Draft

ENVIRONMENTAL ASSESSMENT

FOR

K BASINS SLUDGE STORAGE AT 221-T BUILDING,

HANFORD SITE, RICHLAND, WASHINGTON

U.S. DEPARTMENT OF ENERGY

RICHLAND, WASHINGTON

MARCH 2001

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PREFACE

This environmental assessment is prepared to assess potential environmental impacts associated with the proposed action to store sludge from the 100-K Area into the 221-T Building canyon in the 200 West Area until future disposition of the sludge is determined. Information contained herein will be used by the Manager, U.S. Department of Energy, Richland Operations Office, to determine if the Proposed Action is a major federal action significantly affecting the quality of the human environment. If the Proposed Action is determined to be major and significant, an environmental impact statement will be prepared. If the Proposed Action is determined not to be major and significant, a Finding of No Significant Impact will be issued and the action would proceed. Criteria used to evaluate significance are found in Title 40, Code of Federal Regulations 1508.27.

This environmental assessment is prepared in compliance with the *National Environmental Policy Act of 1969*, as amended, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the *National Environmental Policy Act* (Title 40, Code of Federal Regulations 1500-1508), and the U.S. Department of Energy Implementing Procedures for the *National Environmental Policy Act* (Title 10, Code of Federal Regulations 1021). The following is a description of each section of this environmental assessment.

1.0 **Purpose and Need for Action.** This section provides a brief statement concerning the problem or opportunity the U.S. Department of Energy, Richland Operations Office, is addressing with the Proposed Action. Background information is provided.

2.0 **Description of the Proposed Action.** This section provides a description of the Proposed Action with sufficient detail to identify potential environmental impacts.

3.0 **Alternatives to the Proposed Action.** This section describes reasonable alternative actions to the Proposed Action, which addresses the Purpose and Need. A No Action Alternative, as required by Title 10, Code of Federal Regulations 1021, also is described.

4.0 **Affected Environment.** This section provides a brief description of the locale in which the Proposed Action would take place.

5.0 **Environmental Impacts.** This section describes the range of environmental impacts, beneficial and adverse, of the Proposed Action. Impacts of alternatives briefly are discussed.

6.0 **Permits and Regulatory Requirements.** This section provides a brief description of permits and regulatory requirements for the Proposed Action.

7.0 **Organizations Consulted.** This section lists any outside groups, agencies, or individuals contacted as part of the environmental assessment preparation and/or review.

8.0 **References.** This section provides a list of documents used to contribute information or data in preparation of this environmental assessment.

Appendix. Additional information necessary to support an understanding of the Proposed Action, alternatives, and potential impacts is provided.

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APPENDIX A

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FIGURES (cont)

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GLOSSARY

ALARA	as low as reasonably achievable
ACHP	Advisory Council on Historic Preservation
CAM	continuous air monitor
CEDE	committed effective dose equivalent
CERCLA	*Comprehensive Environmental Response, Compensation and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CH	contact handled
Ci	curie (measure of radioactivity)
CSB	canister storage building
CY	calendar year
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DST	double-shell tank
EA	environmental assessment
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ERPGs	emergency response planning guidelines
ESA	*Endangered Species Act of 1973*
FH	Fluor Hanford
FONSI	finding of no significant impact
ft^3	cubic foot
FY	fiscal year
HazOp	Hazards and Operability Analysis
HEPA	high-efficiency particulate air (filter)
HSW-EIS	draft Hanford Site Solid (Radioactive and Hazardous) Waste Program-EIS
K Basins	K East and K West Basins in the 100-K Area
KE	K East Basin
KW	K West Basin
LCF	latent cancer fatalities
MCO	multi-canister overpack
m^3	cubic meters
mg/m^3	milligrams per cubic meter

GLOSSARY (cont)

NDA	nondestructive analysis
NEPA	*National Environmental Policy Act of 1969*
NOC	notice of construction (for air permit)
PCB	polychlorinated biphenyl
Pu	plutonium
^{239}Pu	isotope of plutonium
RCRA	*Resource Conservation and Recovery Act of 1976*
RH	remote handled
RH-TRU	remote handled transuranic (waste)
rem	common unit of radiological dose equivalent
ROD	Record of Decision (under NEPA process or CERCLA process)
RTAM	routine technical assistance meeting (WDOH, DOE-RL & contractors)
SNF	spent nuclear fuel
TEDE	total effective dose equivalent
TEELs	temporary emergency exposure limits
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TRU	transuranic (waste)
TSCA	*Toxic Substance Control Act of 1976*
U	uranium
USC	*United States Code*
WAC	*Washington Administrative Code*
WDOH	Washington State Department of Health
WESF	Waste Encapsulation and Storage Facility
WHC	Westinghouse Hanford Company

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.39	inches
feet	0.31	Meters	meters	3.28	feet
yards	0.91	Meters	meters	1.09	yards
miles	1.61	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.45	square centimeters	square centimeters	0.16	square inches
square feet	0.09	square meters	square meters	10.8	square feet
square yards	0.84	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	Hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.4	Grams	Grams	0.035	ounces
pounds	0.45	kilograms	kilograms	2.2	pounds
short ton	0.91	metric ton	Metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.6	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	Liters	liters	1.06	quarts
gallons	3.79	Liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3	cubic feet
cubic yards	0.76	cubic meters	cubic meters	1.31	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,410	British thermal unit	British thermal unit	0.00029	kilowatt hour
kilowatt	0.95	British thermal unit per second	British thermal unit per second	1.06	kilowatt
Force/Pressure			**Force/Pressure**		
pounds per square inch	6.89	kilopascals	kilopascals	0.145	pounds per square inch

After: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

DEFINITION OF TERMS

Remote-handled (RH) waste containers produce greater than 200 millirem per hour dose rates at the container surface. RH waste contains a high proportion of radionuclides that produce highly penetrating radiation. Thus, RH containers require special handling and shielding during operations.

Transuranic (TRU) waste is waste that contains alpha particle-emitting radionuclides with atomic numbers greater than that of uranium (92) and half-lives greater than 20 years and concentrations greater than 100 nanocuries per gram of waste. TRU waste is not high-level waste. Some TRU waste also has hazardous components and is sometimes referred to as TRU mixed waste.

Temporary Emergency Exposure Limits (TEELs) for uranium oxide are established by the U.S. Department of Energy Subcommittee on Consequence Assessment and Protective Actions (WSMS-SAE-99-0001 2000). The limits for uranium oxide are the same or more conservative than for metal. The U.S. Department of Energy Emergency Management Guide (DOE-G-151.1-1) calls for the use of TEELs when Emergency Response Planning Guidelines (ERPGs) are not available. Although ERPGs are the standard community exposure limits approved by the American Industrial Hygiene Association, less than 100 chemicals have been assigned ERPGs, and none of these include compounds of uranium. The definition of the TEEL limits is as follows.

- TEEL-0: The threshold concentration below which most people will experience no appreciable risk of health effects. The TEEL-0 for uranium oxide (insoluble compound) is 0.05 milligram per cubic meter (mg/m^3).
- TEEL-1: The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient health effects or perceiving a clearly defined objectionable odor. The TEEL-1 is 0.6 mg/m^3.
- TEEL-2: The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing irreversible or other serious health effects or symptoms that could impair their abilities to take protective action. The TEEL-2 is 1.0 mg/m^3.
- TEEL-3: The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing or developing life-threatening health effects. The TEEL-3 is 10 mg/m^3.

Sludge is particulate material that has accumulated on the K West (KW) and K East (KE) Basins floors and pits and in/on spent nuclear fuel canisters.

Several different types of sludge exist depending on the basin, canister type, and location where the particular sludge is found. Each type of sludge is a unique, non-homogeneous mixture possibly containing corroded fuel (i.e., uranium oxides, hydrates, hydrides), fuel cladding pieces, debris such as windblown sand or insects, rack and canister corrosion products, ion exchange resin beads, polychlorinated biphenyls (PCBs), and/or fission products. Additional sludge is expected to be generated during the processing of fuel elements for dry storage.

1.0 PURPOSE AND NEED FOR ACTION

The following sections describe the purpose and need and provide background information for this environmental assessment (EA).

1.1 PURPOSE AND NEED

The U.S. Department of Energy (DOE), Richland Operations Office (DOE-RL) needs cost effective and safe interim storage capacity in the 200 Areas for sludge currently in the K-East and K-West Basins (K Basins) in the 100 Areas (Figure 1) on the Hanford Site (Figure 2).

1.2 BACKGROUND

The K-East (KE) and K-West (KW) Basins in the 100-K Area (Figure 1) of the Hanford Site (Figure 2), built in the early 1950's, have been used to store spent nuclear fuel (SNF) underwater. In 1992, the decision to deactivate the Plutonium-Uranium Extraction (PUREX) Plant left approximately 2,100 metric tons (2,300 tons) of SNF in the K Basins with no means for near term processing. A substantial fraction of the SNF in the K Basins has become degraded due to cladding breaches during reactor discharge, and corrosion has continued during underwater storage.

The fuel in the KE Basin is stored in open top canisters, some of which have screened bottom while others have closed bottoms. The open canisters release soluble fission products into the basin water and allow fuel corrosion products to combine with canister rack dust, concrete dust, and environmental particulate material. These materials settle to the basin bottom as a fine sludge, and depths exceeding three feet have been measured in one of the pits in the KE Basin. The closed stainless steel canisters used at the KW Basin also contain corroded fuel. Some leakage of soluble fission products to the water in the KW Basin has occurred but at a much lower rate than at the KE Basin.

The KE Basin leaked up to 56.8 million liters (15 million gallons) of contaminated water to the soil in the 1970s and another 341,000 liters (90,000 gallons) in early 1993 (WHC-SD-SNF-TI-013). Subsequently, repairs were made to the basins to prevent further leakage to the environment; however, the integrity of the basins continues to degrade with age, as does the condition of the SNF. The potential hazards associated with leaks of the sludge and basin water to the environment provide the impetus to remove the sludge from the basins as soon as possible.

In the early 1990s, the DOE determined that action was necessary to mitigate further SNF degradation releases from the K Basins. The *National Environmental Policy Act* (NEPA) *of 1969* process was used to evaluate alternatives for action and an environmental impact statement (EIS), *Management of Spent Nuclear Fuel from the K Basins at the Hanford Site, Richland, Washington*, was issued in January 1996 (DOE/EIS-0245F). The alternatives analyzed in the EIS focused on managing the SNF, with secondary discussions on the sludge, water, and debris. The sludge alternatives selected in the resulting 1996 NEPA Record of Decision (ROD) (61-FR-10736) was to remove the K Basins sludge with transfer of the sludge to either a tank farm or solid waste management facility in the 200 Areas.

When the DOE schedule for implementing the NEPA proposed action was delayed, activities to mitigate the potential to release radioactive substances from the K Basins to the environment were brought under the authority of the *Comprehensive Environmental Response, Compensation and Liability Act* (CERCLA) *of*

1980. A CERCLA Focused Feasibility Study (FFS), *Focused Feasibility Study for the K Basins Remedial Action* (DOE/RL-98-66), was prepared in April 1999. The scope of the FFS included sludge treatment to meet waste acceptance criteria, removal from the basins, and transportation to the receiving facility. The analysis of environmental impacts related to the removal and transportation of the sludge was included in the K Basins EIS (DOE/EIS-0245F) and was adopted into the FFS by reference. Environmental impacts were further discussed in the NEPA values section of the FFS.

In July 1999, DOE-RL authorized a new path forward for the management of K Basins sludge (DOE 1999a), and a CERCLA ROD was reached among DOE-RL, EPA, and the Washington State Department of Ecology (Ecology) in September 1999 (DOE 1999b). The new path forward and CERCLA actions helped trigger negotiation of Tri-Party Agreement milestones, which stated that the current K Basins sludge should be removed from the K Basins on the schedule currently specified in the Tri-Party Agreement milestones M-34-08 (Initiate Full Scale K-East Basin Sludge Removal – 12/31/2002) and M-34-10 (Complete Sludge Removal from K Basins – 8/31/2004).

Once the sludge is separated from the fuel and removed from the K Basins, DOE-RL has determined that K Basins sludge would be managed as remote-handled transuranic (RH-TRU) waste (DOE 1999c). Due to the presence of poly-chlorinated biphenyls (PCBs), the sludge will be regulated under the Toxic Substances Control Act (TSCA). The physical and chemical characteristics of K Basins sludge are documented in HNF-SD-SNF-TI-009.

The K Basins sludge would be retrieved and managed as two separate waste streams (DOE 1995). The majority of the sludge volume, up to about 62 m^3 (2200 ft^3), would be packaged in larger, Type 1 containers (HNF-SD-SNF-TI-009). This sludge consists primarily of less reactive components (windblown sand and rocks, spalled concrete from basin walls, iron and aluminum corrosion products, ion exchange material, uranium oxides) along with a small of uranium metal particles. Type 1 containers are described in greater detail in Section 2.3, below

The second sludge stream consists of up to about 8 m^3 (280 ft^3) of sludge, would be packaged in Type 2 containers (HNF-SD-SNF-TI-009). This sludge has a larger amount of reactive metallic uranium fragments and fuel corrosion products. This sludge stream is to be packaged in smaller diameter Type 2 containers, and might require underwater storage similar to current storage conditions at the K Basins. Type 2 containers are described in greater detail in Section 2.3, below.

Before the proposed action of storing the sludge in the 221-T Building (Figure 3) of the T Plant Complex, the Shippingport fuel that currently resides in the 221- T Building canyon pool (Cell 2R) would be moved out of the pool to the Canister Storage Building, as described in the *Environmental Assessment* (EA) *Management of Hanford Site Non-Defense Production Reactor Spent Nuclear Fuel* (DOE/EA-1185). In addition, certain T Plant Complex canyon deck cleanout activities covered by NEPA categorical exclusions would occur before the proposed action. The proposed action is compatible with the land use designation of Industrial Exclusive Area as defined in the *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement* (DOE/EIS-0222F).

DOE issued a Notice of Intent (62 FR 207) to begin preparation of a draft Hanford Site Solid (Radioactive and Hazardous) Waste Program EIS (HSW-EIS) that examines the management of various waste volumes including, but not limited to, the interim storage and treatment of the current K Basins sludge. This EA for proposed storage of the sludge in the 221-T Building is an interim action to, and would not prejudice any alternatives or decisions that would be made in, the HSW-EIS. The sludge would remain in storage until integrated into the plans for treating and disposing of the other RH-TRU waste located on the Hanford Site, in accordance with Tri-Party Agreement Milestone M-91-00. Treatment and disposal issues of the K Basins sludge would be addressed in future environmental documentation.

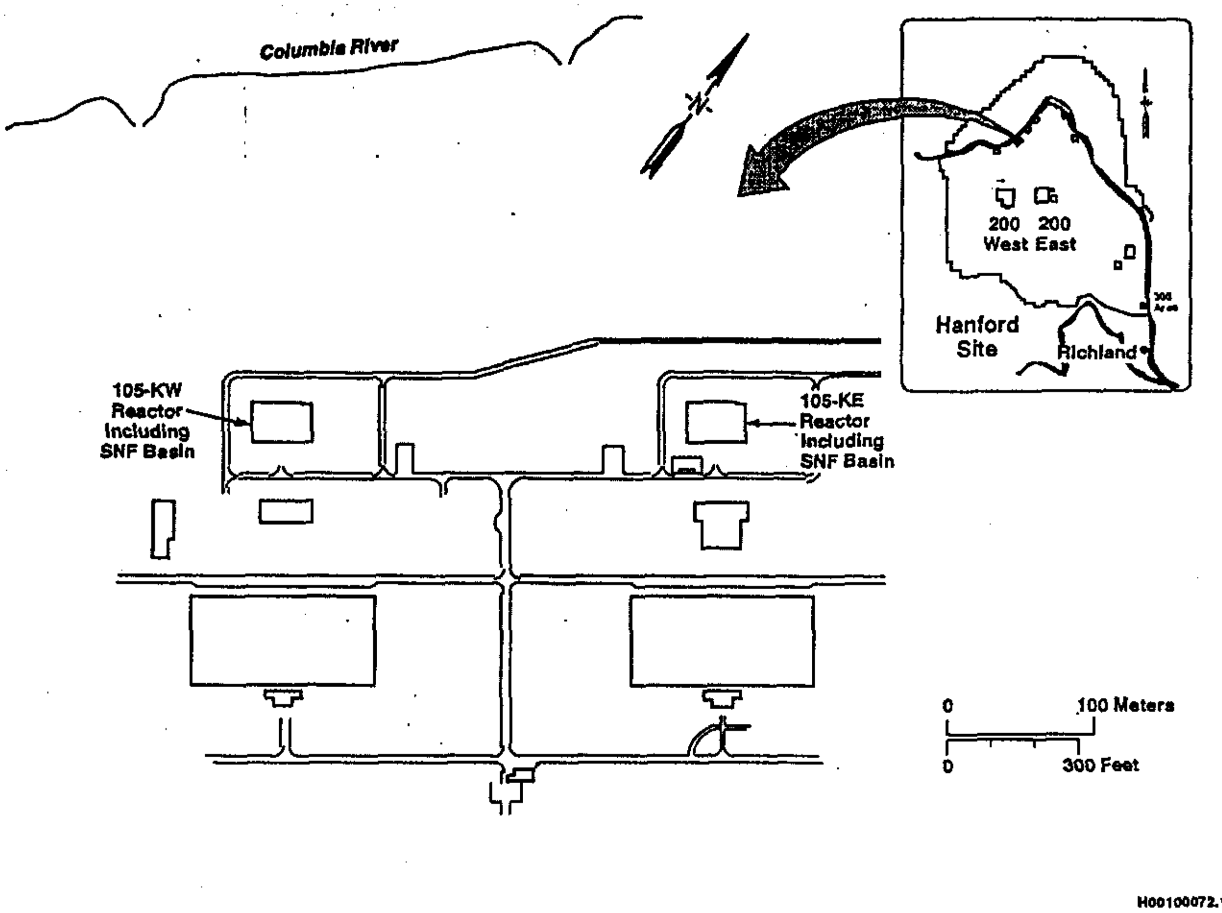


Figure 1. 100-K Area.

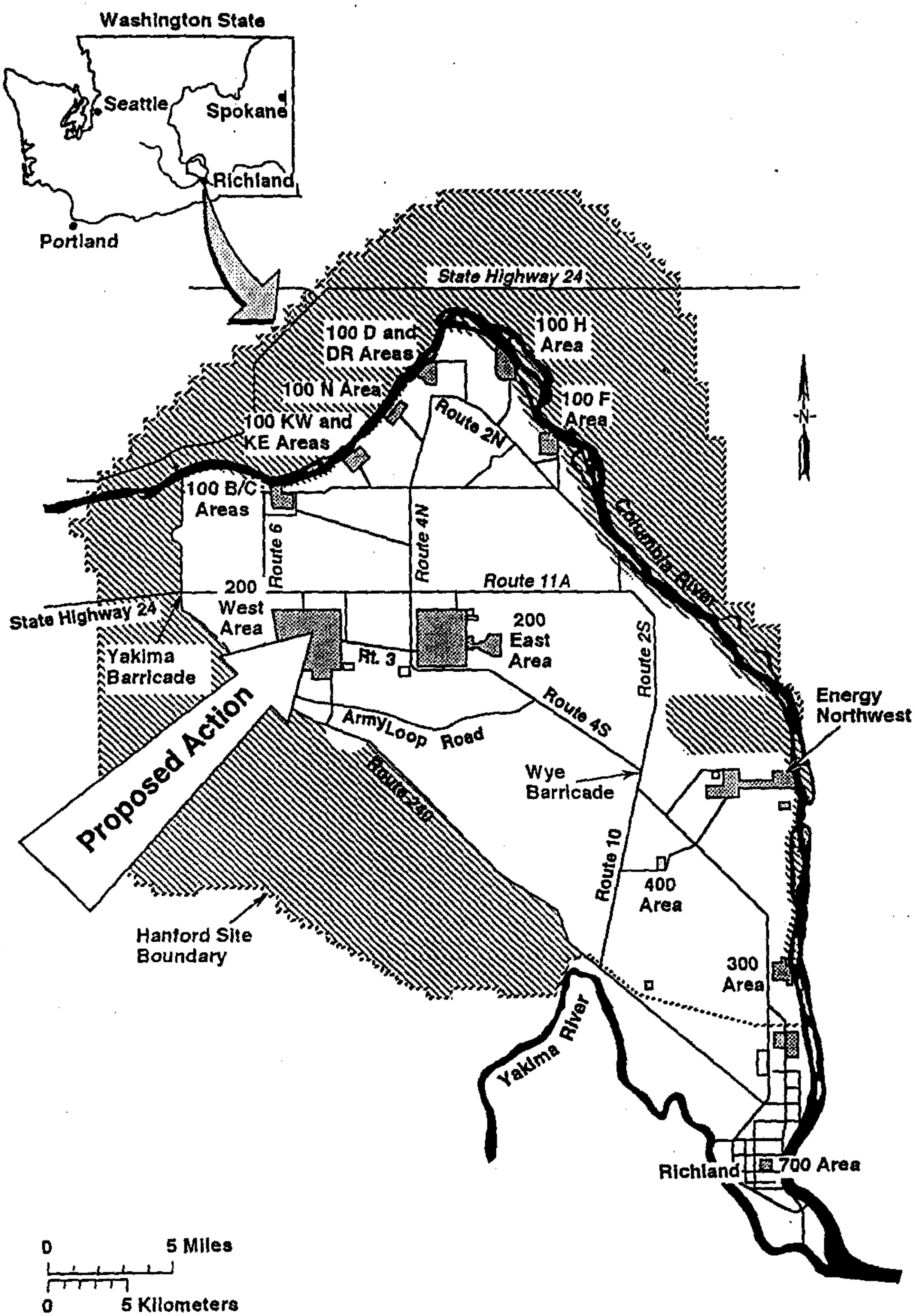


Figure 2. Hanford Site.

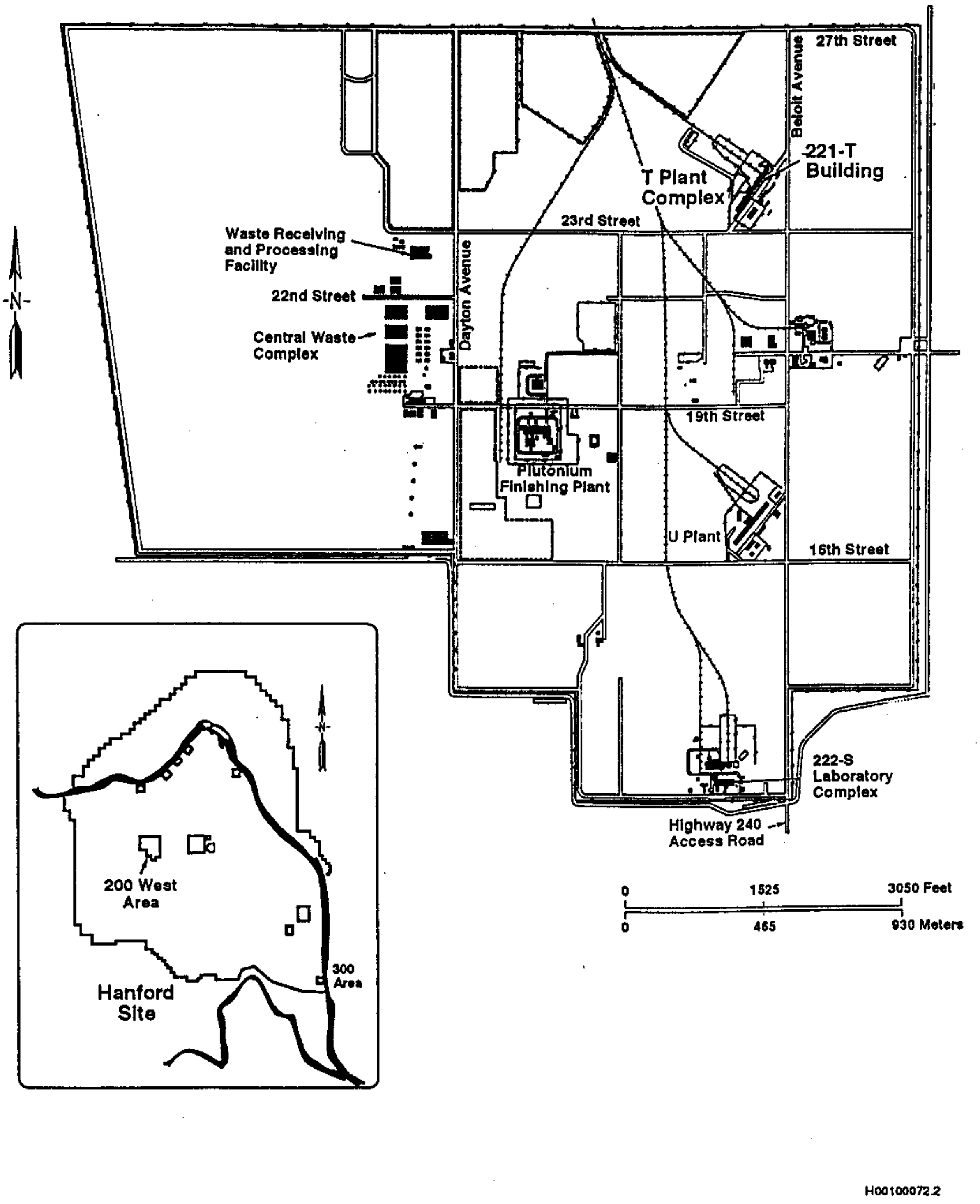


Figure 3. 200 West Area, T Plant Complex Proposed Action.

2.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action would allow cost-effective and safe interim storage for the sludge in the 221-T Building canyon of T Plant Complex. Before sludge acceptance at T Plant Complex (Figures 4 and 5), several modification upgrades would be required to the 221-T (Figure 6) and 271-T Buildings (Figure 7). The proposed action would offload sludge containers (Type 1 and Type 2 containers), which have been transferred in a multi-canister overpack (MCO) cask and transport system via truck and trailer, into the 221-T Building canyon. The MCO casks used to transport the containers would be the same as those used for shipping SNF canisters. Trucks would arrive with one cask containing one container per transfer. The proposed action would be expected to store up to about 70 m^3 (2,470 ft^3) of K Basins sludge in approximately 230 new storage containers.

2.1 PROPOSED T PLANT COMPLEX UPGRADES

The following describes the anticipated upgrade activities that might be required to occur, as determined in final design, before sludge receipt and interim storage. During final design, a determination would be made to store Type 2 containers in the pool cell (2R Cell), or store in up to three dry process cells.

- Install new cell containment, sludge storage rack systems (described below in 2.3), sump pumps, leak detectors, instrumentation and controls in the 221-T Building canyon, as necessary. New floors constructed of self-leveling concrete might be added to the four or five existing dry process cells for storage of Type 1 containers, and up to three existing dry process cells for storage of Type 2 containers, if necessary.

- Install a new pool cover for the 2R Cell of the 221-T Building if it is decided to store Type 2 containers in the pool. The new cover is expected to consist of several new constructed, partially concrete cover blocks made primarily of concrete and would be approximately 0.61-meter (2-feet) thick to cover half the pool cell. Metal grating would cover the other half of the pool. The metal grating is expected to be able to support a live load of about 490 kilograms force per square meter (100 pounds force per square foot). In addition, a new liner/rack system might be installed in the pool, if necessary. Existing water conditioning systems (coolers, ion exchange columns, etc.) might be modified, replaced, or removed.

- Install a new fire alarm system in the 221-T Building, as necessary for storage of the containers.

- Install a manual Class 3 dry standpipe system in the 221-T Building, or equivalent. The system would be activated manually, and would run the length of the canyon. The standpipes would not include hoses or hose cabinets.

- Install a new radiation monitor on the helium purge system in the 221-T Building tunnel. This monitor would verify the absence of radiation during a purge of the MCO cask on arrival.

- Install new door locks in the 221-T Building canyon in accordance with safeguards and security requirements.

- Develop a new remote-operated (by crane) water addition system for occasionally adding water to the Type 1 containers, and Type 2 containers if appropriate, in the dry process cells (not Cell 2R) over the storage life. In addition, a remote detection system would be added to each cell storing containers.

- Provide necessary seismic upgrades to store sludge safely. These may include wall or roof strengthening, crack repair, or may be addressed by reducing loads on the pool cell walls.

- Provide operational support for the proposed action by making the only upgrades to the 271-T Building through installation of a new automatic sprinkler system throughout three floors. This would include installing new piping, pumps (if necessary), and sprinkler heads in the office spaces and hallways of 271-T Building, in accordance with National Fire Protection Association regulations (NFPA 13).

- Install an alpha continuous air monitor (CAM) and reactivate the beta/gamma CAM to 291-T stack to make it compliant.

2.2 PROPOSED PROCESS FOR RECEIPT AND PLACEMENT OF SLUDGE CONTAINERS

The receipt and remote placement of the containers into interim storage at T Plant Complex is detailed as follows. All container movement within the 221-T Building would occur remotely via crane operations.

- *Receive Sludge Containers.* The containers would arrive from K Basins via the transport vehicle (truck and trailer). Each transfer would consist of one transport MCO cask that would be inspected according to approved receipt methods. One of the key aspects of this inspection would be to ensure that the cask and transporter were not contaminated. Once inspection had been completed and the transfer accepted, the transport vehicle would back into the 221-T Building tunnel. The truck would be uncoupled from the trailer and might exit the tunnel before unloading operations commenced. The truck would remain within the Radiological Area, either inside the tunnel or outside the 221-T Building tunnel.

- *Unload Sludge Containers and Place in Interim Storage.* Container unloading operations would be done remotely using the canyon crane system (Figure 8). T Plant Complex personnel would vent and purge the cask with helium, remove the shipping cask lid bolts, attach the lifting attachment to the cask lid, and evacuate the tunnel. The helium purge/venting system would include a radiation monitor to verify that the storage container maintained integrity during transport and would purge all hydrogen from the shipping cask. A separate high-efficiency particulate air (HEPA) filter may be installed on the purge line. The crane operator would position the canyon crane, which would be outfitted with the appropriate cask lid grappling device, remove the cask lid, and place the lid on the trailer bed or lid stand. The crane would be repositioned and, with the appropriate container lifting device, the container would be lifted out of the cask and moved into an interim storage location in the canyon pool (Figure 9) or a dry process cell, depending on container type.

  As a container is moved from the tunnel into the canyon, operations personnel remotely would verify the identification number and record the container number, via existing camera systems. After the container is removed from the cask, the lid would be replaced or placed on the trailer, the tractor would re-enter the tunnel, if necessary, from the Radiological Area and connect with the trailer. The transport system would be surveyed for possible contamination on exiting the Radiological Area, and would return to K Basins.

- *Dry Storage Containers in 221-T Building Canyon Process Cells.* Once the containers (Type 1 and possibly Type 2) would be placed in the interim dry storage location, continuing surveillance would be performed to ensure that safety, regulatory, and safeguards and security requirements were met. Water levels within the dry storage containers would be monitored, and water additions would be made remotely as necessary.

- *Wet Storage Containers in Pool (2R Cell).* Once the Type 2 containers (if necessary) were placed in the interim underwater pool storage location, continuing surveillance would be performed to ensure that safety, regulatory, and safeguards and security requirements were met. Pool storage conditions (water quality, water temperature, water level, and ion exchange column status) would be monitored and provisions would be made for remote water addition to the pool.

- *Surveillance Requirements.* Surveillance requirements would be determined. Areas that surveillance requirements are derived from include safeguards and security, Radiation Control, and pool and/or dry storage conditions (water quality, water temperature, water level, and ion exchange column status).

2.3 PROPOSED SLUDGE STORAGE CONFIGURATION

Based on differing criticality and heat rejection requirements, Type 1 (Figure 10) and Type 2 (Figure 11) containers would be required for sludge storage. Both container types would be configured as right circular cylinders with dished ends and would have welded lids with a minimum of two nozzles. During sludge loading, one nozzle would be used for sludge filling and the other for water overflow. During storage, one nozzle would be capped, or used to add water during storage life, and the other nozzle would function as a passive vent to prevent pressurization and allow the escape of hydrogen and other gasses that would be produced chemically and radiolytically during storage. For containers to be stored in the dry process cells, the vent would be fitted with a NucFil®[1] filter. Containers that might be stored underwater would be fitted with a vent with a one-way value to preclude ingress of water to the containers.

Containers might hold approximately 50% sludge and 40% water, with the remaining 10% being void space. These filling levels are subject to possible change awaiting final design details. Each container would have its own unique characteristics with regard to waste specifics and dose rate.

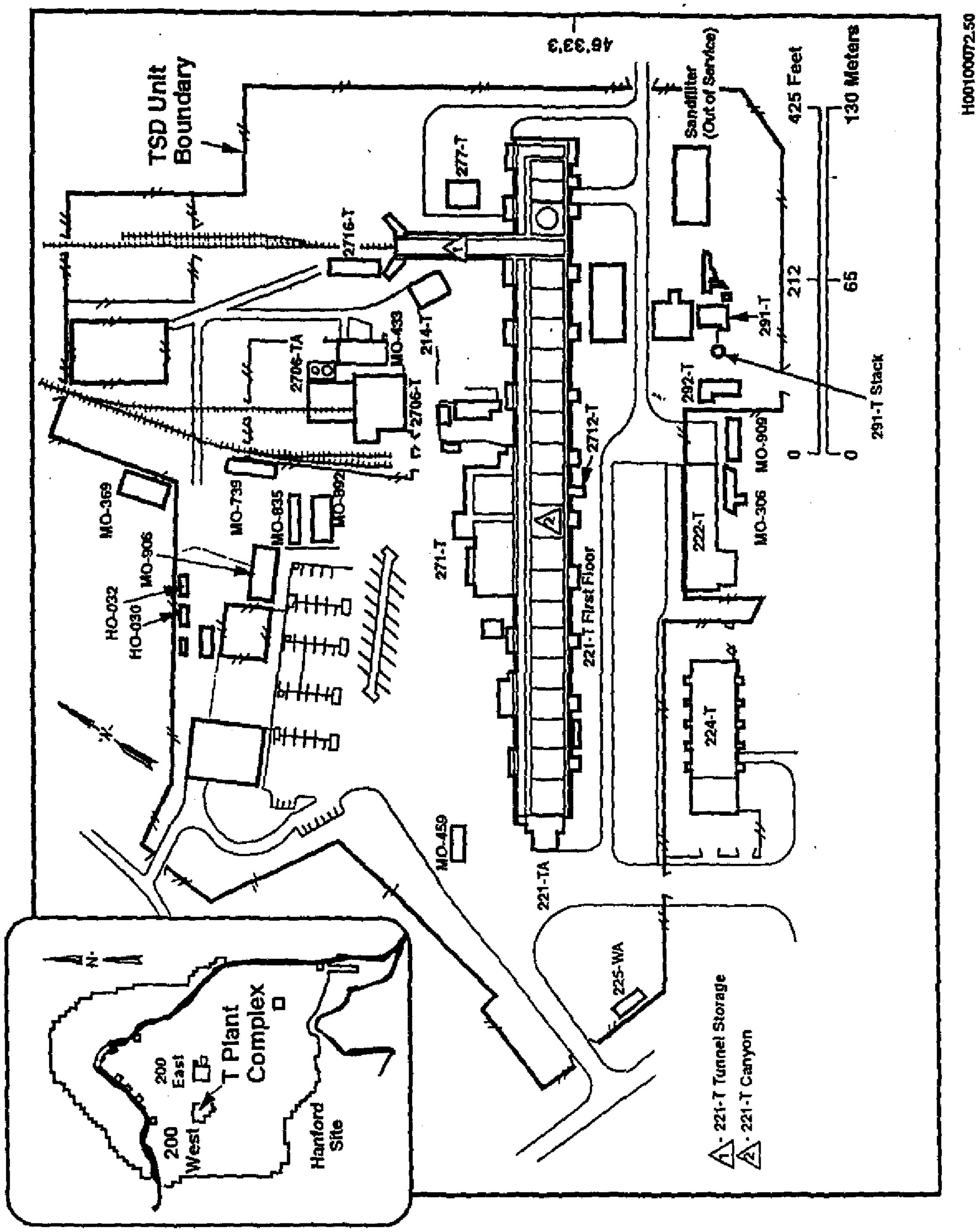
The Type 1 container would have an outer diameter of approximately 61 centimeters (24 inches) and a height of approximately 4 meters (13 feet). The nominal stainless steel wall thickness for the Type 1 containers is expected to be between one to 3 centimeters (1/4 to one inch) wall thickness. Based on anticipated sludge stream volumes, up to 140 Type 1 containers would be needed. Type 1 containers would be held in dry storage in process cells. Type 1 containers are expected to have the capacity for remote water additions to prevent the sludge from drying out inside the containers, because dry sludge would complicate future sludge removal and treatment.

The second container, designated Type 2 container, might have an inner diameter of approximately 25 centimeters (10 inches) and a height of approximately 4 meters (13 feet). The stainless steel wall thickness for the Type 2 containers would be approximately one to 3 centimeters (1/4 to 1 inch). Based on anticipated sludge stream volumes, up to 90 Type 2 containers would be needed.

[1] NucFil is a registered trademark of Nuclear Filter Technology, 741 Corporate Circle, Suite R, Golden, Colorado 80401, USA.

The Type 2 sludge stream has a higher reactivity than the Type 1 stream, depending on results of final heat transfer analysis, and might need to be stored underwater for temperature control. If the Type 2 containers are stored in the 2R Cell (pool), the containers would not require addition of water during storage because underwater storage would minimize evaporation of water that initially is loaded with the sludge. Type 2 containers also may incorporate a diagonal bar or other passive feature to preclude large, spanning gas bubbles from forming and causing a sludge plug to rise to the top of the container, which would plug the vent.

Storage racks would be designed specifically to hold Type 1 containers (Figures 12 and 13) for use in the dry cells. A similar design would be used for the sludge storage racks to hold the smaller Type 2 containers for use either in a dry process cell (Figures 14 and 15) or the pool (Figures 16 and 17). The storage racks for the containers would be arranged in an array, conservatively spaced about 64 centimeters (25 inches) center-to-center, with the spacing maintained by the storage racks. This equates to about 3 centimeters (1 inch) spacing edge-to-edge between Type 1 containers. Type 2 containers would be spaced about 33 centimeters (13 inches) edge-to-edge. The container storage racks would be designed to maximize the capacity and maintain criticality spacing as necessary within the dry process cells and the pool (2R Cell) if used. The dry process cells would have a capacity to hold a minimum of 32 Type 1 or 35 Type 2 containers, and if the pool is used would hold a minimum of 76 Type 2 containers.



TSD = treatment, storage, and/or disposal

Figure 4. T Plant Complex Site Plan.

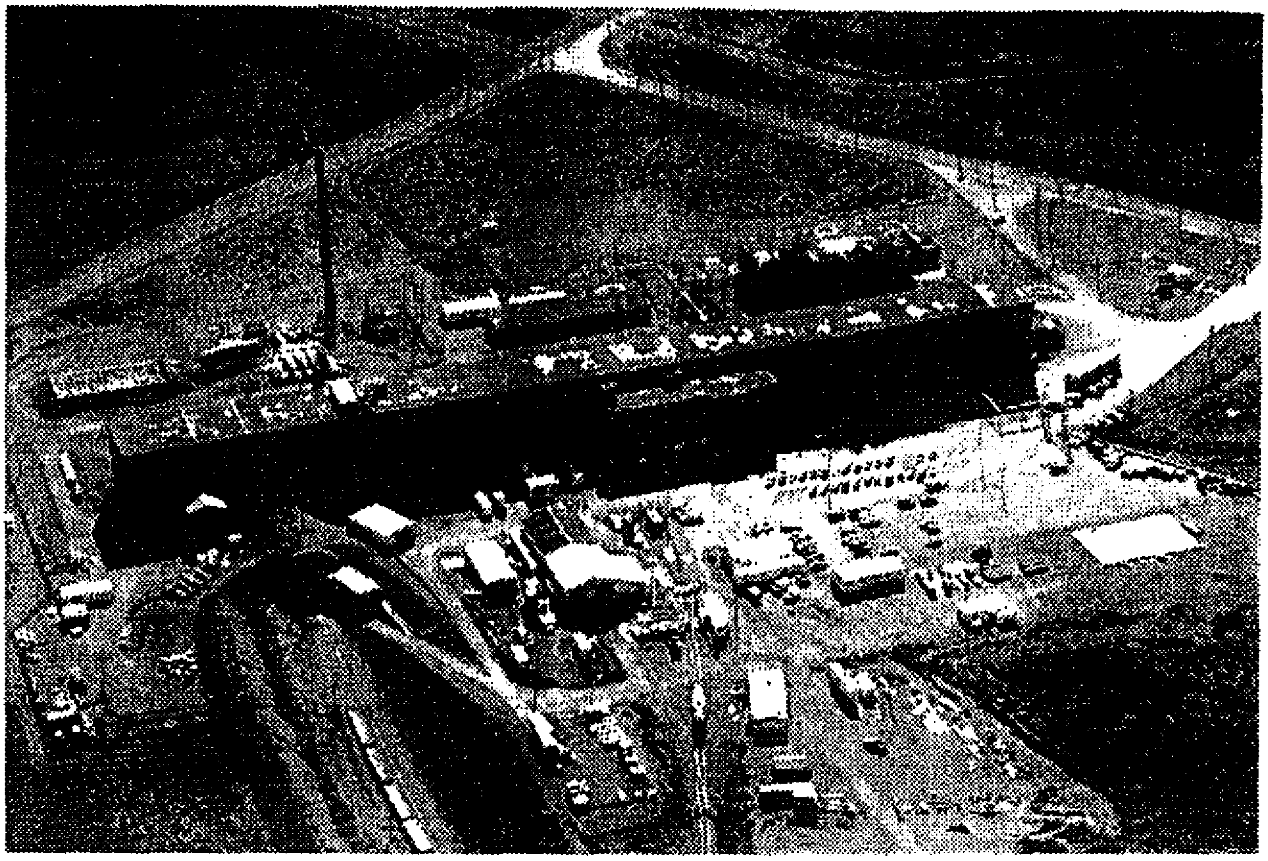


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Figure 5. T Plant Complex Aerial View.

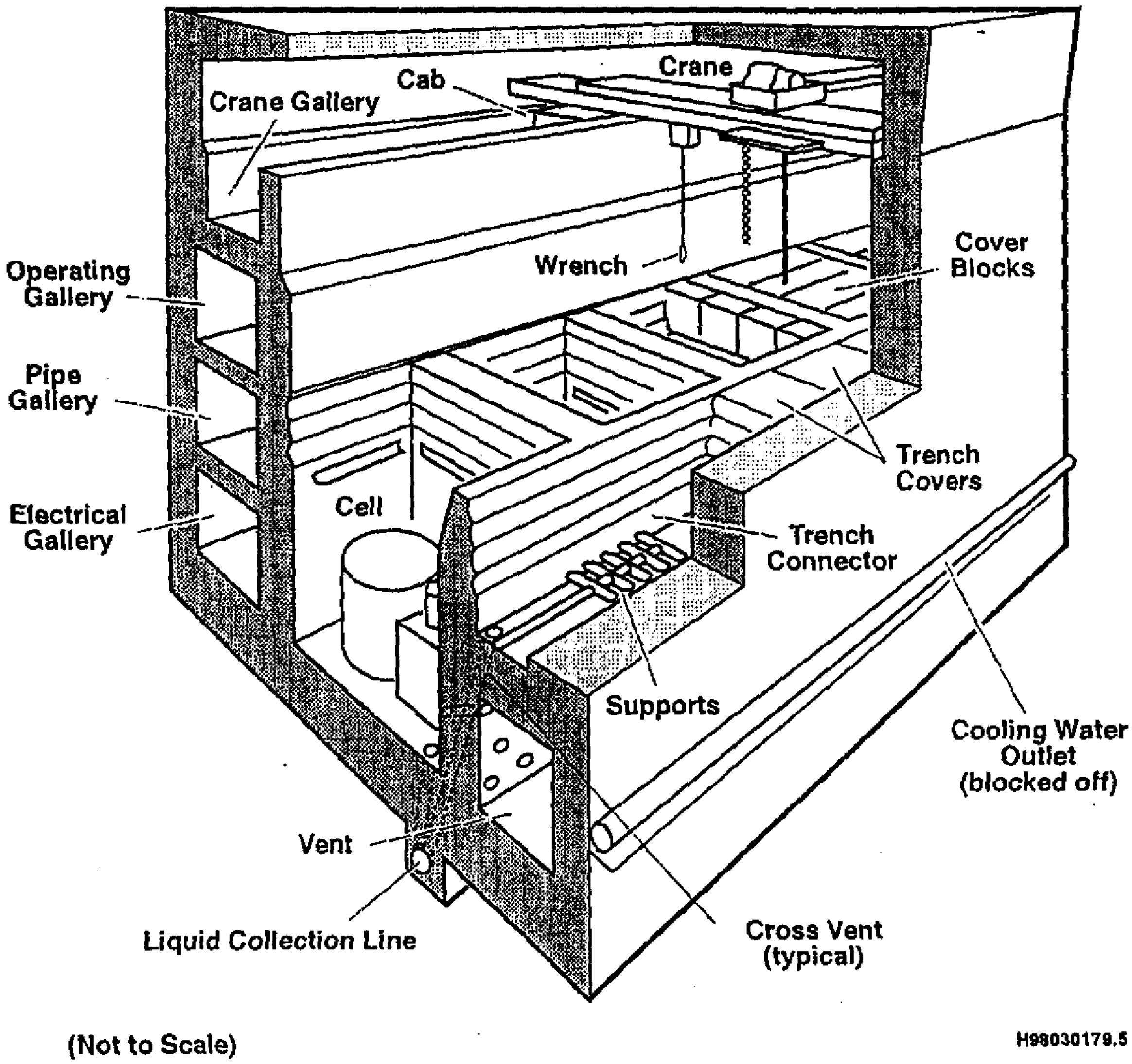


Figure 6. 221-T Building Cutaway.

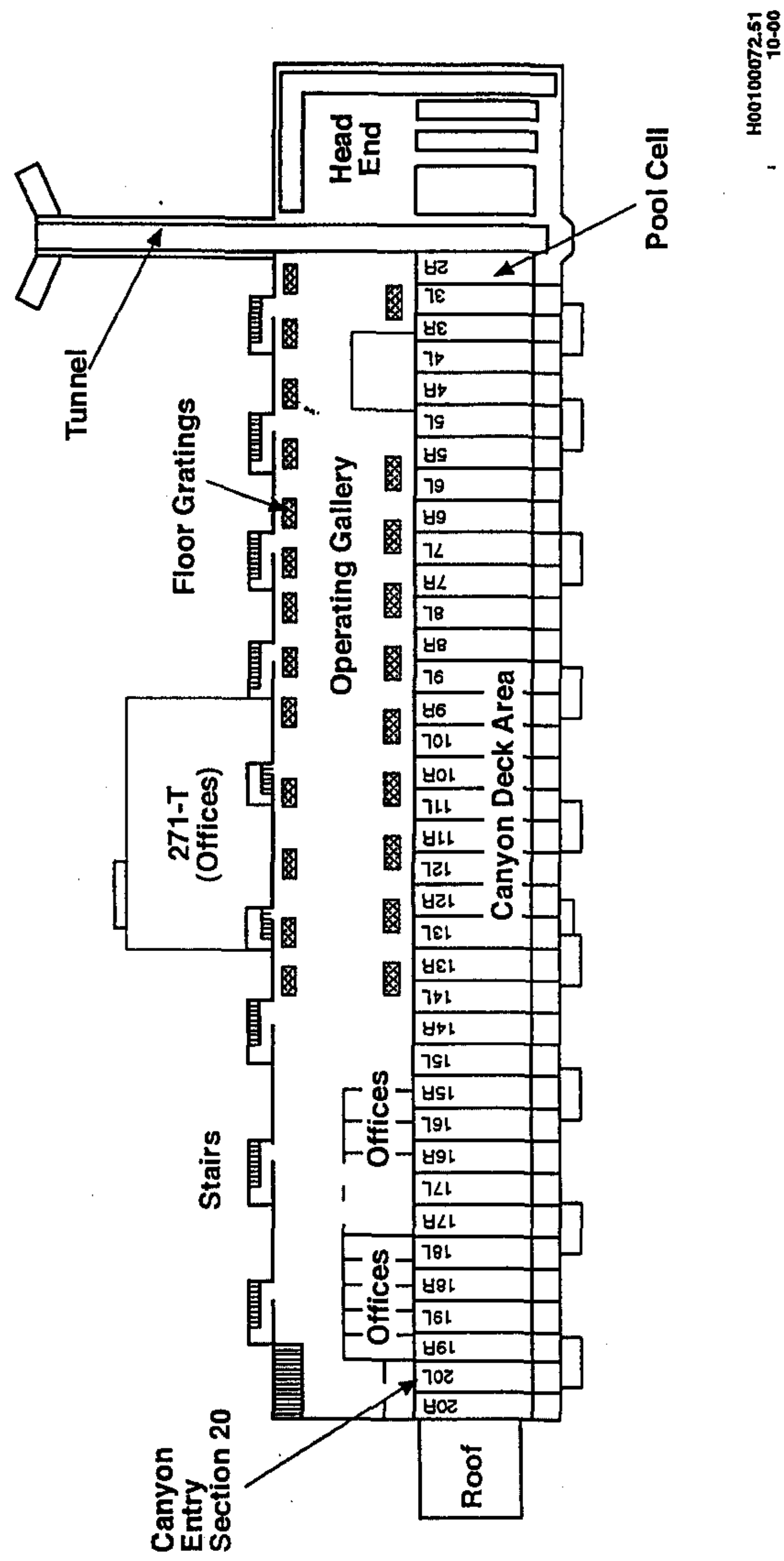


Figure 7. 271-T Building and 221-T Building Second Floor Cell Layout.

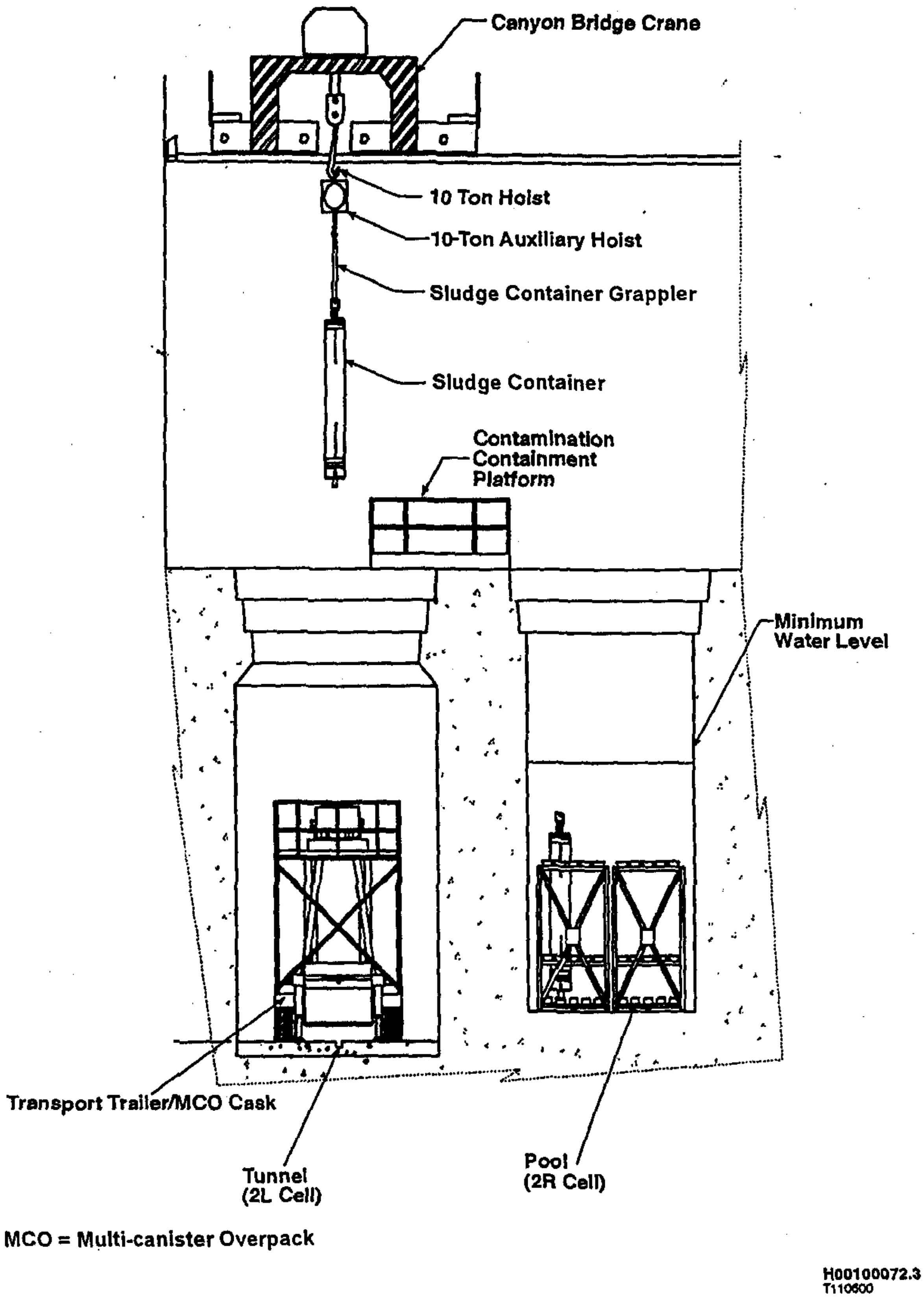


Figure 8. 221-T Building Tunnel and Pool Cell (Side View).

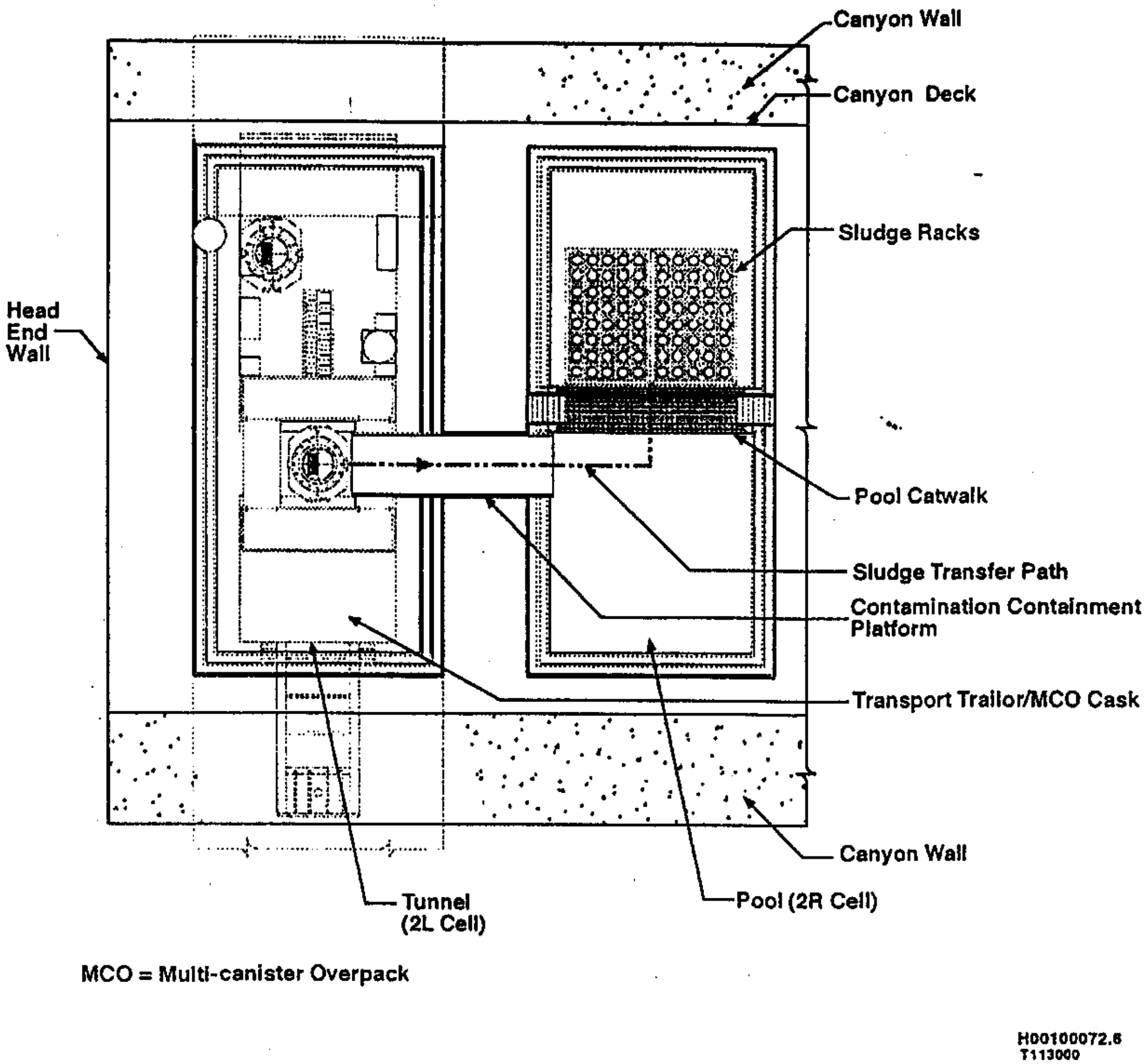
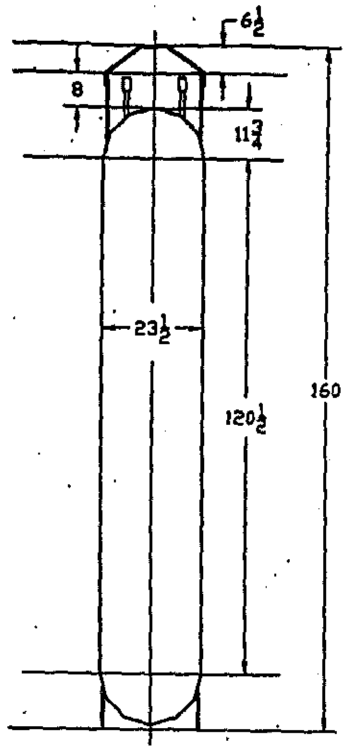
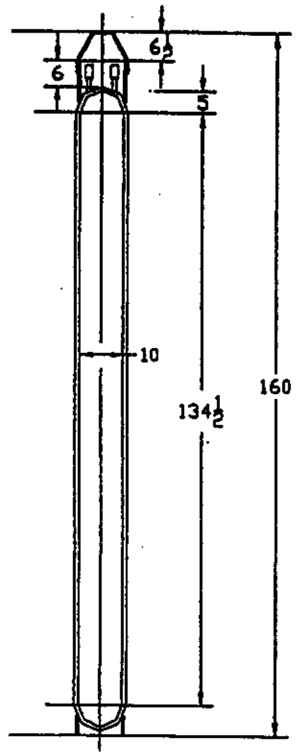


Figure 9. 221-T Building Tunnel and Pool Cell (Top View).



Dimensions are in inches.

Figure 10. Type 1 Container (Conceptual).



Dimensions are in inches.

Figure 11. Type 2 Container (Conceptual).

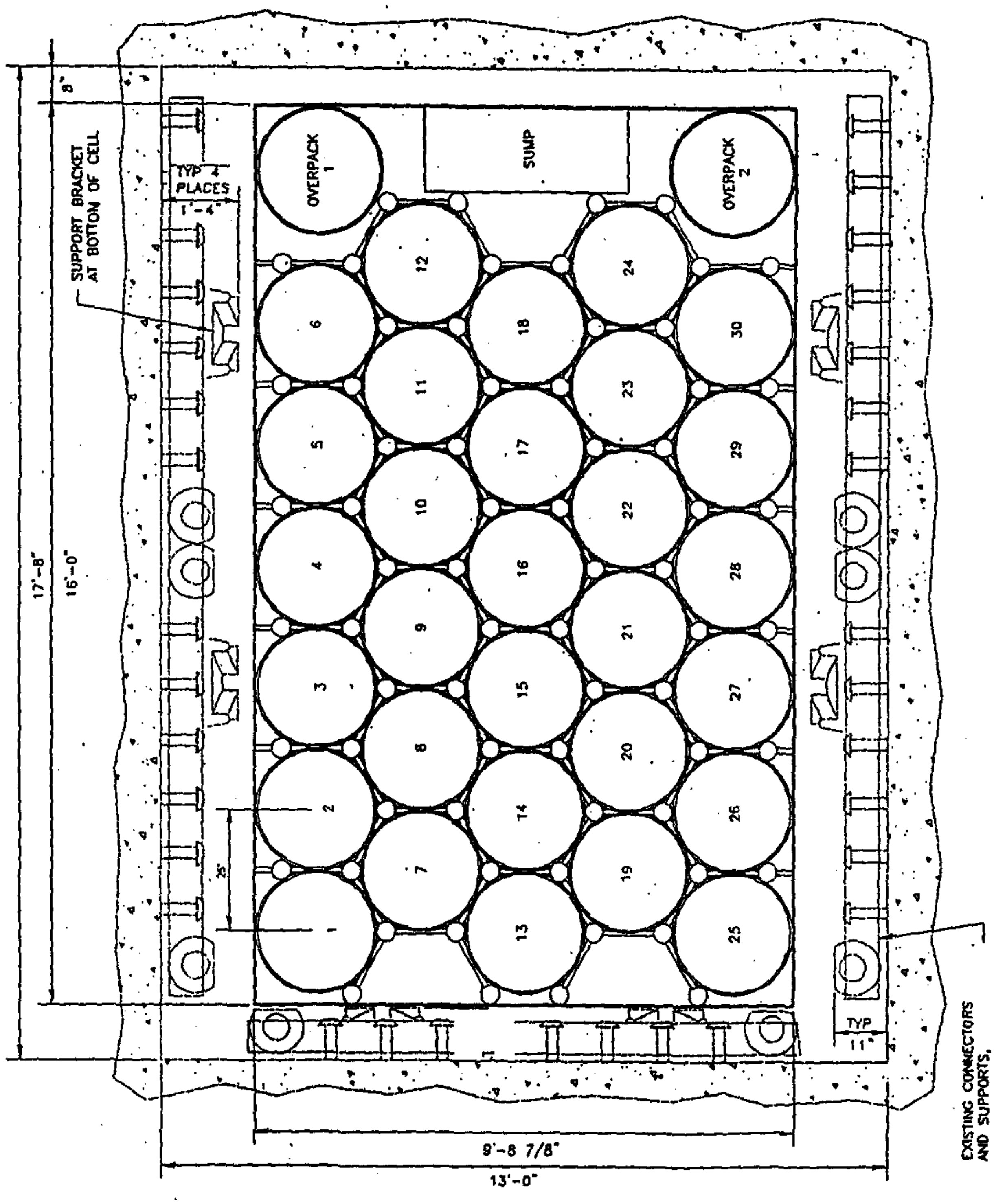


Figure 12. Typical Arrangement Type 1 Containers in Container Storage Rack for Dry Process Cell (Top View).

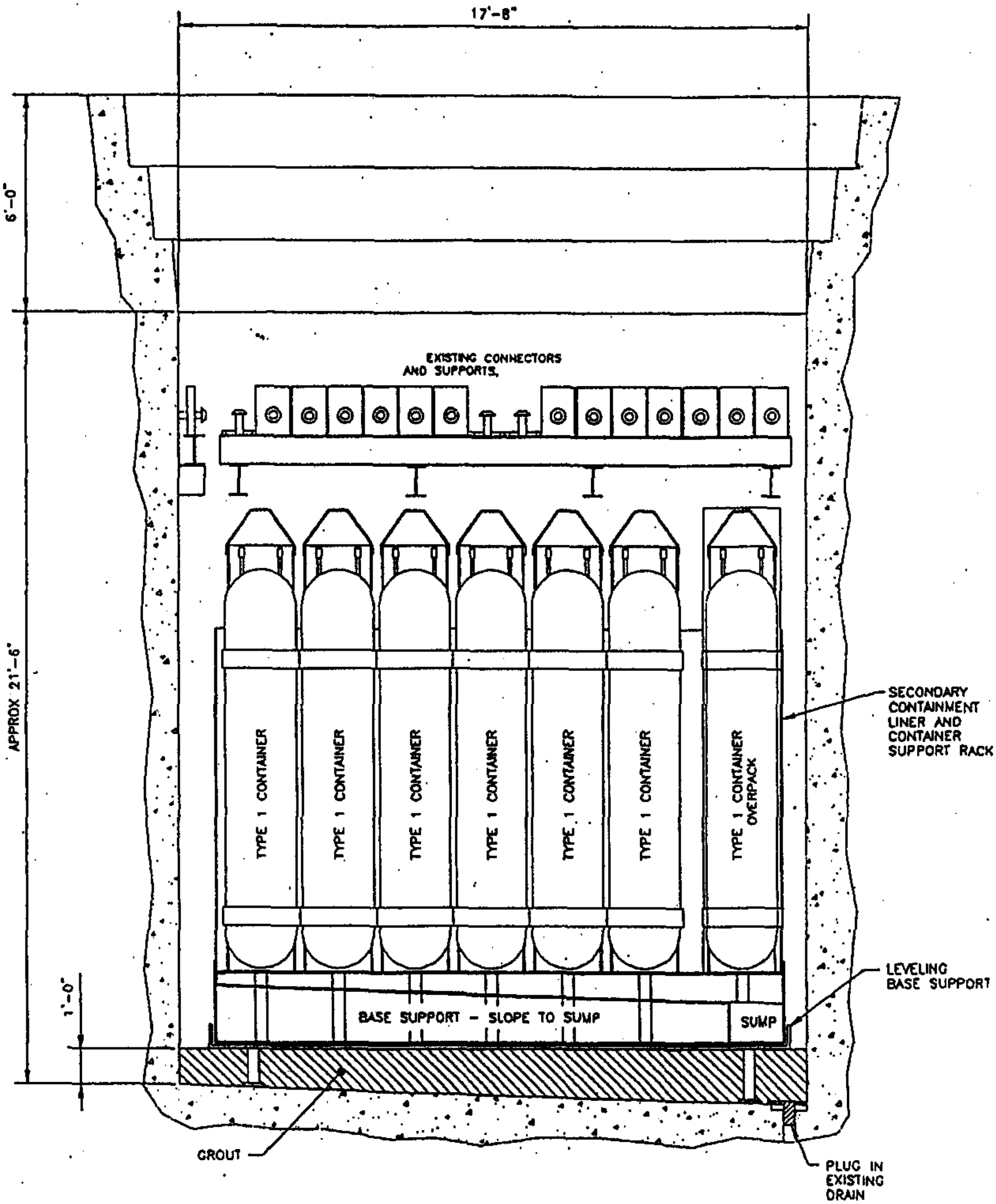


Figure 13. Typical Arrangement Type 1 Containers and Container Storage Rack for Dry Process Cell (Side View).

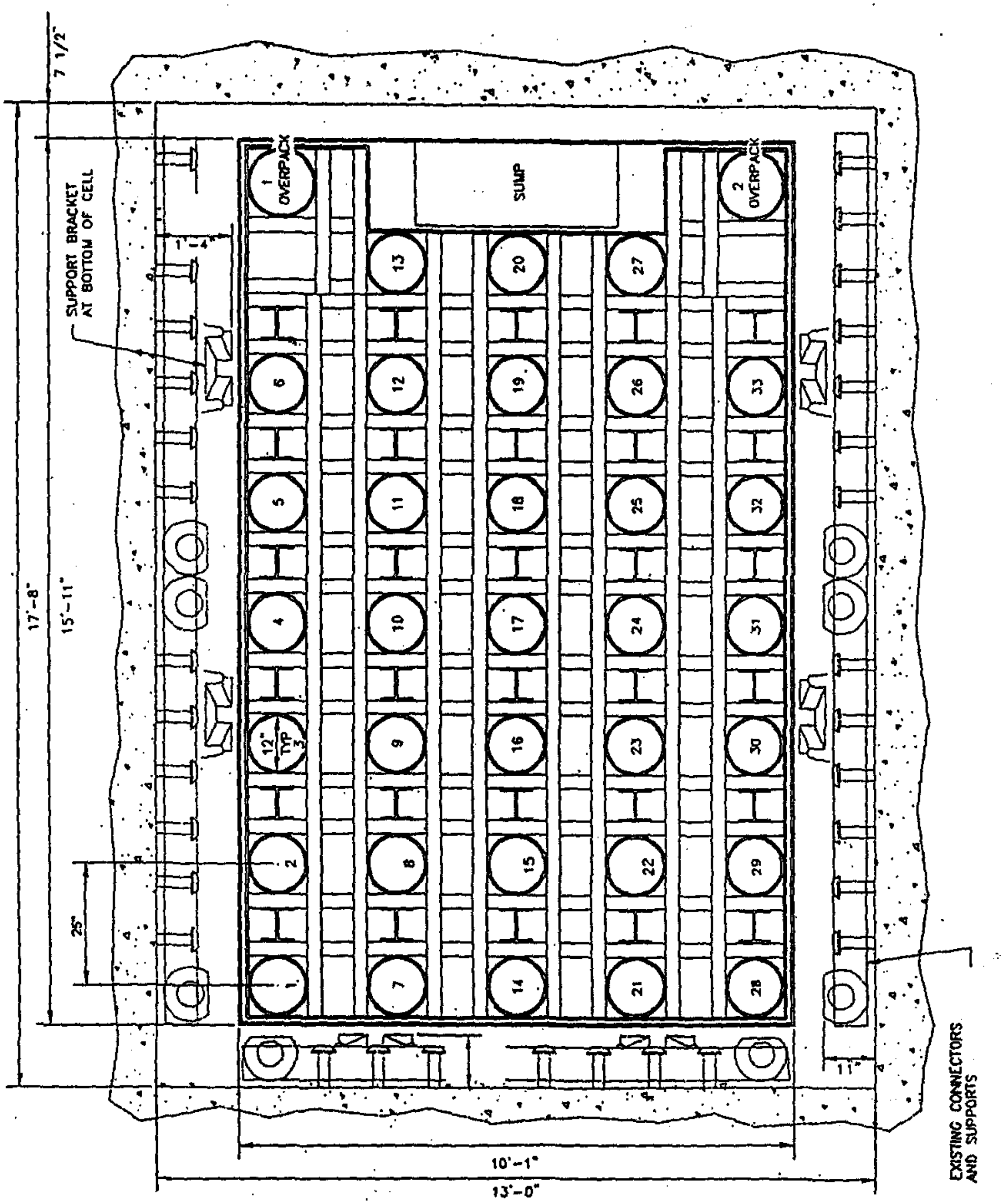


Figure 14. Typical Arrangement Type 2 Containers in Container Storage Rack for Dry Process Cell (Top View).

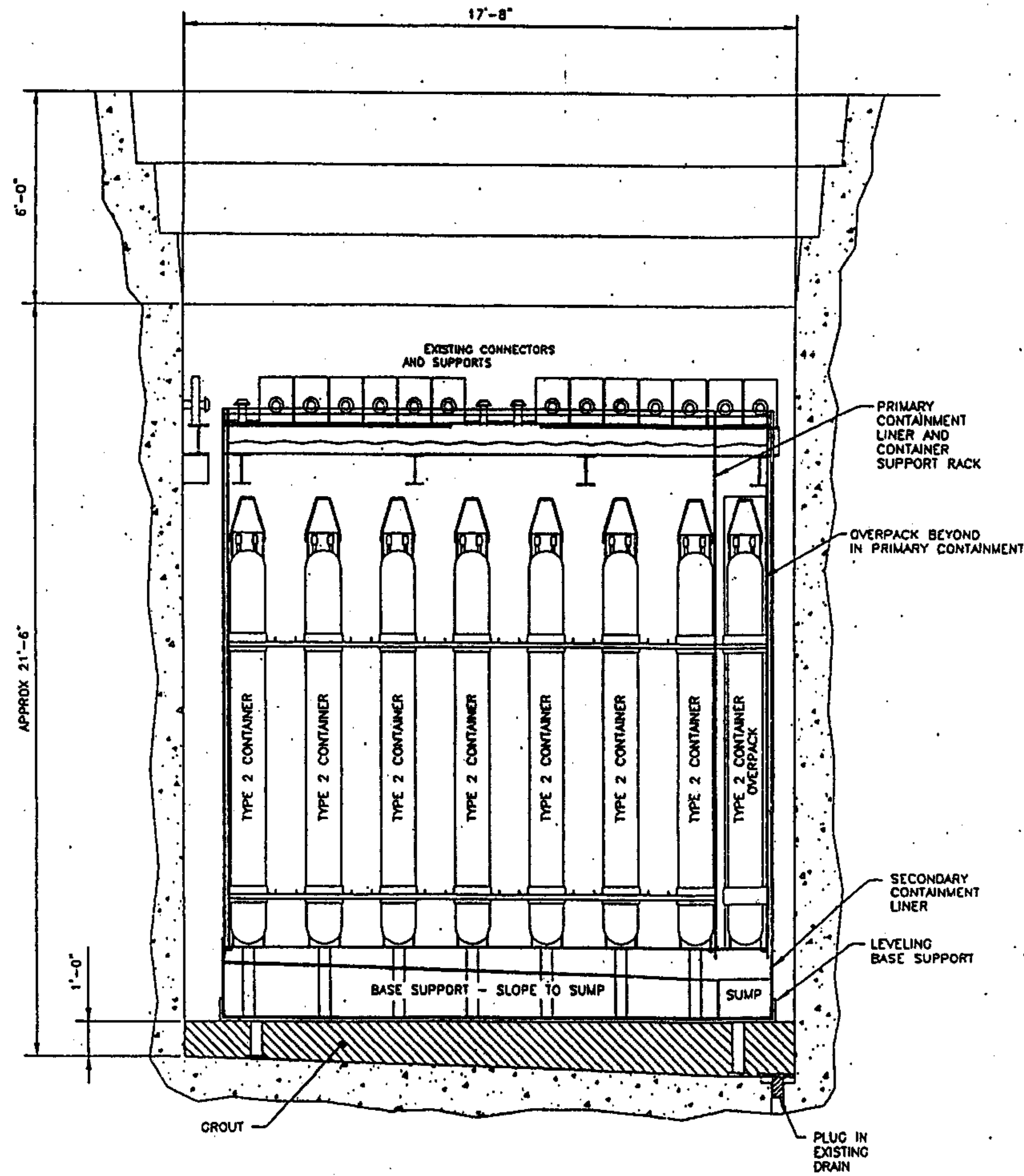


Figure 15. Typical Arrangement Type 2 Containers in Container Storage Rack for Dry Process Cell (Side View).

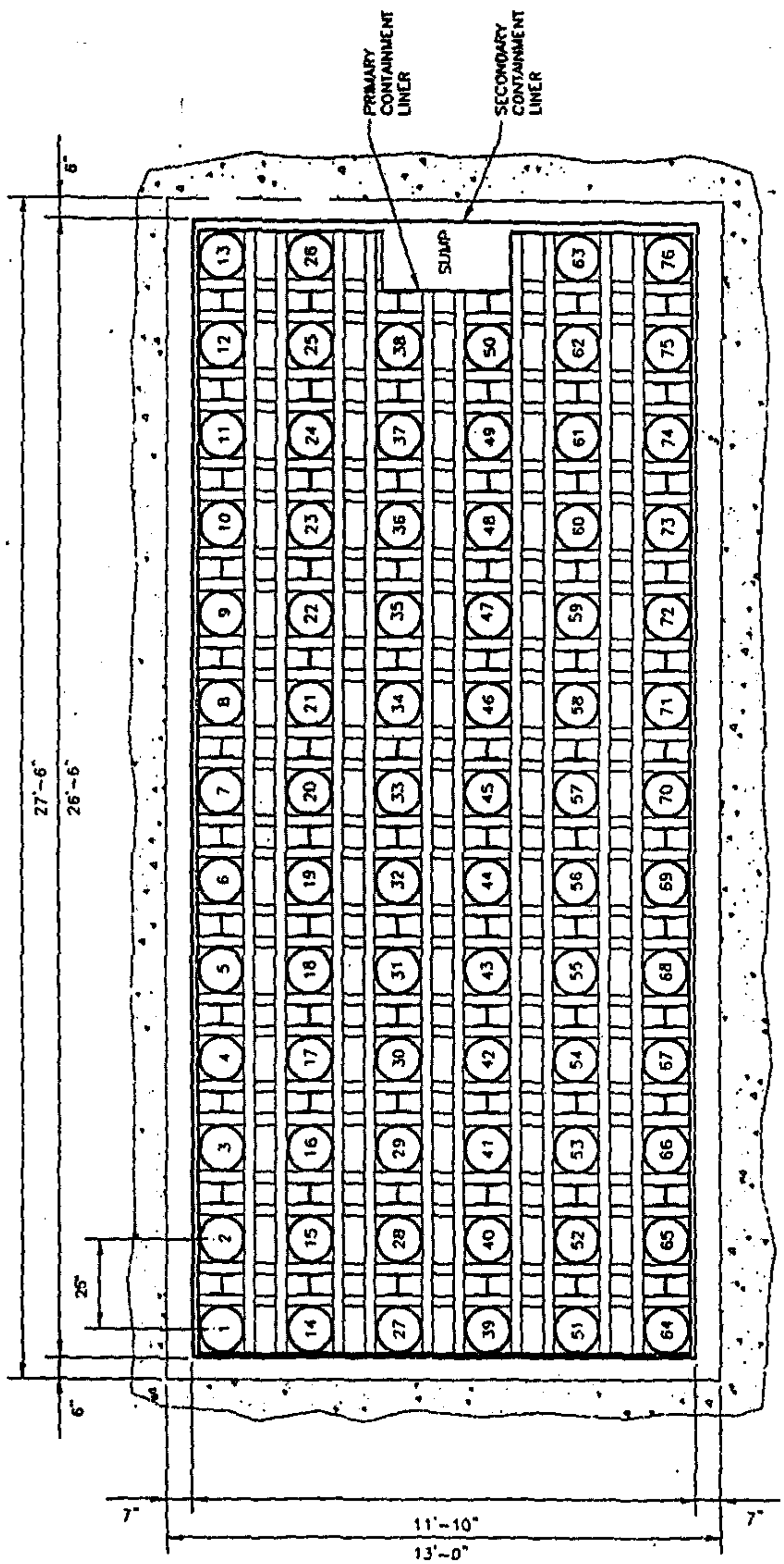


Figure 16. Typical Arrangement Type 2 Containers in Container Storage Rack for Pool (Top View).

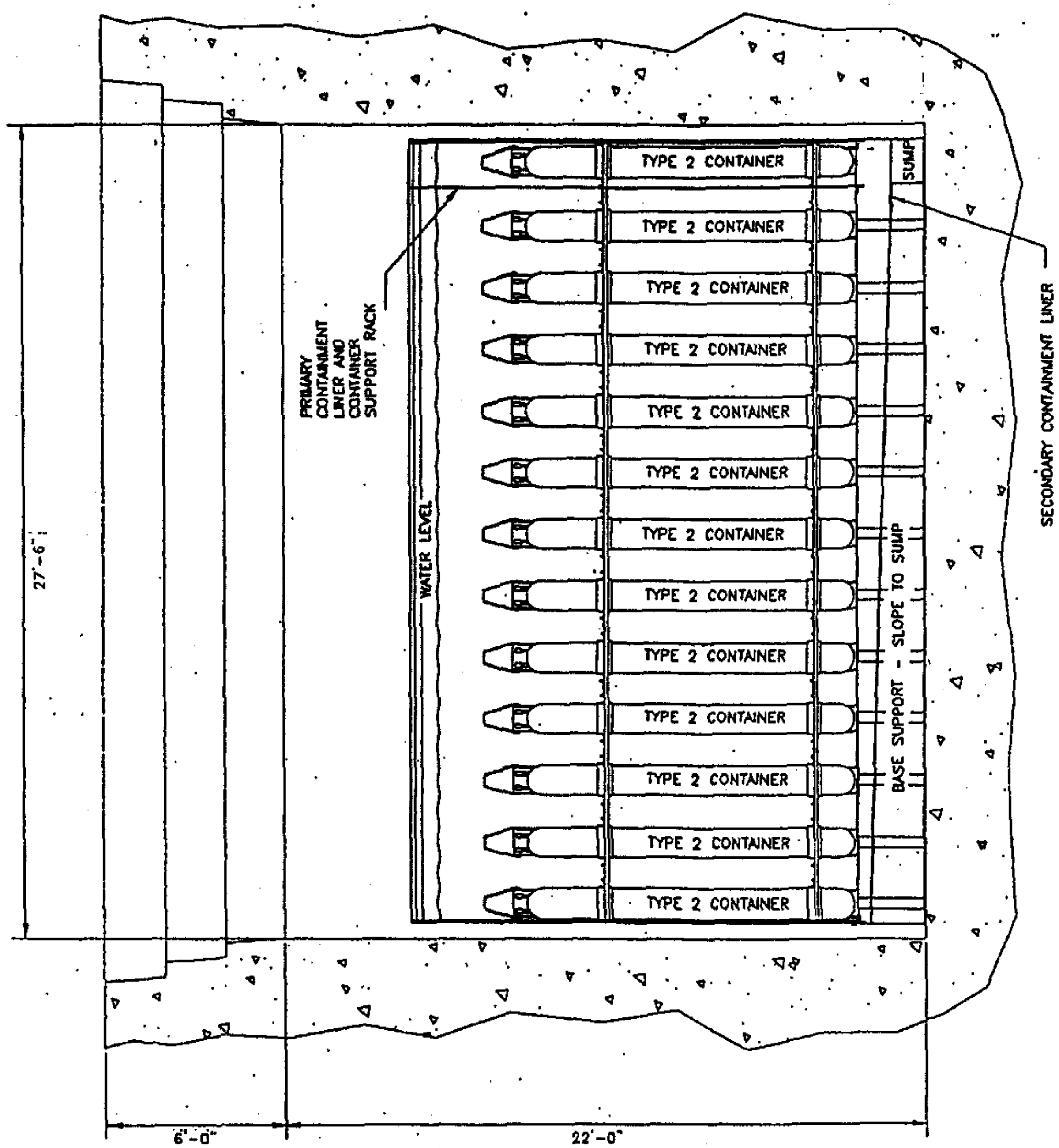


Figure 17. Typical Arrangement Type 2 Containers in Container Storage Rack for Pool (Side View).

3.0 ALTERNATIVES TO THE PROPOSED ACTION

Alternatives to the proposed action are discussed, but not fully analyzed, in the following sections.

3.1 NO ACTION ALTERNATIVE

The No Action Alternative to the proposed action would involve the continued storage of K Basins sludge in the existing KE and KW Basins for up to 40 years with no modifications except for maintenance, monitoring, and ongoing safety upgrades, as described in DOE/EIS-0245F. This would result in the sludge remaining in the K Basins, which were not designed for a 90-year life (50 years to date and up to an additional 40 years). This alternative would require increasing maintenance of aging facilities with associated potential for increased radiological impacts on personnel and would not preclude leakage of radionuclides to the soil beneath the basins and near the Columbia River. This alternative would fail to alleviate concerns expressed by the public relative to environmental impacts induced by seismic events. The T Plant Complex would not be upgraded and would not receive and store sludge.

3.2 OTHER ALTERNATIVES

Other alternatives to the proposed action are described in the following sections. These alternatives were evaluated in previous documents.

3.2.1 Alternative to Store Sludge in Double-Shell Tanks

This alternative would store the K Basins sludge on an interim basis in the double-shell tanks (DST) farms in the 200 East Area (Figure 14), and was the preferred alternative in DOE/EIS-0245F. The requirements for processing K Basin sludge for acceptance into the DST farms (HNF-SD-TWR-OCD-001) would result in excessive costs and delays for safe storage of the sludge, and is inconsistent with the CERCLA record of decision for DOE/RL-98-66.

3.2.2 Alternative to Store Sludge in the Waste Encapsulation and Storage Facility (WESF)

This alternative for interim storage of K Basins sludge in the pool cell of WESF in the 200 East Area (Figure 18) was considered. In order to get sludge into WESF with Type 1 or Type 2 containers, WESF would have to be greatly modified and the pool would have to be significantly expanded. If very small sludge containers (10 centimeters or 4 inches) were used for storage of sludge in WESF, then more than twice as many of these small containers compared to the number of strontium and cesium containers currently residing in the WESF pool cell would have to be made to contain all of the K Basins sludge. In any case, modifications to WESF and container additions would not provide adequate capacity for K Basins sludge storage without a significant addition to the WESF pool cell.

3.2.3 Alternative to Store Sludge in a New Facility

An alternative to build a new storage facility for interim storage of the sludge currently in the 100-K Area was considered. However, this alternative would require the need to construct and operate a relatively expensive storage facility.

3.2.4 Alternative to Store Sludge in the Canister Storage Building

This alternative would store the sludge in the Canister Storage Building (CSB). However, the storage tubes in the CSB (Figure 18) are sealed and would not allow venting of the sludge container during storage. Wet storage of the sludge is incompatible with conditions that must be maintained for the storage of dry SNF in the CSB. In addition, the dry storage of the SNF removed from the K Basins and other Hanford facilities would leave insufficient capacity for storage of K Basins sludge.

3.2.5 Alternative for Offsite Storage

An alternative for offsite storage was considered. If this alternative were chosen, the storage of the sludge might be similar to the proposed action, but the cost for storage of the sludge would be more expensive due to shipping costs. In addition, no certified packaging in compliance with U.S. Department of Transportation regulations currently exists to transport the sludge offsite, and there would be increased transportation risks of sending the K Basins sludge offsite.

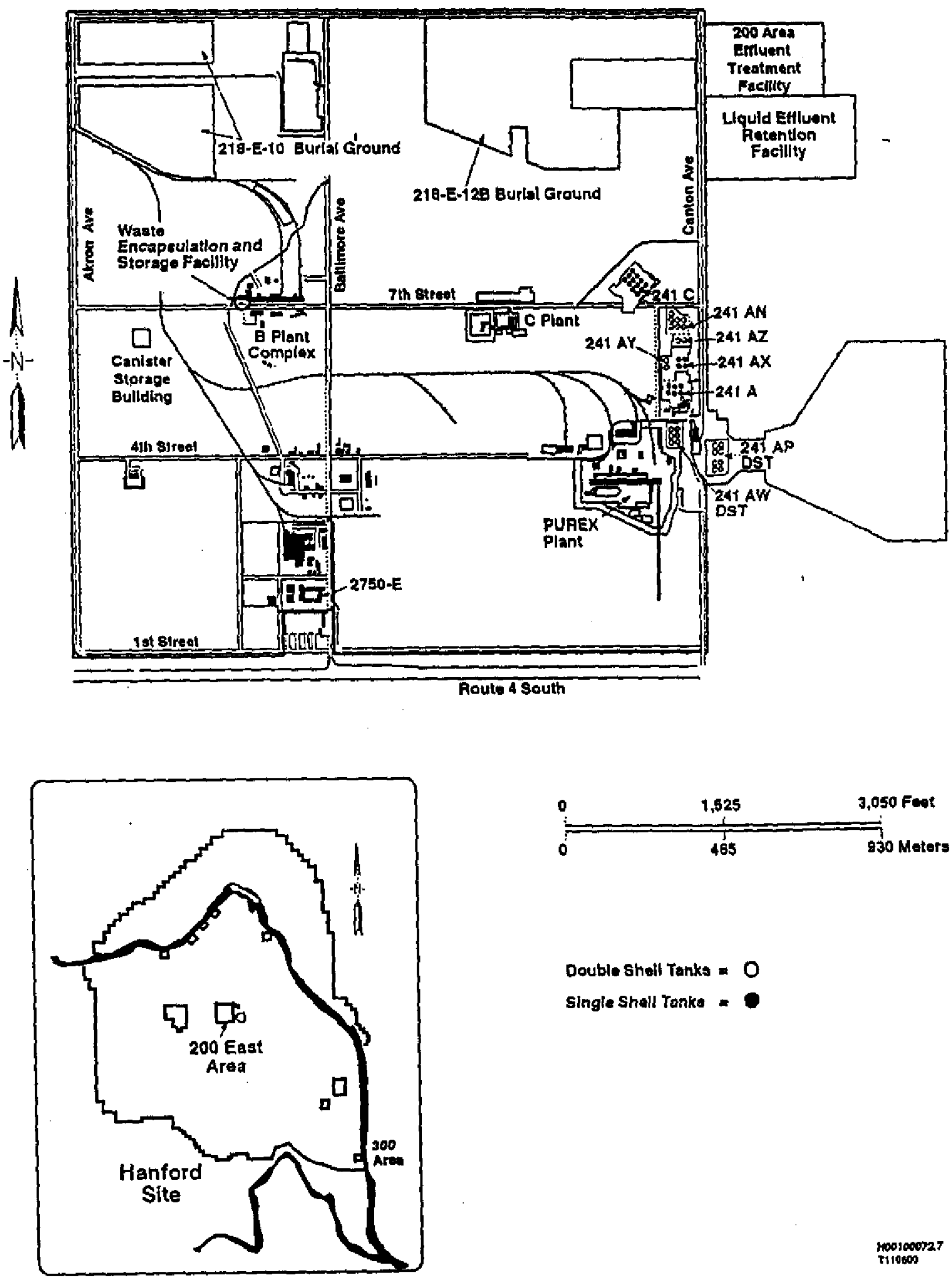


Figure 18. 200 East Area Double-Shell Tanks, Waste Encapsulation and Storage Facility, and Canister Storage Building Alternatives.

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4.0 AFFECTED ENVIRONMENT

The following sections provide a discussion of the existing environment that would be affected by the proposed action and alternatives.

4.1 GENERAL HANFORD SITE ENVIRONMENT

The Hanford Site, about 1,517 square kilometers (586 square miles) is located in southeastern Washington State, in a semiarid region with rolling topography. Two topographical features dominate the landscape: Rattlesnake Mountain located on the southwest boundary and Gable Mountain located on the northern portion. The Columbia River flows through the northern part and forms part of the eastern boundary of the Hanford Site. Areas adjacent to the Hanford Site primarily are agricultural lands. The 200 East Area and 200 West Area have been used heavily as waste processing and waste management areas.

Designations for land use at the site for the next 50 years have been established in DOE/EIS-0222-F. These designations at Hanford include preservation, conservation, industrial, and research and development. On June 9, 2000, the Hanford Reach National Monument was established (65 FR 37253) covering 78,900 hectares (195,000 acres) under the preservation land use category. The Hanford Reach National Monument incorporates a portion of the Columbia River corridor, the Fitzner-Eberhardt Arid Lands Ecology Reserve to the south and west, portions of the Hanford Site north of the Columbia River, and recognizes the unique character and biological diversity of the area, as well as its geological, paleontological, historic, and archaeological importance.

The Hanford Site has a mild climate with 15 to 18 centimeters (6 to 7 inches) of annual precipitation, with most of the precipitation taking place during the winter months. Temperature ranges of daily maximum temperatures vary from normal maxima of 2°C (36°F) in early January to 35°C (95°F) in late July. Monthly average wind speeds are lowest during the winter months, averaging 10 to 11 kilometers (6 to 7 miles) per hour, and highest during the summer, averaging 14 to 16 kilometers (8 to 10 miles) per hour (PNNL-6415). Tornadoes are extremely rare in the region surrounding the Hanford Site.

During 1999, the Hanford Site air emissions remained below all established limits set for regulated air pollutants (PNNL-13230). Atmospheric dispersion conditions of the area vary between summer and winter months. The summer months generally have good air mixing characteristics. If the prevailing winds from the northwest are light, less favorable dispersion conditions might occur. Occasional periods of poor dispersion conditions occur during the winter months.

On June 27, 2000, a fire known as the 24 Command Fire, spread rapidly and eventually consumed 66,322 hectares (163,884 acres) of Federal, state, and private lands. A total of 24,384 hectares (60,254 acres) within Hanford burned, including lands within the Hanford Reach National Monument, most of the Fitzner-Eberhardt Arid Lands Ecology Reserve, and areas near former production sites. Fire suppression impacts included construction of 66 kilometers (41 miles) of bulldozed fire lines, widened dirt roads, and cut fences (DOI 2000). Impacts to the land should not be permanent because of rehabilitation measures, including revegetation and fence repair.

The vegetation on the Hanford Site is a shrub-steppe community of sagebrush and rabbitbrush with an understory consisting primarily of cheatgrass and Sandberg's bluegrass. The typical insects, small birds, mammals, and reptiles common to the Hanford Site can be found on the 200 Area Plateau (PNNL-6415).

Relatively undisturbed areas of the mature shrub-steppe vegetation are high quality habitat for many plants and animals and have been designated as "priority habitat" by Washington State.

Most mammal species known to inhabit the Hanford Site are small, nocturnal creatures, primarily pocket mice and jackrabbits. Large mammals found on the Hanford Site are deer and elk, although the elk exist almost entirely on the Fitzner-Eberhardt Arid Lands Ecology Reserve. Coyotes and raptors are the primary predators. Several species of small birds nest in the steppe vegetation. Semiannual peaks in avian variety and abundance occur during migration seasons. Additional information concerning the Hanford Site can be found in PNNL-6415.

DOE-RL and its contractors dominate the local employment picture with almost one-quarter of the total nonagricultural jobs in Benton and Franklin counties. Ninety-three percent of Hanford Site personnel reside in the Benton and Franklin county areas. Therefore, work activities on the Hanford Site play an important role in the socioeconomics of the Tri-Cities (Richland, Pasco, and Kennewick) and other parts of Benton and Franklin counties (PNNL-6415). Other counties are less affected by changes in Hanford Site employment.

4.2 SPECIFIC SITE ENVIRONMENT

The 221-T Building, the largest structure (Figure 15) in the T Plant Complex (Figure 16), is constructed of reinforced concrete, is 260 meters (850 feet) long, 20 meters (70 feet) wide, and 23 meters (74 feet) high, and covers an area of 5,370 square meters (57,800 square feet). One of the early Hanford Works construction projects, the 221-T Building began operation on December 26, 1944 as the original bismuth phosphate separation facility. The building was shut down in 1956 and converted to a decontamination facility in 1957. The 221-T Building currently provides services for processing, decontamination, reclamation, treatment, and storage of waste and failed, radioactively contaminated process equipment. Waste packaging, verification, and repackaging activities also are performed. The building currently serves as a storage area for the pressurized water reactor fuel assemblies (Shippingport fuel) at the Hanford Site. The fuel will be removed from the building before the proposed action would occur.

The 221-T Building is approximately 11 kilometers (7 miles) southwest from the Columbia River. The 200 West Area is not located in a 100-year or 500-year floodplain, nor located within a wetlands area (PNNL-6415). The elevations for the 200 Areas average about 220 meters (720 feet) above mean sea level. The 200 West Area does not contain any prime farmland, state or national parks, forests, conservation areas, or other areas of recreational, scenic, or aesthetic concern. The city of Richland (population approximately 32,000), located about 40 kilometers (25 miles) from the 200 Areas in Benton County, adjoins the southernmost portion of the Hanford Site boundary and is the nearest population center.

The 221-T Building consists of a canyon divided into 20 sections, three galleries (operating, pipe, and electrical), one craneway, one railroad tunnel, and a head-end facility. A cutaway view of the 221-T Building is shown in Figure 17. The 221-T canyon, railroad tunnel, and head-end each serve as container storage and treatment areas.

221-T Canyon. Currently, the 221-T canyon deck and several cells (Figure 18) are used for the storage of failed process equipment. The canyon cell area consists of 37 cells grouped into 12 meter (40 foot) sections arranged in a single row running the length of the building with one railroad tunnel entrance/exit (Cell 38). Each cell is divided in half. Certain cells have been used for storage and for handling of waste resulting from decontamination efforts. Each cell is separated by a 2-meter- (7-foot-) thick-reinforced concrete wall. All cell floors except 5R slope to one corner, where drains lead to a drain line running the length of the building. The drain line empties into tank 5-7 in cell 5R. The canyon deck is approximately 12 meters (40 feet) below a 0.9- to 1.2-meter- (3- to 4-foot-) thick concrete roof. The canyon deck is used for packaging, special decontamination services, and equipment repair. Equipment that requires decontamination, such as pumps, motors, and resin columns, currently is stored on the canyon deck. Equipment also can be located in the canyon cells. Most of the contaminated equipment on the canyon deck and all of the equipment in the chosen dry process cells would be removed before the proposed action.

A catwalk above the highest pool water level allows access to the pool for water sampling and maintenance. Two coverblocks extend from the east end of the cell over the fuel assemblies, and are expected to be replaced with a lighter cover block to reduce wall loading and protect sludge containers. The west end of the cell is left open to facilitate surveillance and maintenance of the pool water and fuel and to minimize stress on the cell walls. This is expected to be replaced with a metal grating allowing surveillance of pool water. The catwalk and equipment associated with the fuel pool are located west of the coverblocks.

An ion-exchange column recirculating system has been used for pool water purification, but currently is out of service. This system might be put back into service or equivalent installed, if the pool is used.

The original design for the 221-T Building provided for two electrically operated overhead traveling bridge cranes with capacities of 68 metric tons (75 tons) and 9 metric tons (10 tons). The capacity of the large crane has been downgraded to 40 metric tons (45 tons). Moving parallel to the canyon gives the cranes easy access to the canyon deck area for remote decontamination and maintenance. The crane maintenance platform located in section 20 allows hands-on crane inspection and maintenance.

The standard canyon cells normally are covered by four 2-meter-(6-foot-) thick concrete cover blocks. All lines that service the cells are encased in concrete and terminate in a row of connector flanges on the cell wall 3 meters (9 feet) below canyon deck level. In some instances, process lines go directly through the wall to the adjacent cell in the same section. Because there are expansion joints between sections of the building, there are no direct through-the-wall connections from section to section.

221-T Building Galleries. The electrical gallery in the 221-T Building contains the main electrical lines, motor control, and electrical distribution centers for the building. The main steam lines and water lines also enter the building through this gallery. The electrical gallery also contains most of the drain system lines converging from the piping and operations galleries. The gallery is 230 meters (760 feet) long and 4 meters (14 feet) wide. A corridor extends along the full length of the gallery and can be entered through nine stairwells.

The 221-T pipe gallery contains most of the nonradioactive chemical, process, and utility piping. The pipe gallery is divided into four areas, is 230 meters (760 feet) long and 4 meters (14 feet) wide, and can be entered through nine stairwells. The pipe gallery contains two compressor/condenser units and the main power supply for the ion-exchange column, locker rooms, and a shower room.

The operating gallery serves as the control center for remote operation of the canyon equipment. The gallery is approximately 230 meters (760 feet) long and 4 meters (14 feet) wide. Nine stairwells provide access. The control panel for the pool cell, various control boards, and offices for operations personnel are located in the operating gallery. One office contains panel controls for canyon air and lights, along with power controls for the centrifuge run-in station, while another office contains controls for the pump run-in station. The canyon entry area and emergency decontamination shower are located as part of the operating gallery.

221-T Craneway. Stairwells within the 221-T Building allow access to a 230-meter (760-foot) long 3-meter (11-foot) wide craneway. The 40-metric-ton (45-ton) capacity crane is operated using periscopes and a remote video camera from a shielded crane cab. The cab is shielded by a parapet and 10-centimeter- (4-inch-) thick lead walls. A remote video system also is available and would be upgraded. Other remote equipment includes a left and right 0.9-metric-ton (1-ton) capacity auxiliary hoist, an impact wrench, a clam bucket, and an auxiliary impact wrench. A 9-metric-ton- (10-ton-) capacity crane and rotary hook provide adaptability for handling, positioning, and maneuvering functions. The 9-metric-ton- (10-ton-) capacity crane is operated from the canyon deck by use of a suspended control box hanging from the crane assembly. This crane also can be operated from the crane cab on the crane bridge.

221-T Tunnel. The tunnel serves as a staging area for transporting equipment into and out of the canyon. Additionally, the tunnel is used for waste treatment, repackaging, sampling, verification, storage, and other types of reprocessing. The tunnel enters at cell 2L. Outside access to the tunnel occurs through a 5 meter (16 foot) wide by 7 meter (22 foot) high opening, covered by a motor-driven rollup steel door. The tunnel would be where the containers would enter via the MCO cask (Figure 4).

4.2.1 Soil and Subsurface

The soil in the 200 Areas is predominately a sand and gravel mixture. All areas within the proposed action have been disturbed previously and scraped clean of any vegetation. The geologic strata under the surface layer, in descending order, are Holocene eolian deposits, Hanford formation, Ringold Formation, and the Columbia River Basalt Group. The eolian sands are fine- to coarse-grained, and relatively quartz- and feldspar-rich. Deposits of the Hanford formation underlie the eolian deposits. Hanford formation strata generally are dominated by deposits typical of the gravel-dominated facies consisting of uncemented granule to cobble gravels and minor coarse-grained sand. This is underlain by the top of the Ringold Formation. Basalt flows of the Columbia River Basalt Group and intercalated sediments of the Ellensburg Formation underlie the Ringold Formation. The region is categorized as one of low to moderate seismicity (PNNL-6415).

4.2.2 Hydrology

The water table in the 200 Areas is approximately 75 meters (240 feet) to 90 meters (290 feet) below the surface (PNNL-6415). No groundwater contamination plumes have been detected originating from the 221-T Building.

4.2.3 Air Resources

The Hanford Site is subject to the emission limits of WAC 173-400-040, *General Standards for Maximum Emissions*, which is designed to protect existing air quality. There are no impacts to these general standards from the proposed action. New Source Review in accordance with WAC 173-400-110 has been determined to be inapplicable, i.e., a notice of construction application under WAC 173-400 or WAC 173-460, *Controls for New Sources of Toxic Air Pollutants*, will not be required.

Air emissions from the proposed action exhaust from the canyon through the 291-T-1 Stack. Under the proposed action, the 291-T-1 Stack at the T Plant Complex would become a 'major' stack, which requires T Plant Complex operations to meet the continuous monitoring requirements of 40 Code of Federal

Regulations (CFR) 61.93, National Emissions Standards for Hazardous Air Pollutants. During the December 5, 2000 Routine Technical Assistance Meeting (RTAM) with the WDOH and in conjunction with EPA, WDOH agreed that resumption of continuous sampling using the existing stack sampling system in its current configuration in conjunction with annual nondestructive analysis (NDA) of the second stage of the HEPA filters is allowable, pursuant to WAC 246-247-075(4). A detailed description of this alternative method would be described in the radioactive air emissions NOC application, which would be approved by both WDOH and EPA before the proposed action would occur.

4.2.4 Plants and Animals

The immediate area surrounding the 221-T Building previously has been disturbed. No plant or animal species protected under the *Endangered Species Act* (ESA) *of 1973*, on the federal list of "Endangered and Threatened Wildlife and Plants" (50 CFR 17), or on the Washington State list of threatened or endangered species would be found in the area of the proposed action.

4.2.5 Cultural Resources

A Hanford Cultural Resources Review #2001-200-006 (Appendix A) was conducted for the proposed action. The review concluded that, "There is a finding of no effect to historic properties and no further actions are required". The T Plant Complex is eligible for listing on the National Register of Historic Places under criterion's A, B, and C, and has also been recommended by DOE and the Advisory Council on Historic Preservation (ACHP) for National Landmark Status.

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5.0 ENVIRONMENTAL IMPACTS

The following sections describe impacts from the proposed action.

5.1 MODIFICATION AND OPERATION IMPACTS

Impacts from the modification and operation activities are described in the following sections.

5.1.1 Soil or Subsurface Disturbance and the Consequences

It is not expected that any soil disturbances would occur.

5.1.2 Liquid Discharges to the Groundwater or Surface Waters and the Consequences

It is not expected that any liquid discharges would be made to the groundwater or surface waters.

5.1.3 Gaseous, Particulate, or Thermal Discharges to the Air and the Consequences

Small quantities of gaseous, particulate, or thermal discharges might occur from typical construction upgrade activities within the tunnel and canyon. Sources could include welding and indoor construction equipment. The containers stored in dry cells would remain with cover blocks in-place during upgrades and storage of the containers. Each container would be vented and particulate releases that may occur would be mitigated by capture in a NucFil®[2] filter before entering the ventilation system. The containers that might be stored under water in the pool cell would have a one way valve, which only allows gasses to vent directly to canyon air. The water would capture any potential particulates. Typical operation activities would not be affected greatly by the proposed action of K Basin sludge storage in the canyon.

All air effluents exhaust from the canyon through the HEPA filtered 291-T Stack. Under the proposed action, the 291-T Stack would become a 'major' stack, which requires T Plant Complex to meet the continuous monitoring requirements of 40 CFR 61.93. Continuous sampling using the existing stack sampling system in its current configuration would be resumed, along with NDA of the second stage of the HEPA filters is allowable as a 'major' stack, pursuant to WAC 246-247-075(4). This approach was agreed upon between WDOH and EPA during the December 5, 2000 RTAM meeting. A detailed description of this alternative method would be described in the radioactive air emissions NOC air permit application per WAC 246-247-110(9). The NOC would be approved by both WDOH and EPA before the proposed action would occur.

Only minor radionuclide contamination air releases through the HEPA filtered air system are expected. Under conditions that would be in effect, no substantial increases in overall emissions are envisioned from the proposed action.

[2] NucFil is a registered trademark of Nuclear Filter Technology, 741 Corporate Circle, Suite R, Golden, Colorado 80401, USA.

5.1.4 Radionuclide Releases or Direct Radiation Exposure and the Consequences

Any work in the T Plant Complex would be performed in compliance with as low as reasonably achievable (ALARA) principles, applicable federal and state regulations, and DOE Orders and guidelines. T Plant is monitored routinely for radiation levels, and radiation work permits would specify the radiological condition and any tunnel or canyon entry requirements. Personnel would be required to have appropriate training, wear appropriate personal protective equipment, adhere to ALARA principles, and follow established administrative controls. Extremely small radionuclide contamination releases, if any, are expected.

Personnel radiation protection during both upgrades and operation would be provided through the use of engineering controls and remote operations. The potential radiation received by personnel during the proposed action would be less than the typical exposure that occurs during current 221-T Building canyon cleanout of contaminated equipment operations and removal of the Shippingport fuel, because less contaminated material and radiation exposure would be present during the proposed action. Radiation exposures would be controlled administratively below DOE limits established in 10 CFR 835, "Occupational Radiation Protection" and the *Project Hanford Radiological Control Manual* (HNF-5173). Those limits require that individual radiation exposure be controlled below an annual total effective dose equivalent (TEDE) of 5 rem per year.

Construction Phase

During the majority of upgrade work, it is expected that no personnel would be on the canyon deck when cover blocks are removed from the process cells. Installation of the modular liner/rack systems and receiving or placing the containers in the cells would occur when the cover blocks are removed. Primarily four work areas of construction are anticipated at the T Plant Complex. The four work areas for the upgrade work would occur within the radiological contamination areas in the 221-T Building canyon, tunnel, process cells, and the 271-T Building office spaces (nonradiological area). Construction work in the canyon would be in a radiological zone and only would be performed by radiological trained construction personnel. Plant personnel would provide support only to the project from the standpoint of canyon access, crane operations, and would not be expected to be doing any direct construction work.

To bound the anticipated person hours needed to complete the upgrades within the canyon, the construction crew would be assumed to be an average size of 8 persons over the construction work period. The estimated personnel hours worked are very conservative until definitive design and final construction planning is complete.

General canyon work includes upgrade construction to support Type 1 container storage in the dry process cells and is planned for 90 days. Each work day conservatively would assume 4 hours of canyon work in a single work day. This equates to a total of 90 days times 8 persons times 4 hours per day = 2,880 person-hours or 360 hours per person. Upgrades to support Type 2 container storage in the pool cell or in dry process cells currently is scheduled at 180 work days. This equates to 180 times 8 persons times 4 hours per day = 5,760 person-hours or 720 hours per person. Hence, the total hours in the general canyon work area are anticipated to be 8,640 person-hours, or approximately 9,000 person-hours. Based on work in the canyon during the past few months, the radiological dose rate to canyon personnel is approximately 0.0002 rem per hour. For estimation of person-rem of dose exposure to personnel performing general canyon work, this equates to 0.0002 rem per hour times 9,000 person-hours = 1.8 person-rem.

Upgrades for tunnel work would entail modification to the helium purge system. Construction is not expected to exceed 15 work days. Each work day assumes four hours within the radiological area. This equates to 15 days times 8 persons times 4 hours per day = 480 person-hours, or 60 hours per person. Dose rate recently received by personnel in the tunnel has averaged about 0.0001 rem per hour. For estimation of person-rem of dose to personnel performing tunnel work, this equates to 0.0001 rem per hour times 480 person-hours = 0.048 person-rem.

Construction would occur in or near the dry process cells and possibly near the pool cell. This upgrade work is not expected to exceed ten days. Each work day would assume a maximum of 4 hours of cell work. This equates to 10 work days times 8 people times four hours a day = 320 person-hours, or 40 hours per person. A higher dose rate of about 0.0003 to 0.0005 rem per hour would be assumed for the work in close proximity to the cells as compared to the general canyon work. For estimation of person-rem of dose to personnel performing canyon work in close proximity to the cells, the conservative 0.0005 rem per hour was used. For estimation of dose exposure, this equate to 320 person-hours times 0.0005 rem per hour = 0.16 person-rem.

Fire systems would be upgraded in the 271-T Building. Since this work is in a nonradiological area, no dose to personnel is expected.

The bounding maximum estimated total collective dose estimate for all personnel doing canyon, cell, and tunnel upgrade work in the 221-T Building in support of the proposed action can be calculated by totaling the collective dose estimates for each portion of the canyon, cell, and tunnel work. This equates to 1.8 person-rem for general canyon work plus 0.16 person-rem for cell work plus 0.048 person-rem for tunnel work = about 2.0 person-rem. The average individual rem per person assuming 24 total radiological workers (8 per work area) would equate to about 2.0 person-rem and (8 workers times 3 work areas) = 0.08 rem per worker. This dose would be from direct exposure, as recent reports have indicated that there has not been any inhalation or skin contamination reported in the canyon or tunnel during the period from the third quarter in fiscal year 1998 until the last quarter fiscal year 2000.

Operations Phase

During operations the coverblocks would be in place over the cells and remain there during storage of the containers. The coverblocks are occasionally removed during storage for container water addition, weighing, or safeguards. These activities are designed for remote handling, with the strong possibility of the crane operator being the only personnel in the canyon. The crane operator sits inside a shielded crane cab, and has received less than 0.01 rem per year over the last two years from direct radiation exposure. It is not expected that the crane operator would incur a substantial amount of dose from the proposed action. The amount of work performed by operations in the canyon by personnel would occur only when the coverblocks are in place, or only by the crane operator.

Because the proposed action would involve only small radionuclide releases or direct radiation exposure during construction work upgrades and operational storage of sludge, and almost all operations activities would occur remotely, these impacts to the environment are expected to be small.

5.1.5 Nonhazardous Solid Waste Generated and the Consequences

It is expected that only small amounts of nonhazardous solid waste would be generated during the proposed action. The addition of nonhazardous waste into an onsite landfill would be small compared to the expected overall waste disposal capacity on the Hanford Site. In addition, other facilities would be expected to have adequate capacity to accept all other waste volumes from the proposed action. All nonhazardous waste would be disposed in accordance with applicable requirements. Therefore, these impacts to the environment are expected to be small.

5.1.6 Hazardous, Dangerous, or Radioactive Waste Generated and the Consequences

Small amounts of potential hazardous/dangerous/radioactive waste (e.g., minor construction materials) might be expected to be generated during upgrades and operation. This waste, if generated, would be managed and disposed in accordance with applicable federal and state regulations. Waste that might be generated from the proposed action is expected to be minimal compared to annual Hanford Site waste generation. Therefore, these impacts to the environment are not expected to be consequential.

5.1.7 Hazardous Substances Present and the Consequences

It is not expected that there would be any hazardous substances, other than radioactively contaminated material, present or expected to be present during construction and operation of the proposed action.

5.1.8 Disturbance to Previously Undeveloped Areas and the Consequences

All areas within the proposed action are previously disturbed areas within the T Plant Complex.

5.1.9 Consumption or Commitment of Nonrenewable Resources

Consumption of nonrenewable resources (e.g., steel, concrete, grout, etc.) would occur. None of the materials to be used are in short supply. The amount of consumption would be minimal and managed through acceptable procedures.

5.1.10 Effects on Federal or State Listed, Proposed or Candidate, Threatened or Endangered Species

No federal or state-listed, proposed, candidate, threatened, or endangered species are expected to be affected, because the proposed action would occur within the 221-T Building.

5.1.11 Effects on Cultural Resources

A Hanford Cultural Resources Review, HCRC #2001-200-006 (Appendix A) was conducted for the preferred alternative. The review concluded: "There is a finding of no effect to historic properties and no further actions are required". Therefore, no adverse impacts under the *National Historic Preservation Act of 1966* are expected.

5.1.12 Effects on any Floodplain or Wetland

The construction would not occur in a 100- or 500-year floodplain, nor within any area designated as a wetland.

5.1.13 Effects on any Wild and Scenic River, State or Federal Wildlife Refuge, or Specially Designated Area

The proposed action is outside any Wild and Scenic River corridor, state or federal wildlife refuge, or specially-designated area.

5.1.14 Reasonably Foreseeable Accidents Considered and the Effects

Construction Phase

The reasonably foreseeable accidents during the construction upgrades would be typical construction accidents. Nonradiological risks to workers from occupational illness or injury are based on statistics for DOE and DOE contractor experience (DOE 2000). The lost work day rate is 63 per 200,000 hours of construction work. The fatality rate is zero per 200,000 hours of work. About two lost work day and no fatalities would be expected during the construction upgrades. All construction personnel would follow approved T Plant Complex safety procedures for construction activities. There have been no lost workdays in the T Plant Complex over the last 2 years. Public health and safety would not be affected because the area is closed to the general public. Typical construction hazards would exist; however, the risk of severe accidents would be small.

Operations Phase

During container storage, operations would be similar to the current monitoring activities in the 221-T Building canyon, which are conducted under a DOE-approved T Plant Complex safety authorization basis and in conformance with recognized safety codes, regulations, and approved procedures. Administrative controls would be used to reduce the chance of accidents.

The preliminary hazard evaluation for the handling and storage of containers at the 221-T Building, documented in HNF-6527, *Hazard Evaluation for the Storage of Spent Nuclear Fuel Sludge at the Solid Waste Treatment Facility*, was performed using the hazards and operability analysis (HazOp) methodology. The HazOp study focused on hazardous conditions that could lead to exposure of personnel, co-located personnel, or the public to accidental releases of K Basin sludge. The information gathered during the HazOp was used to establish bounding accident types, to define a spectrum of potential accidents, and to support the assumptions used in the preliminary accident analysis (HNF-6625) *Preliminary Accident Analysis for Storage of K Basin Sludge in T Plant*.

Accidents specifically associated with the storage of containers at the 221-T Building canyon are analyzed in HNF-6625. This analysis identifies representative accidents that are judged to bound the potential accidents that could occur during the receipt, handling, and storage of the containers in the 221-T Building canyon and provides unit dose radiological and toxicological consequences for these accidents. HNF-7511, *Radiological and Toxicological Doses for Representative Accidents – Sludge Storage at T Plant*, provides estimated consequences for bounding sludge storage accidents based on the unit doses in HNF-6625.

The following section contains 'expected' and 'bounding' mitigated accident consequences for two selected representative accident scenarios identified in HNF-6625: Type 1 Container Failure Due to Impact (low consequence, high frequency) and Type 2 Container Failure Due to Hot Overpressure (high consequence, low frequency). 'Expected' consequences were estimated using 50-percentile meteorology by sector, while the "bounding" estimates used worst-case (99.5-percentile) meteorology as defined in *Atmospheric*

Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants (U. S. Nuclear Regulatory Guide 1.145). All radiological dose consequences provided are 50-year total effective dose equivalents (TEDE) in rems.

Type 1 Container Failure Due to Impact

The failure of one or more Type 1 containers because of impact could result from the drop of a process cell cover block into a cell containing sludge containers in a storage rack. This scenario assumes, as a worst case, that a cover block is dropped end first into a process cell containing a full rack of Type 1 containers such that eight of the sludge containers in dry storage are damaged. Each damaged container is assumed to immediately leak its complete sludge inventory onto the floor under the storage rack. Since no event that could result in failure of the canyon exhaust system as well as a cover block drop has been identified, credit is taken for the high-efficiency particulate air (HEPA) filtration in the canyon exhaust system. Because cell cover block drops have occurred on the Hanford Site, this accident initially has been assigned a frequency category of Anticipated (10^{-2} to 10^{-1}/year).

Table 1 provides expected and bounding radiological doses and toxicological (uranium oxide) concentrations in air resulting from this accident for several receptor locations (HNF-6625 and HNF-7511).

Table 1. Radiological Doses and Toxicological Concentrations for Type 1 Container Failure Due to Impact.

Receptor Location	Total Effective Dose Equivalent (rem)		Uranium Concentration in Air (mg/m^3)	
	Expected	Bounding	Expected	Bounding
Maximum onsite	3.45 E-06	1.99 E-05	5.80 E-08	3.35 E-07
Nearby facility	2.87 E-06	1.23 E-05	4.82 E-08	2.12 E-07
Maximum offsite	4.58 E-07	2.88 E-06	7.60 E-09	4.93 E-08
Onsite public (Columbia River Bank)	8.10 E-07	4.12 E-06	1.36 E-08	7.05 E-08
Onsite public (Highway 240)	1.40 E-06	5.95 E-06	2.36 E-03	1.02 E-07

The risk to the directly involved person (i.e., an individual in the immediate vicinity during a cover block drop) is highly dependent on the specific location of the person, meteorological conditions, and nature of the accident. Many of the routine activities in the 221-T Building canyon, including the movement of the cover blocks, are performed remotely, and personnel are generally not expected to be in the canyon during cover block movement. During canyon entry, personnel wear protective clothing and follow administrative controls in accordance with radiation work permits and hazardous materials permits. In the event of an inadvertent cover block drop, it is assumed that affected personnel would immediately evacuate the area, and, once at a safe distance, would move to a position according to T Plant procedures. Evacuation time to that location would be measured in minutes.

Collective dose to the offsite population was calculated using both 50% and 99.5% atmospheric dispersion parameters (HNF-7511). The collective offsite dose (without ingestion) to the population within approximately 80 kilometers (50 miles) from a filtered release resulting from the Type 1 container failure due to impact was calculated to be 3.6 E-03 person-rem (50% dispersion) and 3.0 E-02 person-rem (99.5% dispersion). Based on a dose-to-risk conversion factor of 5.0 E-4 latent cancer fatality per person-rem, these doses equate to 1.8 E-06 latent cancer fatalities (LCF) and 1.5 E-05 LCF, respectively.

Based on Table 1 and the temporary emergency exposure limits (TEEL) for uranium, airborne concentrations of uranium at all receptor locations are several orders of magnitude less than TEEL-0, below which most people would experience no appreciable risk of health effects. At a high probability of occurrence with a low consequence level, the onsite risk for the Type 1 container failure due to impact accident is low.

Type 2 Container Failure Due to Hot Over Pressure

Type 2 container failure due to hot over pressure could be caused by gas formation within the container or by an overheated condition of the sludge. Temperature increases within the container might result from either an unexpected degree of heating in a dry-stored container or from loss of water from the pool in the case of the pool-stored containers. In either case, the container vent also must become plugged for this accident to occur. In the bounding representative accident scenario, one Type 2 container is assumed to breach in air because of high internal pressure, leading to a flashing spray of the entire contents of the container. Based on the multiple failures that would have to occur to produce this accident, it has been assigned a frequency category of Unlikely (10^{-4} to 10^{-2}/year). Since no event that could result in failure of the canyon exhaust system as well as hot over pressure of a container has been identified, credit is taken for the high-efficiency particulate air (HEPA) filtration in the canyon exhaust system.

Table 2 provides expected and bounding radiological doses and toxicological (uranium oxide) concentrations in air resulting from this accident for several receptor locations (HNF-6625 and HNF-7511).

Table 2. Radiological Doses and Toxicological Concentrations for Type 2 Container Failure Due to Hot Over Pressure[1].

Receptor Location	Total Effective Dose Equivalent (rem)		Uranium Concentration in Air (mg/m^3)	
	Expected	Bounding	Expected	Bounding
Maximum onsite	2.53 E-03	1.45 E-02	5.80 E-05	3.34 E-04
Nearby facility	2.09 E-03	9.20 E-03	4.81 E-05	2.12 E-04
Maximum offsite	3.30 E-04	1.13 E-03	7.60 E-06	4.92 E-05
Onsite public (Columbia River Bank)	5.09 E-04	3.06 E-03	1.36 E-05	7.03 E-05
Onsite public (Highway 240)	1.03 E-03	4.44 E-03	2.35 E-05	1.02 E-04

As noted, many of the routine activities in the canyon are performed remotely, and the pool cell will be partially covered by cover blocks. In addition, personnel wear protective clothing and follow administrative controls in accordance with radiation work permits and hazardous materials permits. In the event of a spray release resulting from hot over pressurization of a Type 2 container, it is assumed that any personnel that might be in the work area immediately would evacuate the area, and, once at a safe distance, would move to a position according to T Plant procedures. Evacuation time to that location would be measured in minutes.

Collective dose to the offsite population was calculated using both 50% and 99.5% atmospheric dispersion parameters. The collective offsite dose (without ingestion) to the population within approximately 80 kilometers (50 miles) from a filtered release resulting from hot over pressurization of a Type 2 container was calculated to be 2.2 person-rem (50% dispersion) and 1.8 E+01 person-rem (99.5% dispersion) (HNF-7511). Based on a dose-to-risk conversion factor of 5.0 E-4, these doses equate to 1.1 E-03 LCF and 8.8 E-03 LCF, respectively.

Based on Table 2 and the TEELs for uranium, the airborne concentration of uranium at all receptor locations is less than TEEL-0. TEEL-0 represents the threshold concentration below which most people would experience no appreciable risk of health effects. At a low probability of occurrence with a high consequence level, the onsite risk acceptance for Type 2 container failure is low.

5.2 SOCIOECONOMIC IMPACTS

Based on the anticipated T Plant Complex upgrades with a total crew of between 8 and 24 personnel operating for a period of about 24 months, a temporary contractor most likely would hire the construction craft personnel from the local area. The existing operating crew at T Plant Complex already exists on the Hanford Site, so no additional newly hired personnel would be needed. In a community of over 165,000 persons with a workforce in excess of 8,000 persons on the Hanford Site, the socioeconomic impacts of this proposed action would be expected to be small. There would be no discernible impact to employment levels within Benton and Franklin counties. The proposed action would use existing operating and some construction personnel on the Hanford Site; therefore, the proposed action would have little, if any, socioeconomic impacts.

5.3 ENVIRONMENTAL JUSTICE IMPACTS

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", requires that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or socioeconomic effects of their programs and activities on minority and low-income populations. Minority populations and low income populations are present near the Hanford Site (PNNL-6415). The analysis of the impacts in this EA indicates that there would be minimal impacts to both the offsite population and potential workforce by implementing the proposed action. The offsite health impacts from the proposed action analyzed in this EA are expected to be minimal. Therefore, it is not expected that there would be any high and disproportionately adverse impacts to any minority or low-income portion of the community.

5.4 CUMULATIVE IMPACTS

In analyzing the impacts of the proposed action, increased radioactive dose, toxicological exposures, and potential accident scenarios to personnel would occur temporarily during the upgrades to T Plant Complex. Once in place, the sludge containers would remain below deck grade in canyon cells with coverage by thick cover blocks. Potential air releases from upgrade work and during storage would be captured by the HEPA filtered ventilation system before leaving the T Plant Complex through the permitted 291-T Stack. These air releases would be comparable to releases at the existing location of sludge for the no action, and would remain small.

All nonhazardous solid waste and hazardous or dangerous waste generated during the proposed action would be temporary and in small quantities, easily handled by existing storage or disposal methods on the Hanford Site. The proposed action is sited in a facility designed to contain radioactively contaminated materials and conduct remote handling operations similar to the K Basins sludge. T Plant Complex would more than adequately store the sludge in a more secure safety envelope than currently exists at K Basins. In addition, the location of the proposed action would benefit the environment because if potential releases occur, the releases would have less environmental impact because the releases would be further away from the Columbia River.

Because the proposed action would involve existing operations and construction personnel and a small crew of temporary construction personnel, little or no change is expected in the overall workforce on the Hanford Site or within Benton and Franklin counties. Operations within the T Plant Complex would be modified slightly, but change little because of the proposed action. There would be no adverse socioeconomic impacts or any high and disproportionately adverse impacts to any minority or low-income portion of the community. Because there are no foreseeable adverse impacts from this Proposed Action, there would be no substantial addition to Hanford Site cumulative impacts.

5.5 IMPACTS FROM ALTERNATIVES

Alternatives and the No Action Alternative are discussed in the following sections.

5.5.1 *Impacts of the No Action Alternative*

The No Action Alternative would involve continuing storage of sludge in the K Basins. This would result in expensive storage because of increased maintenance and repair costs, as well as a greater potential for sludge or radioactive materials to leak to the environment. In addition, dose exposures to personnel would be higher than the proposed action.

5.5.2 Impacts of Alternatives

The alternative to store the sludge in the existing DSTs in 200 East Area was analyzed. To store the sludge in the DSTs, a very expensive pretreatment facility would be required to be built to meet DST waste acceptance requirements. Increased criticality geometry concerns would have to be resolved. Extensive time delays and higher costs would be incurred under this alternative compared to the proposed action.

The impacts of the alternative to store the sludge in the WESF storage pools would be to package the sludge into containers small enough to fit through the 10 centimeter (4-inch) transfer ports, which would require core drilling or cutting through the highly contaminated concrete wall. 3,700 containers would be required to hold the smaller volume sludge containers, which substantially is more than the approximate 2,000 cesium and strontium capsules produced during all of the WESF operations. There is not enough space in the existing WESF storage pools to store the additional sludge containers.

The alternative to build a new sludge facility would cost much more and take longer than using the existing facility of the proposed action. The environmental impacts would be greater because of having to displace existing vegetation. In addition, a large construction force would be required to support this alternative.

The alternative to store sludge in the CSB would be incompatible with dry storage requirements in the CSB. Also, the storage of SNF in the CSB would leave insufficient capacity for storage of sludge in the current configuration of the CSB, which would require a substantial addition to the CSB.

The alternative of offsite storage would require greater costs and time delays to meet U.S. Department of Transportation packaging requirements, transportation costs, and greater storage expense, as well as greater transportation hazards and vehicle exhaust releases.

6.0 PERMITS AND REGULATORY REQUIREMENTS

It is the policy of the DOE to carry out its operations in compliance with all federal, state, and local laws and regulations; Presidential Executive Orders; DOE Orders; and DOE-RL Directives. The proposed action would follow pollution prevention requirements under *Executive Order 12856: Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements*. An air permit NOC per WAC 246-247-110(9), *Radiation – Air Emissions*, would be requested for approval from the WDOH and the EPA. Environmental regulatory authority over the Hanford Site is vested in federal and state agencies.

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7.0 ORGANIZATIONS CONSULTED

Before approval of this EA, a draft version will be sent for a 30 day review to the following:

- Nez Perce Tribe
- Confederated Tribes of the Umatilla Indian Reservation
- Yakama Indian Nation
- Confederated Tribes of the Colville Reservation
- Wanapum People
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- Advisory Council on Historic Preservation
- Washington State Departments of Ecology, Fish & Wildlife, and Health
- Washington State Historical Preservation Officer
- Oregon State Office of Energy
- Benton County
- Franklin County
- City of Pasco
- City of Richland
- City of West Richland
- Hanford Advisory Board
- Heart of America
- Physicians for Social Responsibility.

A draft version will be made available in the DOE reading room (Consolidated Information Center at Washington State University Tri-Cities), Richland Public Library, and placed on the Hanford Site Homepage (http://www.hanford.gov/#ea).

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8.0 REFERENCES

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APPENDIX A

CULTURAL RESOURCES REVIEW

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Pacific Northwest
National Laboratory
Operated by Battelle for the
U.S. Department of Energy

October 27, 2000

No Effect on Historic Property
SHPO Notification Required

Mr. Brett Barnes
Solid Waste Treatment Project
Flour Hanford Inc., T3-28
P. O. Box 100
Richland, Washington

Dear Mr. Barnes,

CULTURAL RESOURCES REVIEW FOR THE STORAGE OF K BASIN SLUDGE AT THE 221-T AND THE 271-T FACILITIES. HCRC#2001-200-006

Project Description

In response to your request received October 26, 2000, staff of the Hanford Cultural Resources Laboratory (HCRL) conducted a cultural resources review of the subject project located in the 200 West Area of the Hanford Site. According to the information that you supplied, the project will be modifying the 271-T and the 221-T Buildings to safely accept K-Basin sludge. The project is expected to store 50-70 cubic meters of sludge in approximately 120-200 new storage containers. Two different container types are expected:

1. Type 1 are 24 inches in diameter and 13 feet high. These will be stored on racks in the process cells.

2. Type 2 are10 inches in diameter and 13 feet high. These will be stored in Cell 2R in pool cells.

The anticipated upgrades currently foreseen for the sludge mission within 221-T and 271-T facilities are the following:

1. Install a new pool cover for Cell 2R. This is expected to include several new constructed cover blocks approximately two feet thick to cover half the pool cell and the other half to be metal grating. The metal grating is expected to be able to support 100 psf.

2. Install a new automatic sprinkler system throughout three floors of the 271-T building. This will include, installing new piping, pumps (if necessary), and sprinkler heads in the office spaces and hallways of 271-T. The pressure, flow and duration shall be adequate for the design of an ordinary hazard group 2 system in accordance with NFPA 13 including a hose stream allowance of 500 GPM.

3. Install a new fire alarm system in 221-T with automatic early detection, manual activation and alarm notifications throughout the unprotected areas of the Canyon.

902 Battelle Boulevard • P.O. Box 999 • Richland, WA 99352

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Brett Barnes
October 26, 2000
Page 2

4. Install a dry manual Class 3 dry standpipe system in 221-T. The system will be manually activated and will run the length of the canyon. The standpipes will not include hoses or hose cabinets.

5. Install new cell liners and rack system, sump pumps and leak detectors, including the possibility for new self-leveling concrete floors to four existing process cells. In addition a new liner/rack system will be installed in the pool cell (2R). Existing water conditioning systems (coolers, IX columns, etc.) may be modified or removed.

6. Install a new radiation monitor on the Helium Purge System previously installed under the Shipping Port Project. This monitor will verify the absence of radiation during a purge of the shipping cask upon arrival at T-Plant, and verify the absence of a container leak.

7. Install new door locks in the 221-T Canyon in accordance with Safeguards and Security Requirements. Develop a new fixed volume remote operated (by crane) water addition system for occasionally adding water to the Type 1 storage containers in the dry process cells (not cell 2R) over its storage life.

Notifications and Records and Literature Review

On October 26, 2000:

- Per 36 CFR 800, the State Historic Preservation Officer was notified of this cultural resources review request and the Area of Project Effect (APE). The APE was defined as the 221-T and 271-T plants and the surrounding buildings that comprise T-Plant facilities that are contributing properties within the Hanford Site Manhattan Project/Cold War Era Historic District.

The U. S. Department of Energy has concluded that the 221-T and 271-T facilities are eligible for inclusion in the National Register of Historic Places (Register) under criterion A as contributing properties recommended for individual documentation within the Hanford Site Manhattan Project and Cold War Era Historic District (District) as stipulated in Appendix C, **Table 5** of the Programmatic Agreement (PA) for the Maintenance, Deactivation, Alteration, and Demolition of the Built Environment on the Hanford Site, Washington, (DOE/RL-96-77). The 221-T Building also called T-Plant was constructed in 1943 to separate plutonium out for use in the atomic bomb. The 271-T Office Building also called the Chemical Preparation and Services Building is attached to the 221-T Building. It was constructed in 1943 to house chemical make-up areas, sampling, and instrumentation facilities for the fresh chemicals going into the T-Plant to be used in facility's bismuth radiochemical process.

Findings and Actions Required

It is the finding of HCRL that of the seven listed modifications, items numbered 2, 3, 4, 6, and 7 are considered to be exempt from the requirement for review pursuant to the Programmatic Agreement (PA) under Exemption III.B.7 Security and Personal Safety Systems. Each of those items is a necessary upgrade to ensure safe storage of the K Basin sludge. Items numbered 1 and 5 **will not affect the characteristics of the 221-T and 271-T Buildings that make them eligible to the National Register of Historic Places.** There is a finding of no effect to historic properties and no further actions are required.

Pursuant to Section IV.D. of the PA, the Site Preservation Officer (SPO), Dee Lloyd, will submit official notification to the SHPO of our findings.

Brett Barnes
October 26, 2000
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This project is a Class VI case, defined as a project which involves demolition or remodeling of existing structures. If you have any questions, please call me at 376-4626. Please use the HCRC# above for any future correspondence concerning this project.

Very truly yours,

Ellen Prendergast
Scientist
Cultural Resources Project

Concurrence: ____________________
D. C. Stapp, Project Manager
Cultural Resources Project

Review and Concurrence: ____________________
D. W. Lloyd, Site Preservation Officer
DOE, Richland Operations Office

cc: D. W. Lloyd, RL (2)
G. D. Cummins, A1-14
K. R. Welsch, G1-30
Environmental Portal A3-01
File/LB

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