulation container. Void spaces are filled with a foaming agent to meet the NTS void space requirements. The foam hardens, anchoring the drums within the container. A polyethylene lid is placed on the top of the polyethylene liner. The lid contains electric heat strips along the edge. Once the lid is in place, weights are applied to the top to apply pressure. The power supply leads are connected to the lid, and low voltage electricity is applied. The electricity heats the heat strips which melt the surfaces around the lid rim. After a pre-set amount of time (about 20 minutes), the current is terminated, and the sealed area is allowed to cool. The weights are then removed, and the metal box lid is installed and bolted. The box is then ready for shipment to NTS. A macroencapsulation unit is also used inside the BBA for bulk loading large waste items, which are known to be MLLW.

- **Tour Stop 6: Sludge Storage Tanks**

From here we can see the Melton Valley Storage Tank Capacity Increase (MVST-CI) facility. This facility houses 6-100,000 gallon tanks in which sludge and supernate are stored. This facility is a part of the active liquid waste management system at ORNL and is currently operated by BJC. Tank W-35 is one of these tanks and is currently planned to be used as the sludge batch-mixing tank where sludge sampling will be performed. It is currently assumed that the sludge samples will be pulled by BJC and turned over to the TWPC operating contractor. The TWPC contractor will be take possession of the samples once they have been pulled and will be responsible for obtaining all necessary sample characterization. Tank W-35 is equipped with a sludge mobilization system. It is assumed in this contract that BJC will continue to manage and operate the MVST-CI. This will include operation of the sludge mobilization and mixing equipment and transfer of the sludge slurry to the TWPC.

A little farther to the north, is the MVST facility. Due to the congestion of the area, we won't go to view the MVST, but it is exactly like the pictures viewed in the presentation this morning.

The MVST houses 8-50,000 gallon tanks in which is stored the majority of existing sludge to be processed through the TWPC. The MVST facilities are currently operated by BJC,

but will become the responsibility of the TWPC contractor at a time necessary to support the installation of the sludge mobilization system. The design, procurement, installation, testing, operation and maintenance of the sludge mobilization system, as well as all other permits, safety basis documentation, procedures and other necessary considerations for the completion and operation of the MVST and sludge mobilization systems will be the responsibility of the TWPC contractor.

A pulse-jet mixing system is the current concept for the sludge mobilization system. Several similar systems have been installed and used on the ORNL site since the late 1990s.

The TWPC generates its own steam and provides its own compressed air. These support buildings are located behind the main processing building in this area. These include the air compressor buildings, Motor Control Center (for power supply), and the steam generator building and the diesel generator.

Let's now go into the Process Building to look at the equipment and operations housed there. We will move through the Personnel Building up to the third floor of the Process Building. Our first stops will be in the Hot Cell Maintenance Room and the sludge processing rooms.

### ***GROUP "B" STARTS HERE***

- **Tour Stop 7: Hot Cell Maintenance**

This room is called the Hot Cell Maintenance Room. Roof plugs can be removed from the Hot Cell (and the Canister Storage Room) to allow equipment to be removed and relocated to this room. Hands-on maintenance with the appropriate PPE could then be performed in a controlled, low-background environment. A manually operated, bridge-mounted hoist is provided for lifting heavy equipment.

Let's now move to the Sludge Processing Equipment area.

- **Tour Stop 8: Sludge Processing Equipment**

Through this door is the sludge processing equipment associated with the former proposed sludge processing system, which used evaporation to dry the sludge prior to packaging it in canisters. An engineering review of this method was conducted last year, and it was determined that sludge solidification was a more reliable method of treatment. Therefore, the currently proposed sludge processing strategy does not use this equipment. In addition to this equipment a second, unused dryer, essentially identical to the SN Dryer is on-site. The unused dryer is available for use, as needed.

This area is identified on the TWPC floor plans as 4 rooms. As you can see effectively this is one large room. Also as you can see this room is very cluttered.

We will now move down to the Canister Storage Room. On the way down we will pass by the three blowers and HEPA filter banks and stack that exhaust air from the Process Building. In addition as we move from the roof and into the North Stair Tower, on our right will be the Sludge Condensate Room where the SN Evaporator Superheater and HEPA bank and the Sludge Dryer condensate skid are located.

- **Tour Stop 9: RH Canister Storage Room**

Through this window we can see into the RH Canister Storage Room. As is obvious, you will need to take turns viewing this through the window. This room has a maximum physical storage capacity for 19 WIPP-Ready RH canisters. There are 15 spaces in storage racks, and 4 spaces in the floor wells. The maximum number of canisters allowed to be stored could be reduced depending on their radiological content and dose. Once RH waste has been placed in canisters, and the lid has been placed, the canisters are brought into this room using the overhead crane through the south transfer portal for staging prior to shipment to WIPP. Normally, shipments to WIPP will be made on an essentially real-time basis. However, should WIPP shipments be delayed, we have the capacity to store canisters here. At peak processing forecast rates of 10 canisters per month, this will allow up to two months of processing time prior to reaching capacity. In addition, canisters will be stored here while awaiting approval of initial WIPP certification of the RH processing program.

Canisters are loaded into the 72B shipping cask through the cask load out portal which is located in the middle of the room.

We will now proceed out to view the main processing areas.

- **Tour Stop 10: RH Hot cell (Outside)**

We are now standing outside the RH Hot Cell. At this location, waste operators use the master/slave manipulators, and control the PaR manipulator, overhead cranes, and other equipment to process RH debris waste. Waste is removed from the incoming RH cask, which has been lifted and mated to the underside of the cask portal from the first floor. The PaR manipulator is used to remove the waste from the cask and place it on the sorting table. Operators are trained to visually examine the waste for items which are considered “prohibited” from going to WIPP, or for items that may require special handling. Equipment is contained within the Hot Cell to size reduce waste items so that they will fit into 55 gallon drums. Multiple cameras are provided at strategic locations to improve viewing of hot cell operations and activities.

Waste is certified for disposal at WIPP using visual examination and dose-to-curie analysis. When drums are filled, they are stored in the hot cell for a period of 3-4 days to meet the required DAC (drum age criteria) period. They are then passed into the dose-to-curie alcove at the south end of the hot cell, where they are monitored to confirm the radiological characterization, and Summa head-space gas samples are collected from a portion of the drums. Drums are then returned to the hot cell, and loaded into the 72-B canisters through a portal in the floor.

Under the Hot Cell waste sorting table and below the hot cell windows is an area for making transfers of materials and drums into the hot cell, as well as drumming out waste determined to be contact-handled waste,. This is accomplished through three drum portals in the sorting table. This area is called the “snake-pit”. The snake-pit area is maintained as a non-contaminated area. Several methods are used to prevent contamination during transfers, such as utilization of localized HEPA vacuums during drum-out operations, performing numerous rad swipes during operations to detect contamination, and using the tent enclosures to prevent spread of contamination should it occur.

All equipment in the hot cell has been designed to maximize operating life and to minimize the need for maintenance. In some cases the equipment can be remotely maintained or replaced, such as lights and cameras. Equipment can be moved to the Hot Cell Maintenance Area located directly above the Hot Cell. Should an equipment failure require an entry into the hot cell, the hot cell will be de-inventoried and decontaminated as necessary. Maintenance personnel will then enter wearing bubble-suits. However, entry into the hot cell is considered a last resort.

You may approach and look in the windows for a closer look if you wish. Please do not touch any controls. In a few minutes we will go inside the hot cell to view the specific equipment used for processing the waste. However, now we’ll turn our focus back to Contact-Handled Waste Processing and view the Contact-Handled Glovebox.

- **Tour Stop 11: CH Glovebox**

This is the CH Glovebox. The glovebox is used for repackaging CH waste that is in drums which are 85-gallon or less in size. Drums larger than 85-gallons must be processed in the Box Breakdown Area. Drums are inserted into the drum-in enclosure, and are passed through an airlock into the glovebox. Once inside, the lid is removed, and the drum is tipped, allowing operators to remove the contents of the drums into trays. Waste is then sorted and visually examined to remove any prohibited items or items requiring special treatment (such as liquids, aerosols, etc.). The emptied incoming drum is passed into a drum compactor, which compresses the drum into a puck. A portal in the glovebox floor is opened, and the crushed drum is loaded into a 110-gallon drum. When loaded, the 110-gal drum will be removed and disposed as low-level waste. The

waste is passed through the glovebox and loaded into a new 55-gallon, WIPP-compliant drum that is mated to the drum-out portal at Glovebox Station #2 or #3. The sleeve connecting the drum to the Glovebox is horsetailed and cut, the drum lid installed, the drum checked for contamination and the repackaged waste drum removed from the drum-out stations. If the incoming waste is repackaged drum for drum then the processing is complete, but if not then it will be returned to the CHSA for NDA verification.

You may go up the steps and look into the glovebox if you wish. Then we'll proceed to the BBA.

- **Tour Stop 12: CH Box Breakdown Area**

The BBA is used for repacking waste that has been received in drums larger than 85-gallons and boxes. The waste must be removed from these containers and repackaged into WIPP-compliant 55-gallon drums. Containers enter the BBA through a series of airlocks, the Outer-Outer, the Outer, and the Inner Airlock. Operators working in the BBA and the Inner Airlock wear Bubble-Suits with breathing air. Containers are opened, and operators use hand-tools to size-reduce the waste in order to place it into the 55-gallon drums. In some instances, if it is determined that the waste is LLW or MLLW, size reduction of the waste could be minimized and the waste loaded into boxes for disposal instead of drums. If the waste is MLLW, macroencapsulation of the waste is performed. Due to the nature of the work in this area, this is one of the most hazardous operations in the facility. Contamination within the BBA is controlled to prevent it from becoming excessive. Contamination levels as high as 900,000,000 dpm has been observed on some waste items.

If you would like to look into the BBA, you may approach the windows by way of these stairs. Please do not touch any controls.

If you will follow me, we will proceed around to the far side of the BBA to view the BBA drum-out station and breathing air equipment. (WALK AROUND)

On this side of the BBA, you can see the breathing air system. A back-up system is maintained available for use should the primary system go out of service.

In addition, we see the drum-out alcove. Waste is removed from the BBA through this drum-out station and returned to the CHSA for NDA analysis. Behind the drum-out area is the personnel entry area where operators and rad techs don and doff their PPE and enter/exit the BBA.

We will now go to the Hot Cell to get a better view of the equipment used for processing Remote-Handled waste.

- **Tour Stop 13: RH Hot cell (Inside)**

Now that we are inside the hot cell, we can get a better view of most of the equipment used here. On the north side of the hot cell is the cask portal, where the incoming overpacked cask is mated to the hot cell. After the overpacked cask has been mated to the Hot Cell the portal cover is removed, and the Lid Extraction Tool (LET) is placed over the concrete cask lid. This tool is used to pry and lift the lid from the top of the cask, and place it aside. The PaR manipulator is the large yellow robotic arm located overhead. Waste is removed from the cask with the PaR manipulator and placed on the sorting table for visual examination. Waste is then placed in a new 55-gallon drum and staged for the DAC period. Once the DAC period is complete, the drum is moved into the Dose-to-Curie alcove and surveyed. A head-space gas sample is also collected in the Dose-to-Curie alcove on the required number of drums. The drum is then moved from the Dose-to-Curie station and either temporarily stored in the Hot Cell or loaded into the 72-B canister through this portal (POINT).

As waste is visually examined waste that is thought to be CH is lowered into a drum located in the Snake Pit and mated to the Hot Cell in the CH drum-out portal. The dose level will be measured by equipment in the Snake Pit. If the dose is above pre-determined level it will be removed and packaged as RH waste. When the CH drum is “full” it will be removed from the Hot Cell, and processed as CH waste, receiving final NDA analysis in the CHSA. The CH drum will then be disposed as CH-TRU waste or as LLW/MLLW, depending on the radiological analysis.

- **Tour Stop 14: Dose-to-Curie Alcove**

Behind this shield door is the Dose-to-Curie alcove. RH waste is moved into this area from the Hot Cell, and the shield door is closed. The drum is surveyed as it rotates, to assess the radiological dose. These dose readings are used by CCP along with a pre-determined dose-to-curie profile to characterize the waste. The dose-to-curie profile has been developed based on the information gathered about the waste during the preparation of the Acceptable Knowledge for each waste stream. Operators then enter through the shield door from Room 231 to collect the Summa head-space gas sample from the drum. After the operators exit and close the shield door, the drum is returned to the hot cell for loading into the 72-B canister.

We'll now go downstairs to view items of interest on the 1<sup>st</sup> floor.



- **Tour Stop 15: Flam-Gas Analysis Room**

Samples collected from drums of CH waste are brought to this room to receive analysis for transportation purposes, to comply with the WIPP TRAMPAC requirements. This operation is conducted by CCP, however, the site contractor supports the operation by performing drum movements as necessary. In addition, this room is also used for temperature equilibration for CH drums after they have completed their required DAC period, in order to collect SUMMA samples of the drums.

- **Tour Stop 16: RH Canister Lid Installation/Load Out**

We are now located below the Hot Cell. At this station the canister is in position to receive RH drums from the Hot Cell. The canister is mated to the Hot Cell through a plastic sleeve and a retractable bellows apparatus. This shield door is closed when the drums are loaded into the canister. After three drums are loaded using the Hot Cell XYZ crane, and the Hot Cell portal cover is closed, the bellows apparatus is raised, the shield door is opened and the sleeve is pulled into the operator area. The shield door is partially closed and the sleeve is horse-tailed, taped and cut. The canister is then transferred to this next access portal, where the canister lid is lowered into place using the crane in the Canister Storage Room, and manually rotated to closure. Once the lid is on, the canister is lifted up into the Canister Storage Room for temporary storage or direct loading into a 72-B cask, which would be positioned here (POINT) for transport to WIPP.

We will now stop in the Hallway next to the SN Pump Gallery.

- **Tour Stop 17: Supernate (SN) Corridor**

Behind this wall are the SN Pump Gallery and the SN Tank Vault. Both of these areas are rad contamination zones and so we will not enter these areas. The equipment in these areas includes 4 - 7,800 gallon SN tanks, the SN Evaporator Skid and 4 pairs of SN pumps. All of this equipment was used during the 2004 SN Processing campaign. After completion of SN processing the equipment was decontaminated internally by flushing with water and a dilute acid solution. The entire system was then put under a nitrogen pad to inert the system against possible corrosion. It has remained under the nitrogen pad since then. The current baseline for sludge and supernate processing includes the re-start and use this equipment.

We'll now go back upstairs and exit the Processing Building through the Personnel Contamination Monitors. The EnergX escorts will assist. Please follow their instructions. We will then continue our tour outside the building down at the first floor 30-ton Crane Bay

### ***GROUP "C" STARTS HERE***

- **Tour Stop 18:** DAC Area, Crane Bay, RH Cask Delivery and 72-B Canister Loading

The large storage boxes here are the DAC storage buildings for CH-TRU waste. After processing is completed, drums are placed in these buildings for the required DAC period (up to 20 days, depending on the packaging). The drums requiring Summa canister sampling will then be moved into Room 122 (where the Flam-Gas Analysis equipment is located) where they will remain for 72 hours to allow the temperature in the drum to equalize with the temperature of the room, a minimum of 17° C. The Summa samples will then be shipped offsite to analysis for hazardous waste contents verification. Samples from every CH TRU drum will be taken and analyzed by flam-gas analysis, to meet transportation requirements. After the sampling requirements have been completed the drums are moved to the CHMB, where we stopped when we entered the site, where they are stored until shipment to WIPP.

Here we also see the 30-ton Crane Bay, and the access doors into the Process Building for the incoming RH waste casks (POINT OUT), the RH 72-B casks, and the incoming 72-B canisters. The 4<sup>th</sup> door was used during the supernate campaign for removal of supernate waste liners, and will be used again during the sludge campaign. This area is serviced by a 30-ton crane, which is used for unloading incoming and loading outgoing waste containers and shipping casks, vehicles and bogies. Waste containers and casks move into and out of the building on one of four bogies: RH cask bogie, 72B Cask bogie, 72B canister bogie or LLW SN/SL bogie.

(MOVE IN TO VIEW THE RH CASK LIFT MECHANISM) This is the RH Cask lift system, which is used for raising the incoming casks of RH waste to the bottom of the hot cell floor. The concrete casks are moved into position after removal of the cask overpack lid. The lift system then elevates the cask into position, the contamination sleeve is attached, and the cask is sealed to the bottom of the hot cell. Once the cask is in position, the hot cell portal cover is removed, and the cask lid is removed to access the waste. Once the cask has been emptied of the waste, the cask is partially lowered and the contamination sleeve is heat-sealed and cut. The empty cask is then sent to NTS as Low-Level Waste.

We'll now move to view the Drum Venting System.

- **Tour Stop 19: DVS Building**

This is the Drum Venting Building. Currently there are approximately 525 overpacked containers of waste in storage by BJC. The system that BJC uses for venting containers is

not capable of penetrating and sampling the inner overpacked drums to ensure that they meet the TWPC Waste Acceptance Criteria for hydrogen and volatile organics. Upon delivery from BJC, those overpacked drums will be processed through this Drum Venting System prior to delivery to the CHSA. The system is a self-contained HEPA ventilated unit, and is essentially the same system employed for this purpose at other sites around the complex. This system was recently installed, and has not yet been activated. This operation is managed by CCP and the site operating contractor is responsible for assisting CCP in this operation by moving drums into and out of the facility.

***GROUPS CONTINUE TO OTHER PARTS OF TOUR IN ORDER***

We will now return to the area outside the Control Room where we will sign out of the RWP and complete our tour.