2.0 HSW EIS Waste Streams and Waste Management Facilities

This section describes:

- the four waste types evaluated in this EIS: low-level waste (LLW), mixed low-level waste (MLLW), transuranic (TRU) waste, and Waste Treatment Plant (WTP) waste[a]
- the specific waste streams within the four waste types
- the waste management facilities that are currently being used
- the proposed new or modified facilities that are being evaluated in the various HSW EIS alternative groups.

Additional information on Hanford waste streams and facilities is contained in Appendixes B, C, and D and the Technical Information Document (FH 2004).

2.1 Solid Waste Types and Waste Streams Related to the Proposed Action

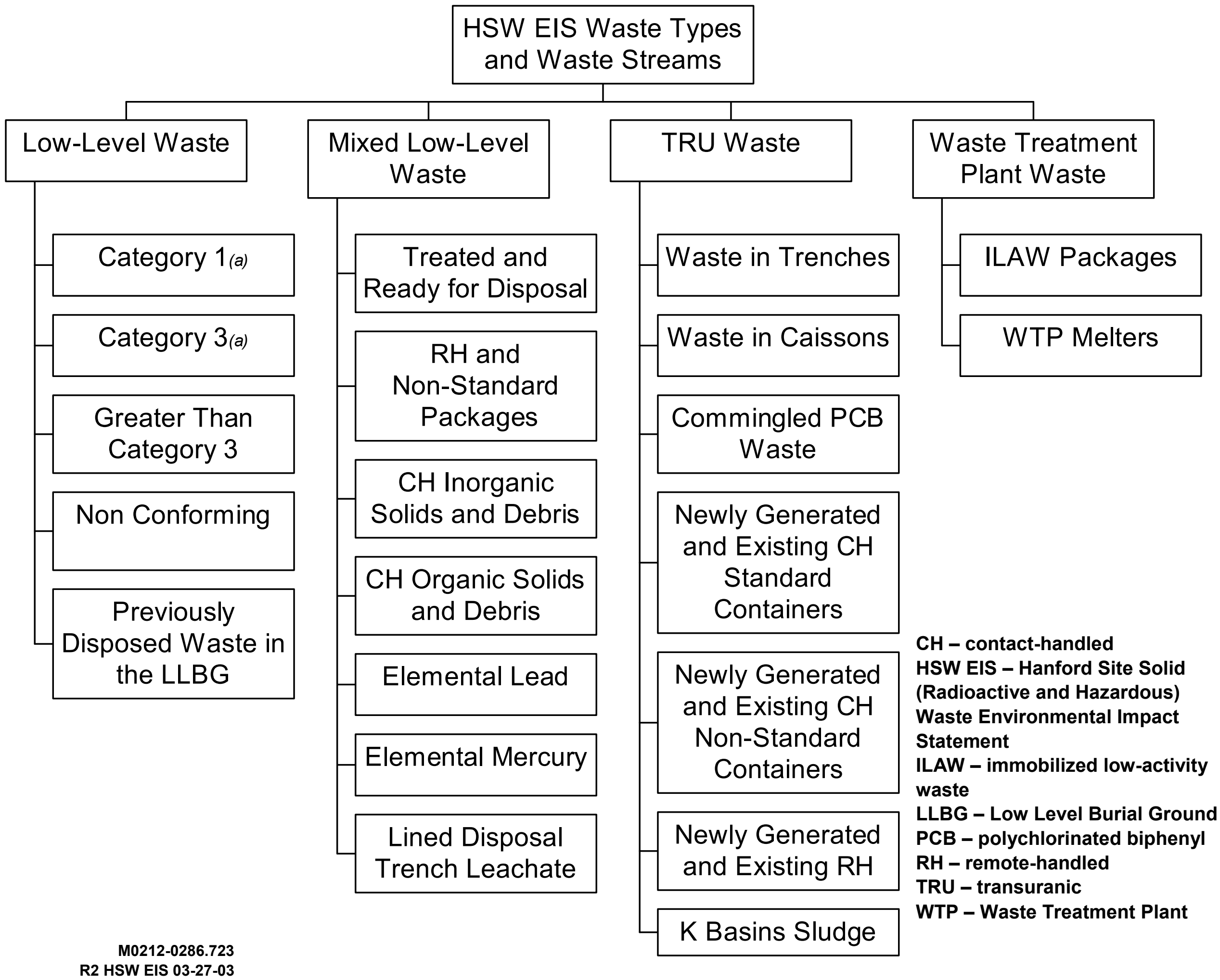
Historically, solid LLW was disposed of in shallow-land disposal units. In 1970, a U.S. Department of Energy predecessor agency, the U.S. Atomic Energy Commission (AEC), determined that waste containing TRU radionuclides would be managed separately from LLW and stored until an appropriate disposal facility was available. Beginning at that time, the suspect TRU waste was emplaced in a manner that it could be retrieved (hence, it is sometimes called "retrievably stored").

In 1987, DOE directed that radioactive waste containing chemically hazardous components, as identified under the Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.), be separated and managed separately from LLW (10 CFR 962.3). This waste, referred to as MLLW, is placed into above ground storage facilities at Hanford until it can be treated and disposed of.

Treatment of Hanford tank waste at the WTP as part of the River Protection Project will result in several waste streams. Of those waste streams, ILAW and melters are being considered as a separate waste type in this EIS because of their unique management requirements. Other routine wastes that may be generated during WTP operations are included in the forecast LLW, MLLW, and TRU wastes.

Each of the four waste types has been further divided into waste streams for analysis in this HSW EIS. For the purposes of this EIS, a waste stream is defined as waste with physical and chemical characteristics that would generally require the same management approach (i.e., using the same storage, treatment, and disposal capabilities). The waste types and waste streams considered within this EIS are shown in Figure 2.1. Brief descriptions of the waste streams are contained in subsequent sections. Information on the volume of waste associated with each stream is provided in Section 3.3.

(a) The WTP wastes (immobilized low-activity waste and melters) are assumed to be MLLW but are considered a separate waste type for the discussions in this EIS.



(a) Category 2 LLW is no longer considered a separate waste stream. See Section 2.1.1.2 for explanation.

Figure 2.1. Waste Types and Waste Streams Considered in the HSW EIS

Radioactive waste may be contact-handled (CH) or remote-handled (RH) waste. CH waste has a dose rate less than 200 millirem/hr as measured with the detector in contact with the container and can be handled without shielding. The RH waste classification applies to containers with a contact dose rate greater than 200 millirem/hr. RH waste requires the use of additional shielding and special facilities to protect workers.

2.1.1 LLW Streams

Low-level waste may be generated during the handling of radioactive materials, which results in the contamination of items and materials. Because many different activities are conducted using different types of radioactive materials and levels of radioactivity, there is a wide variation in the chemical and physical characteristics of waste and levels of contamination. Most of the LLW currently in the Low

Level Burial Grounds (LLBGs) was generated by analytical laboratories, reactors, separation facilities, plutonium processing facilities, and waste management activities. At Hanford, solid LLW includes protective clothing, plastic sheeting, gloves, paper, wood, analytical waste, contaminated equipment, contaminated soil, nuclear reactor hardware, nuclear fuel hardware, and spent deionizer resin from purification of water in radioactive material storage basins. In the foreseeable future, analytical laboratories, research operations, facility deactivation projects, waste management activities, and other onsite and offsite activities would likely continue to generate LLW.

Typical containers used for burial of LLW include 208-L (55-gal) metal drums and boxes nominally 1.2 m by 1.2 m by 2.4 m (4 ft by 4 ft by 8 ft) in size. Other boxes are made in various sizes to accommodate specific waste items. Cardboard, wood, and fiber-reinforced plastic boxes have also been used. Large items or equipment may be wrapped in plastic. However, some bulk waste (that is, soil or rubble) is disposed of without containers.

Both onsite and offsite generators of LLW are required to meet specific criteria for their wastes to be accepted for disposal at Hanford. Those requirements are defined in the *Hanford Site Solid Waste Acceptance Criteria* (HSSWAC) (FH 2003) and include requirements on the waste package, descriptions of the contents of the waste package, the radionuclide content, physical size, and chemical composition. To verify that generators conform with the HSSWAC, a random sample of incoming CH waste is periodically selected for verification at the Waste Receiving and Processing Facility (WRAP), the T Plant Complex, or other appropriate location. Verification of RH waste is typically conducted at the generating facility. Discovery of non-conforming waste can result in rejection of the waste with its return to the generator, or the need for removal or treatment of prohibited items at the generator's expense. Most LLW is only stored for short periods of time awaiting verification or disposal.

The HSSWAC also define LLW categories summarized below by radionuclide activity level. The categories are based on site-specific performance assessments that were conducted in conformance with DOE Manual 435.1-1 (DOE 2001b). The HSSWAC should be consulted for technical details defining Category 1 (Cat 1), Category 3 (Cat 3), and greater than Category 3 (GTC3) wastes. Cat 1 wastes have lower concentrations of radionuclides than Cat 3 wastes. All Cat 1 and Cat 3 wastes that meet the HSSWAC requirements can be disposed of in the LLBGs. GTC3 wastes have even higher concentrations of radionuclides than Cat 3 wastes and require a specific analysis to determine whether they can be disposed of in the LLBGs. Cat 3 and GTC3 LLW are subject to additional disposal requirements because they contain higher concentrations of radionuclides.

The U.S. Nuclear Regulatory Commission (NRC) in 10 CFR 61.55 defines four classes of LLW (A, B, C, and greater than Class C). The NRC requirements apply to all commercial LLW disposal sites. The HSSWAC only apply to Hanford and are adjusted for specific Hanford conditions. Therefore the radionuclide concentrations specified for each NRC class are not necessarily the same as those defined in the HSSWAC for LLW categories.

2.1.1.1 Low-Level Waste – Category 1

Cat 1 LLW represents the largest volume of waste expected at the Hanford Site. It has the lowest concentrations of radioactivity and can be directly placed into the LLBG trenches without treatment and in some cases without additional packaging. Cat 1 LLW can be either CH or RH waste.

2.1.1.2 Low-Level Waste – Category 3

In the original development of the waste categories, Category 2 LLW was defined. However, this category resulted in a small volume of waste and the previous Category 2 material is now managed as Cat 3 LLW. Cat 3 LLW is defined as having radionuclide concentrations greater than limits specified in the HSSWAC for Cat 1 LLW, but lower than maximum concentration limits defined for Cat 3 LLW. Cat 3 LLW is similar to Cat 1 LLW except that it has higher concentrations of certain radionuclides, and requires greater confinement for burial in the LLBGs (FH 2003). Cat 3 LLW may also be CH or RH waste. Greater confinement in the LLBGs has typically been provided either by packaging the wastes in high-integrity containers (HICs) or by in-trench grouting prior to burial (Section 2.2.3). Typical sources of the Cat 3 LLW are operation or cleanout of hot cells and canyon facilities, removal of HLW storage tank equipment, examination of irradiated reactor fuel assembly components, and other operations that handle higher activity items.

2.1.1.3 Low-Level Waste – Greater Than Category 3

GTC3 LLW exceeds the radionuclide concentration limits for Cat 3 LLW. GTC3 LLW requires a specific evaluation to demonstrate that requirements of the LLBG performance assessments would be met before it can be disposed of at Hanford. GTC3 LLW can generally be disposed of in the same manner as Cat 3 LLW in HICs or by in-trench grouting. The sources of GTC3 LLW are similar to Cat 3 LLW. No GTC3 LLW is currently forecast; however, a small volume of this waste is analyzed in this EIS to address future contingencies.

2.1.1.4 Low-Level Waste – Non-Conforming

Non-conforming LLW is waste that does not meet the current HSSWAC for burial and cannot readily be treated to meet those requirements. Non-conforming waste needs to be processed so it conforms with the HSSWAC.

2.1.1.5 Waste Previously Disposed of in the Low Level Burial Grounds

This waste stream includes all waste that has been disposed of in the LLBGs described in Appendix D except for the retrievably stored TRU waste. This waste is included in the EIS analysis of LLBG closure, long-term, and cumulative impacts.

2.1.2 Mixed Low-Level Waste Streams

Regulatory information for mixed wastes can be found in Sections 6.3 and 6.4. Both onsite and offsite MLLW must also meet requirements of HSSWAC. Some waste is subject to Washington State RCRA program (regulated under the Dangerous Waste Regulations, WAC 173-303) with delegated authority for implementation of the Federal RCRA program and independent state statutory authority pursuant to the Washington State Hazardous Waste Management Act (RCW 70.105). In addition, Hanford has some LLW that also contains polychlorinated biphenyls (PCBs), which are regulated under the Toxic Substances Control Act (TSCA) of 1976 (15 USC 2601 et seq.). TSCA wastes are being managed similar to mixed wastes and are included in MLLW inventories and projections. In addition, wastes that are not considered hazardous by the U.S. Environmental Protection Agency (EPA) may be managed as MLLW because they are considered toxic, persistent, or corrosive by state regulations. MLLW was generated by activities similar to those that created LLW, and the two types of waste were not differentiated until 1987. Beginning in 1987, DOE determined that radioactive wastes mixed with hazardous wastes would be designated under RCRA, and would be managed in accordance with RCRA (10 CFR 962.3). Accordingly, DOE has acquired regulatory-compliant waste management storage facilities through building new, or modifying existing Hanford facilities.

Hanford's MLLW was generated from operations, maintenance, and cleanout of reactors, chemical separation facilities, high-level waste (HLW) tanks, and laboratories. MLLW contains the same type of materials as LLW. It typically consists of materials such as sludges, ashes, resins, paint waste, soils, lead shielding, contaminated equipment, protective clothing, plastic sheeting, gloves, paper, wood, analytical waste, and contaminated soil. Hazardous components may include lead and other heavy metals, solvents, paints, oils, other hazardous organic materials, or components that exhibit characteristics of ignitability, corrosivity, toxicity, or reactivity as defined by the dangerous waste regulations.

Extended storage of MLLW is restricted to permitted engineered facilities, such as the CWC. However, pursuant to the applicable regulations, non-permitted facilities may accumulate newly generated MLLW for periods up to 90 days before transferring them to a permitted storage or treatment facility (WAC 173-303-200). Regulatory compliant treatment (generally immobilization or destruction of the hazardous component) is required before most of the MLLW can be sent to a permitted land disposal facility. In some cases, MLLW will already be treated and regulatory compliant when it is received and can be sent directly to the disposal facility. In other cases, the waste will require treatment prior to disposal. Brief descriptions of potential mixed waste treatment technologies are included in the Technical Information Document (FH 2004). The current approach to treatment of MLLW at Hanford uses a combination of onsite and commercial treatment facilities. The Hanford Site currently has limited capacity for MLLW treatment at facilities such as WRAP and the T Plant Complex. Two contracts were placed with a commercial vendor to begin treating limited quantities of CH MLLW in the year 2000. The contracts were intended to serve as a technical demonstration for future commercial treatment of the majority of Hanford's MLLW (see Section 2.2.2.2). After the waste has been treated and meets the regulatory requirements, it can be disposed of in a regulatory-compliant disposal facility. Hanford currently has two MLLW disposal trenches located in the 200 West Area that are operating under interim status. As with LLW, MLLW may be categorized according to radionuclide content as either Cat 1 or Cat 3 MLLW, with disposal requirements described in the HSSWAC.

2.1.2.1 Mixed Low-Level Waste – Treated and Ready for Disposal

This waste stream consists of MLLW that has been treated to meet the applicable RCRA and state requirements for land disposal. The River Protection Project (RPP) is expected to be the primary Hanford generator of MLLW. The RPP waste includes long-length equipment (see Figure 2.2) from Hanford tank retrieval operations, which would be macroencapsulated. MLLW received from offsite generators is assumed to arrive in a regulatory-compliant form and ready for disposal.

M0212-0286.8
HSW EIS 12-10-02

Figure 2.2. Long-Length Tank Equipment

2.1.2.2 Mixed Low-Level Waste – RH and Non-Standard Packages

Existing and forecast quantities of RH MLLW cannot easily be treated under the existing MLLW treatment contracts or at onsite facilities. This waste has physical and chemical characteristics similar to other MLLW, but requires a shielded facility and special equipment for remote handling. In the future, some non-standard packages of CH waste may also be received for which there is no treatment facility. This waste would remain in storage until treatment facilities are available.

2.1.2.3 MLLW – CH Inorganic Solids and Debris

Inorganic solid waste may include substances such as sludges, paints, and dried inorganic chemicals. Debris waste must meet criteria defined in state regulations (WAC 173-303-040). Inorganic debris wastes often contain metal, ceramic, and concrete items and may result from removal of failed or obsolete equipment or from disposal of items used during process operations. They may also result from cleanout or decommissioning of inactive facilities. These wastes generally require treatment by stabilization, or macroencapsulation before disposal.

> ***Non-Thermal Treatments***
> such as stabilization and macroencapsulation are used to immobilize radionuclides and hazardous inorganic components using cement or plastics either as a jacket of material around the waste or as a matrix incorporating the waste.

2.1.2.4 MLLW – CH Organic Solids and Debris

Organic solid waste may include substances such as resins, organic absorbents, and activated carbon. Organic debris wastes meet the regulatory requirements for debris wastes (WAC 173-303-040) and have a greater than 10 percent organic/carbonaceous content. Typical wastes include paper, wood, or plastic. These wastes are included as organic/carbonaceous waste in WAC 173-303-140, which requires that they be thermally treated if capacity is available. There are no existing or planned Hanford facilities with thermal treatment capability for solid waste. Until thermal treatment is available within 1610 km (1000 mi) (WAC 173-303-140), DOE has been authorized by the Washington State Department of Ecology (Ecology) to treat organic debris waste by macroencapsulation.

> ***Thermal Treatments***
> are used to destroy organic constituents within the waste. Thermal treatment uses high temperatures and can include processes such as plasma arcs, incinerators, or vitrification.

2.1.2.5 MLLW – Elemental Lead

Lead metal has been used at Hanford and other DOE sites for radiation shielding and in applications where its high density is of benefit. Most of the lead waste has surface contamination and some of the lead is radioactive from neutron activation. Some lead must be treated as mixed waste by macroencapsulation, or other approved technology, before disposal.

2.1.2.6 MLLW – Elemental Mercury

Elemental mercury is a contaminant for several different types of waste. Waste can contain liquid mercury from various items (that is, light bulbs, switches, thermometers, and chemical process equipment). Mercury can be removed from bulk waste by thermal desorption and then solidified by amalgamation.

> ***Thermal Desorption***
> heats the waste to temperatures sufficient to vaporize mercury, which is subsequently condensed in a separate vessel.
>
> ***Amalgamation***
> solidification of mercury by mixing it with sulfur or other material to form a stable solid.

Limited amalgamation treatment capacity for mercury waste is available at existing Hanford facilities, but additional capability for treatment of the remaining waste is needed.

2.1.2.7 MLLW – Lined Disposal Trench Leachate

This waste stream is generated from operation of lined disposal trenches. It is mostly rainwater or melted snow that is trapped by the collection systems in the lined disposal trenches. It is a liquid waste and is managed differently from the other wastes discussed in this EIS. The liquid waste is currently removed from the lined trenches and trucked to the Effluent Treatment Facility (ETF) where it is treated along with other liquid mixed wastes. Solid waste resulting from the treatment is included in the solid waste streams discussed in previous sections.

2.1.3 TRU Waste Streams

The production of TRU materials, primarily plutonium, was the primary defense mission of the Hanford Site. Most of the Hanford TRU waste was produced in plutonium handling facilities for management of weapons materials or from research on plutonium fuels.

Prior to 1970, TRU waste had not been designated as a separate waste type. In 1970, the Atomic Energy Commission (AEC) determined that waste containing transuranic elements might be associated with increased hazards and should be disposed of in facilities that provide a greater level of confinement than the type of shallow-land burial typically used for disposal of LLW.

The AEC set a minimum concentration level of TRU isotopes at 10 nanocuries per gram of waste. At that time field instrumentation was not available to measure concentrations at that level. Therefore, waste associated with the handling of plutonium was considered to be suspect TRU waste and was placed in a retrievable configuration. The definition of TRU waste was changed to 100 nanocuries/gram in 1984. Once it is determined that the concentration of transuranic elements is below 100 nanocuries/gram, the waste would no longer be managed as suspect TRU waste. For purposes of analysis in this EIS, it was assumed to be managed as LLW. An evaluation of the CH waste placed into retrievable storage estimated that 50 percent of the drums currently managed as TRU waste, would be reclassified as LLW (Anderson et al. 1990).

TRU waste has been stored in several different ways at Hanford. TRU waste was initially placed into retrievable storage in the LLBGs, either with or without a soil cover. After 1985 most TRU waste was no longer placed in trenches, but was stored in an existing facility near the T Plant Complex that had been retrofitted for TRU waste storage. This building was known as the Transuranic Storage and Assay Facility (TRUSAF). Waste storage in that facility was discontinued in 1998 and its inventory, along with most newly generated TRU waste, is now stored in the CWC. TRU waste is also stored at T Plant, in the LLBGs, or at other onsite locations, according to handling and storage requirements for particular waste streams. Newly received TRU waste that contains hazardous materials as defined by RCRA or state regulation is stored in facilities permitted for mixed waste, such as CWC and T Plant. Storage of RH and CH TRU waste would continue until the waste is shipped to WIPP for disposal. Assumptions used in this

EIS regarding the processing and shipment of TRU waste to WIPP are located in Appendix B, Table B.3. The Hanford Performance Management Plan (HPMP) discusses the acceleration of these activities (see Appendix N, Table N.1).

TRU waste disposal began in 1999 with the opening of DOE's Waste Isolation Pilot Plant (WIPP) in New Mexico. The Hanford Site began shipping waste to WIPP in July 2000. Wastes to be shipped to WIPP must be certified to meet the WIPP Waste Acceptance Criteria (DOE-WIPP 2002). WRAP was designed and built at Hanford to perform certification of most CH TRU waste for disposal at WIPP, along with several other functions. Currently, CH TRU drums are being removed from CWC, certified at the WRAP, and shipped to WIPP. TRU waste drums are placed in shipping casks known as Transuranic Package Transporter-II (TRUPACT-II) and are transported by truck to the WIPP (see http://www.emnrd.state.nm.us/wipp/trubig.htm for description).

Some TRU waste also contains hazardous components (mixed TRU waste) and would be managed under applicable RCRA, TSCA, or other state regulations. Contact-handled mixed TRU waste is currently acceptable at WIPP. DOE's hazardous waste permit for WIPP, issued by the State of New Mexico Environment Department in 1999, authorizes the disposal of CH mixed TRU waste. DOE expects to have the capability to transport, receive, and dispose of RH wastes at WIPP by 2006 (DOE-NTP 2002).

2.1.3.1 TRU Waste – Waste from Trenches

From 1970 to 1985, the primary method for storage of TRU wastes involved placing drums or boxes of waste on asphalt pads constructed in the bottom of the trenches and covering the drums with wood, plastic, and a layer of soil (see Section 2.2.1.2). The TRU waste was expected to remain there for less than 20 years. Corrosion of the packaging has continued since they were buried and preliminary inspection of some older containers has confirmed deterioration in their condition. However, observations and monitoring of the area around the drums within the trenches have not detected the release of any alpha emitters, such as plutonium.

DOE previously evaluated the impacts of retrieving this TRU waste (DOE 1987, 2002a) for disposal at WIPP. A description of the activities involved and the impacts analyzed in these previous documents is presented in Sections 1.5.2. The processing of TRU waste at Hanford is evaluated in this HSW EIS in Section 5. The CH drums can be processed, repackaged, and certified at WRAP. However, the capability to process, certify, and ship non-standard containers or RH wastes to WIPP is not available at the Hanford Site, at other DOE sites, or at commercial facilities. These wastes would be placed in CWC until they can be processed. Processing of these wastes would require development of new capabilities. Both the new facilities and the processing operations are evaluated in this EIS.

2.1.3.2 TRU Waste – Waste from Caissons

Beginning in 1970 through 1988, higher-activity TRU waste was placed in four caissons for retrievable storage. These TRU waste caissons are located in Burial Ground 218-W-4B as shown in Appendix D. Most of the waste in the TRU caissons originated from laboratory activities in hot cells in the 300 Area facilities. About 5500 containers were sent to these caissons. Of those, about 97 percent were 3.8-L (1-gal) cans containing residue from the examination of nuclear fuels and irradiated structural materials. Some of the individual containers had measured radiation levels in excess of 1500 R/hr at the time of placement. Other wastes included small-scale process equipment used for radionuclide separations operations. For additional information about the caissons, see Section 2.2.1.3.

DOE previously evaluated the impacts of retrieving this TRU waste (DOE 1987; DOE 2002a) for disposal at WIPP. A description of the activities involved and the impacts analyzed in these previous documents is presented in Section 1.5.2. Waste in the caissons is assumed to be RH TRU waste, and the impacts of processing it at T Plant or a new Hanford facility are evaluated in Section 5.

2.1.3.3 TRU Waste – Commingled PCB Waste

A small amount of TRU waste has sufficient concentrations of PCBs to make it subject to TSCA requirements. Most of the material is debris commingled with a small amount of PCBs, although some drums contain liquids with higher PCB content. Sludge from the K Basins is also TSCA regulated due to its PCB content, but is discussed separately in Section 2.1.3.7. At this time TSCA regulations require treatment of PCB wastes by incineration or other approved technology (40 CFR 761.60). TRU waste commingled with PCBs has not yet been approved for disposal at WIPP. However, DOE has submitted a permit application to allow disposal of this waste at WIPP. If WIPP is granted a permit to dispose of PCB-commingled waste, treatment may not be necessary for the debris materials. Liquid waste containing PCBs may still require thermal treatment or an approved alternative treatment before it could be accepted at WIPP. No capabilities currently exist on the Hanford Site to treat PCB waste. The wastes are expected to remain in storage in CWC until a treatment facility is available or until WIPP can accept such materials.

2.1.3.4 TRU Waste – Newly Generated and Existing CH Standard Containers

This waste stream includes CH TRU waste in standard containers stored in the CWC and future TRU waste that would be received in standard containers. This waste stream also includes the CH TRU waste that will be retrieved from the 618-10 and 618-11 Burial Grounds. The retrieved waste will be placed into standard containers including 208-L (55-gal) and 322-L (85-gal) drums and standard waste boxes (SWBs). The SWB is a metal box 181 cm (71 in) long, 94 cm (37 in) high, and 138 cm (54.5 in) wide that has been designed as a Type A shipping container for use in the TRUPACT-II shipping container. The waste would be inspected and certified at WRAP and would ultimately be shipped to the WIPP for disposal.

2.1.3.5 TRU Waste – Newly Generated and Existing CH Non-Standard Containers

This TRU waste is contained in non-standard boxes or containers that are not compatible with a TRUPACT-II shipping container and that cannot be handled within WRAP. Much of this waste is old equipment or gloveboxes that were removed from processing and laboratory facilities. Processing of this waste would likely include size reduction and repackaging. The Hanford Site does not currently have a facility where these wastes can be prepared for shipment to WIPP. Until they can be processed they will remain in the CWC.

2.1.3.6 TRU Waste – Newly Generated and Existing RH Containers

This TRU waste stream consists of existing and newly generated RH TRU waste, including a small quantity of waste that may be generated during retrieval from the 618-10 and 618-11 Burial Grounds. RH TRU waste would be shielded for storage in the CWC (see Section 2.2.1.1). In some cases, non-mixed RH TRU waste would be stored in concrete vaults in the LLBGs. The Hanford Site does not currently have a facility where RH TRU waste can be prepared for shipment to WIPP, nor are the WIPP waste acceptance criteria or shipping system in place. The RH TRU waste would be accepted at WIPP in accordance with the National TRU Waste Management Plan (DOE-NTP 2002).

2.1.3.7 TRU Waste – K Basin Sludge

This sludge is a combination of corrosion debris from stored fuel elements and their containers, dust, and other materials that have accumulated in the 100 K Area Basins over many years of use. Because of the plutonium, fission product and activation product concentrations in the sludges, they have been determined to be RH TRU waste. In addition, the sludge is TSCA-regulated due to its PCB content. DOE plans to containerize the waste as it is removed from the basins and then transport it to the T Plant Complex for storage (DOE 2001a) until a facility is available to process the waste and prepare it for shipment to WIPP.

2.1.4 Waste Treatment Plant Wastes

The Waste Treatment Plant (WTP) will receive and process the retrieved Hanford tank waste. The retrieved tank waste will undergo a separations process that splits the waste stream into a smaller volume high-level waste (HLW) stream and a larger volume low-activity waste (LAW) stream. The HLW stream will be vitrified and placed into canisters that will be temporarily stored onsite in the Canister Storage Building and eventually sent offsite to the national geologic repository currently planned for Yucca Mountain. The processing of the wastes including their vitrification and the management of the HLW was previously evaluated in the TWRS EIS (DOE and Ecology 1996) and is not included in the scope of this EIS. For purposes of analysis in this EIS, the LAW stream also is assumed to be vitrified in the WTP. After vitrification, the LAW stream is called immobilized low-activity waste (ILAW). The melters used in the WTP for vitrification of Hanford tank wastes would occasionally need to be replaced. These melters become their own waste stream called "WTP melters." Because the TWRS EIS has evaluated the processing of the glass, the HSW EIS addresses only the disposal of the ILAW and the WTP melters. It should be noted that the WTP will produce other LLW, MLLW, and TRU wastes that are included in the waste streams discussed in the previous sections.

2.1.4.1 Immobilized Low-Activity Waste Packages

During processing in the WTP, the molten ILAW can be directly poured into stainless steel canisters to produce a monolithic glass waste form, or it can be poured into water to produce waste in the form of granular glass particles similar to coarse sand, called cullet. The canisters for the monolithic glass waste form would be approximately 2.3 m (7.5 ft) in height and 1.22 m (4.0 ft) in diameter and would weigh up to 10,000 kg (22,000 lb) each when filled. An estimated 81,000 canisters would be filled using the monolithic pour compared to 140,000 canisters being filled with cullet. Dose rates from the cylinders are high enough (~500 mR/hr on contact) that remote handling would be required. The principal components in ILAW glass are silica, calcium oxide, and sodium oxide, making it a soda-lime silicate glass. Other waste forms are being considered for ILAW and are being analyzed in the Tank Closure EIS (68 FR 1052).

2.1.4.2 WTP Melters

The vitrification of Hanford tank wastes would use large melters comprised of metal structural components and ceramic refractories to contain the molten glass. With use, the refractories are slowly consumed and some metal components can become corroded. For this EIS, it was assumed the WTP melters would periodically be replaced with new units, and only the melters that meet HSSWAC would be managed and disposed of onsite in accordance with applicable requirements for RH MLLW. Packages containing the melters can have dimensions of 4.6 to 7.6 m (15 to 25 ft) in length, height, and width; can weigh 545,000 kg (600 tons); and would require special handling.

2.2 Hanford Waste Storage, Treatment, and Disposal Facilities, and Transportation Capabilities Related to the Proposed Action

This section briefly describes existing and proposed facilities for the management of Hanford solid waste. The facilities provide storage, treatment, or disposal functions and are grouped by their primary function in the following discussion (see Figure 3.2 for facility locations). (See FH 2004 for additional details on specific facilities.) Text describing new facilities or those that would be substantially modified under the alternative groups described in Section 3 is presented in text boxes to distinguish those facilities from existing facilities. This section also briefly discusses the transportation of waste and the Hanford pollution prevention/waste minimization program.

2.2.1 Storage Facilities

The primary storage facility for solid radioactive and mixed waste at Hanford is the CWC. Storage also exists at WRAP, the T Plant Complex, and the LLBGs. The T Plant Complex, described in Section 2.2.2.4 as a treatment facility, would be used to store sludge from the K Basins, and potentially other RH waste, as space is available. Trenches in the LLBGs have been used for retrievable storage of TRU wastes and other materials. Additional details on the CWC, trenches and caissons in the LLBGs, and grout vaults are described in the following sections.