Engineering Evaluation/ Cost Analysis (EE/CA) for Decommissioning of TAN-607A

July 2006

Idaho Cleanup Project

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July 2006

Idaho Cleanup Project
Idaho Falls, Idaho 83415

Prepared for the
U.S. Department of Energy
Assistant Secretary for Environmental Management
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EXECUTIVE SUMMARY

Test Area North (TAN)-607, the Technical Support Facility, is located at the north end of the Idaho National Laboratory (INL) in an area known as TAN. This area was established to support nuclear-powered aircraft research. Upon termination of this research, TAN facilities were converted to support a variety of other U.S. Department of Energy Idaho Operations Office (DOE-ID) sponsored projects related to reactor research. TAN-607 was constructed from 1955 to 1957 and was equipped with office and administration areas, manufacturing and maintenance areas, a storage pool, shielded work areas, overhead cranes, decontamination areas, and high bays. The southern portion of TAN-607 contains the manufacturing and maintenance areas, administration areas, the decontamination areas, and the high bays, and is referred to as TAN-607A.

DOE-ID is proposing to decommission TAN-607A (the southern section of the TAN-607 Facility), under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) nontime critical removal action. The scope of the proposed removal action is limited to TAN-607A because the remainder of the TAN-607 facility is currently being evaluated for a potential future mission. This engineering evaluation/cost analysis (EE/CA) has been prepared to assist DOE-ID in identifying the most effective method for performing the decommissioning of the TAN-607A portion of the facility since, despite significant efforts by the U.S. Department of Energy (DOE) to secure new business, no future mission has been identified. In addition, TAN-607 is designated as a Signature Property by DOE Headquarters. As such, public participation is required to determine the final disposition of the facility. The nontime critical removal action approach provides for stakeholder involvement, while providing a framework for selection of the decommissioning end state. Finally, this process will allow disposing of the material as CERCLA generated waste.

This EE/CA has been developed in accordance with CERCLA as amended by the Superfund Amendments and Reauthorization Act of 1986 and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulations [CFR] Part 300). This EE/CA is consistent with the remedial action objectives of the *Final Record of Decision, Test Area North, Operable Unit 1-10* (DOE/ID-10682) and supports the overall remediation goals established through the Federal Facility Agreement and Consent Order for Waste Area Group (WAG) 1. WAG 1 is located at TAN. The decommissioning action will place TAN-607A in a final configuration that remains protective of human health and the environment. Preparation of this EE/CA is consistent with the joint DOE and U.S. Environmental Protection Agency *Policy on Decommissioning of Department of Energy Facilities Under Comprehensive Environmental Response, Compensation, and Liability Act* (DOE and EPA 1995), which establishes the CERCLA nontime critical removal action process as an approach for decommissioning.

DOE-ID has developed two alternatives for decommissioning TAN-607A. The alternatives are summarized as follows:

- **Alternative 1 – Complete Removal:** Alternative 1 consists of removing TAN-607A aboveground structures and components, removing below ground components such as sumps and trenches, removing structural walls to 3 feet below grade, removing residual radiological and nonradiological contamination, and filling the void to grade with clean solid inert material. In addition, three CERCLA sites (TSF-42, TSF-52, and TSF-54) will be remediated under this alternative if possible. If the nature and extent of contamination of these CERCLA sites is greater than the footprint to be remediated, follow-on remedial actions will be addressed under the Federal Facility Agreement/Consent Order (FFA/CO).

- **Alternative 2 – No Action:** Alternative 2 requires no action and will leave the building in a cold, dark, and dry condition. In this condition, the TAN-607A facility will require surveillance and maintenance until a later date when decommission actions would be complete. Under this alternative, the residual radiological and nonradiological contamination will remain in the concrete floor slab and sumps in the building floor. CERCLA sites TSF-42, TSF-52, and TFS-54 will be addressed solely under the terms of the FFA/CO.

A No Action alternative without any long-term surveillance and maintenance was considered but not included for detailed evaluation in this EE/CA. Since residual nonradiological and radiological contamination exists in TAN-607A, under a No Action alternative DOE would still maintain limited surveillance and maintenance throughout the Institutional Control period (until 2095).

Currently residual PCB contamination beneath the slab in the decontamination shop presents an unacceptable risk to human health under a future residential use scenario. In addition, localized hotspots of radionuclide contamination and other compounds, such as mercury and trichloroethene, exceed EPA screening criteria. Alternative 1 will best address the risk posed by these contaminants since this alternative involves the removal of the structures, components, and any residual contamination. Alternative 2, which is a no action monitoring alternative, does not involve the removal any of the contamination.

This EE/CA will become part of the INL Administrative Record and is being made available for public comment. Following public review and comment, an Action Memorandum will be written that documents the selection of the alternative that is identified in this EE/CA.

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TABLES

ACRONYMS

ACHP	Advisory Council on Historic Preservation
ANPP	Aircraft Nuclear Propulsion Program
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cpm	counts per minute
D&D	Decommissioning and Demolition
DEQ	Idaho Department of Environmental Quality
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
dpm	disintegrations per minute
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
HQ	Hazard Quotient
HWMA	Hazardous Waste Management Act
ICDF	Idaho CERCLA Disposal Facility
IDAPA	Idaho Administrative Procedures Act
IET	Initial Engine Test
INEEL	Idaho National Engineering and Environmental Laboratory
INL	Idaho National Laboratory
LOFT	Loss-of-Fluid Test
MOA	Memorandum of Agreement
NMSWLF	Non-Municipal Solid Waste Landfill
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
ppm	parts per million
PREPP	Process Experimental Pilot Plant
PRG	Preliminary Remediation Goals
RACM	regulated asbestos containing material
RCRA	Resource Conservation Recovery Act
ROD	Record of Decision
SHPO	Idaho State Historic Preservation Office
Sr	Strontium
TAN	Test Area North
TSCA	Toxic Substances Control Act
TSF	Technical Support Facility

U.S.	United States
VCO	Voluntary Consent Order

Engineering Evaluation/ Cost Analysis (EE/CA) for Decommissioning of TAN-607A

1. INTRODUCTION

This engineering evaluation/cost analysis (EE/CA) has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (40 Code of Federal Regulation [CFR] Part 300). This EE/CA assists the U.S. Department of Energy Idaho Operations Office (DOE-ID) in identifying the preferred decommissioning alternative for TAN-607A. DOE-ID is proposing to decommission TAN-607A, under a CERCLA nontime critical removal action. Under a CERCLA nontime critical removal action, a removal action can be taken to abate, prevent, minimize, stabilize, mitigate, or reduce the release or threat of release of contaminants. The nontime critical removal action approach facilitates stakeholder involvement while providing a framework for evaluating and selecting the decommissioning end state for TAN-607A. This EE/CA identifies the objectives of the nontime critical removal action and analyzes the effectiveness, implementability, and cost of decommissioning alternatives that satisfy these objectives.

TAN-607, the Technical Support Facility (TSF), is located at the north end of the Idaho National Laboratory (INL) in an area known as Test Area North (TAN). This area was established to support nuclear-powered aircraft research. Upon termination of this research, TAN facilities were converted to support a variety of other DOE-ID sponsored projects related to reactor research. TAN-607 was constructed from 1955 to 1957 and was equipped with office and administration areas, manufacturing and maintenance areas, a storage pool, shielded work areas, overhead cranes, decontamination areas, and high bays. The southern portion of TAN-607 contains the manufacturing and maintenance areas, administration areas, the decontamination areas, and the high bays, and is referred to as TAN-607A. The scope of the proposed removal action is limited to TAN-607A because the remainder of the TAN-607 facility is currently being evaluated for a potential future mission. If a future mission is not identified, a separate EE/CA will be developed to select the end state for the remainder of TAN-607.

Limited deactivation and decontamination activities are currently being performed in TAN-607A. This includes asbestos abatement, decontamination of accessible above grade radioactively contaminated structures, and utility isolation. Two Hazardous Waste Management Act/Resource Conservation and Recovery Act (HWMA/RCRA) interim status units that were located in TAN-607A were closed in 2000. These two interim status units were the Process Experimental Pilot Plant (PREPP) incineration unit and the PREPP waste stabilization unit. In 2006, a third HWMA/RCRA closure in TAN-607A was completed for a sump and associated piping in the decontamination room.

The U.S. Department of Energy (DOE) will issue an action memorandum to document alternative selection. Decommissioning activities will commence in accordance with the approach specified in the alternative selected in the action memorandum. The selected alternative will ensure that TAN-607A will be placed in a configuration that is protective of human health and the environment. The removal action will be consistent with the joint DOE and U.S. Environmental Protection Agency (EPA) *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive Environmental Response, Compensation and Liability Act* (DOE and EPA 1995), which supports use of the CERCLA nontime critical removal action process as an approach for decommissioning.

DOE-ID has developed two alternatives for the decommissioning of TAN-607A. The alternatives are summarized as follows and are discussed in greater detail in Section 4.

- **Alternative 1 – Complete Removal:** Alternative 1 consists of removing TAN-607A aboveground structures and components, removing below ground components such as sumps and trenches, removing structural walls to 3 feet below grade, removing residual radiological and nonradiological contamination, and filling the void to grade with clean solid inert material. In addition, three CERCLA sites (TSF-42, TSF-52, and TSF-54) will be remediated under this alternative, if possible. If the nature and extent of contamination of these CERCLA sites is greater than the footprint to be remediated, follow-on remedial actions will be addressed under the Federal Facility Agreement/Consent Order (FFA/CO).

- **Alternative 2 – No Action:** Alternative 2 requires no action and will leave the building in a cold, dark, and dry condition. In this condition the TAN-607A facility will require surveillance and maintenance until a later date when decommission actions would be complete. Under this alternative, the residual radiological and nonradiological contamination will remain in the concrete floor slab and sumps in the building floor. CERCLA sites TSF-42, TSF-52, and TSF-54 will be addressed solely under the terms of the FFA/CO.

A No Action alternative without any long-term surveillance and maintenance was considered but not included for detailed evaluation in this EE/CA. Since residual nonradiological and radiological contamination exists in TAN-607A, under a No Action alternative DOE would still maintain limited surveillance and maintenance throughout the Institutional Control period (until 2095).

Currently residual PCB contamination beneath the slab in the decontamination shop presents an unacceptable risk to human health under a future residential use scenario. In addition, localized hotspots of radionuclide contamination and other compounds, such as mercury and trichloroethene, exceed EPA screening criteria. Alternative 1 will best address the risk posed by these contaminants since this alternative involves the removal of the structures, components, and any residual contamination. Alternative 2, which is a no action monitoring alternative, does not involve the removal any of the contamination.

2. SITE CHARACTERIZATION

This section provides a brief summation of available information that characterizes TAN-607A. In particular, this section addresses the site description and background of INL and TAN, previous and ongoing closure and cleanup actions at TAN-607A, deactivation activities at TAN-607A that are currently underway, a summary of the radiological and nonradiological characterization of TAN-607A, and the streamlined risk assessment associated with the alternatives.

2.1 Site Description and Background

2.1.1 Idaho National Laboratory Site

The INL Site is an 890-square mile DOE facility located on the Eastern Snake River Plain in southeastern Idaho. DOE-ID controls the land within the INL site, and public access is restricted to public highways, DOE-ID sponsored tours, special-use permits, and the Experimental Breeder Reactor-I National Historic Landmark. DOE-ID also accommodates Shoshone-Bannock tribal member access to specific areas on the INL Site for cultural and religious purposes.

The INL Site consists of several facility areas situated on an expanse of otherwise undeveloped, cool-desert terrain. Buildings and structures at the INL Site are clustered within those facility areas, which are typically less than a square mile in size and separated from each other by miles of primarily undeveloped land. TAN is located at the north end of the INL Site about 27 miles northeast of the Central Facilities Area (see Figure 1).

Population centers in the region include large towns in Idaho (>10,000 residents) such as Idaho Falls, Pocatello, Rexburg, and Blackfoot, which are located several miles to the east and south, and several smaller towns (<10,000) located around the Site such as Arco, Howe, and Atomic City. Yellowstone and Grand Teton National Parks and Jackson Hole, Wyoming, are located less than 60 miles to the northeast. No permanent residents reside on the INL Site.

2.1.2 Test Area North Area

TAN is the most northerly group of facilities on the INL Site. The facilities were largely constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program (ANPP). Upon termination of this research, TAN structures were converted to support a variety of DOE-ID research projects. TAN encompassed several facilities including the TSF, the Initial Engine Test (IET) Facility, Lost-of-Fluid Test Facility (LOFT), Specific Manufacturing Capability (SMC) Facility, and the Water Reactor Research Test (WRRTF) Facility. The IET and WRRTF have previously been completely demolished. LOFT is currently completing decommissioning under a separate EE/CA. SMC supports activities for the Department of the Army and is currently operational. Several decommissioning activities are being completed at the TSF.

2.1.3 TAN-607

TAN-607, also known as TSF was constructed between 1955 and 1956 as an integral part of the ANPP Program. The original portion of TAN-607 (the northern most section) included the storage pool, hot shop, warm shop, locomotive pit, special services cubicle, special equipment service room, mechanical shop and carpentry shop. This portion of TAN-607 is currently being evaluated for a potential future mission. If a future mission is not identified, a separate EE/CA will be developed to select the end state for the remainder of TAN-607.

2.1.4 TAN-607A

The southern portion of TAN-607, referred to as TAN-607A, is an expansion to the original building and was added in 1957. TAN-607A served as the ANPP's main decontamination center. This area included the engine maintenance and large machine shops; high bay assembly shop; chemical cleaning (decontamination) room; and office/administrative areas on the second floor (east side of TAN-607A). See Figure 2 for an exterior view of building. In 1983-84, a portion of the area within TAN-607A was redesigned to support the PREPP project. PREPP's mission was to demonstrate a full-scale method for processing transuranic waste into an acceptable form for disposal in the Waste Isolation Pilot Plant (*Historical American Engineering Record, Idaho National Engineering and Environmental Laboratory, Test Area North*, HAER NO. ID-33-E). However, PREPP never treated actual waste and was HWMA/RCRA closed in 2000.

The plan view of the portion of TAN-607A that is being addressed under this EE/CA is shown in Figure 3 as the unshaded area. TAN-607A is built on a concrete slab at grade. The only below grade portions in TAN-607A are the decontamination room sump, cask pit sump, assembly pit, sand blast pit, and the bed plate. Second story portions of TAN-607A include the office/administrative areas and the second floor added to support the PREPP project.

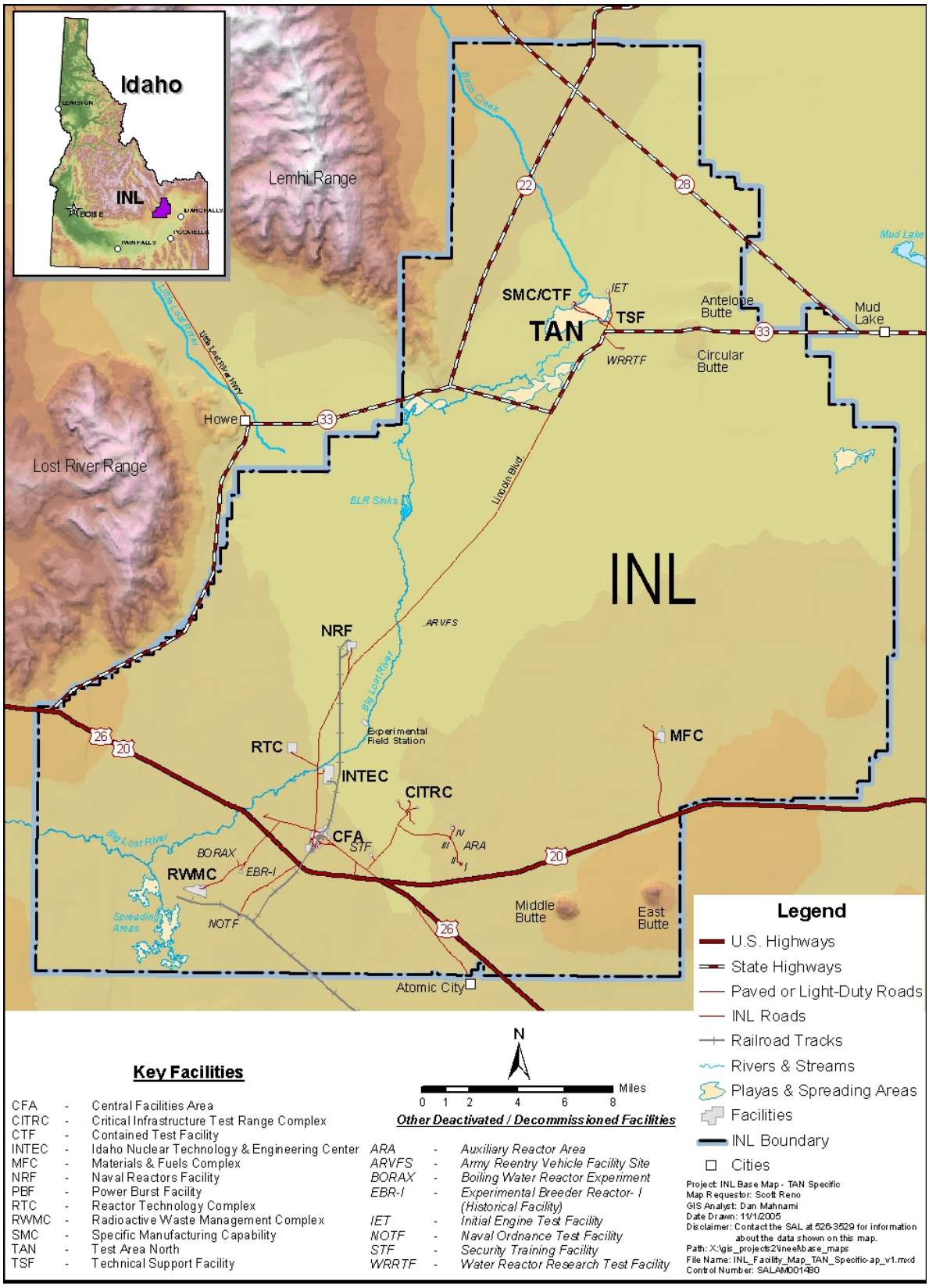

Figure 1. Idaho National Laboratory.

Figure 2. TAN-607A exterior (looking northeast).

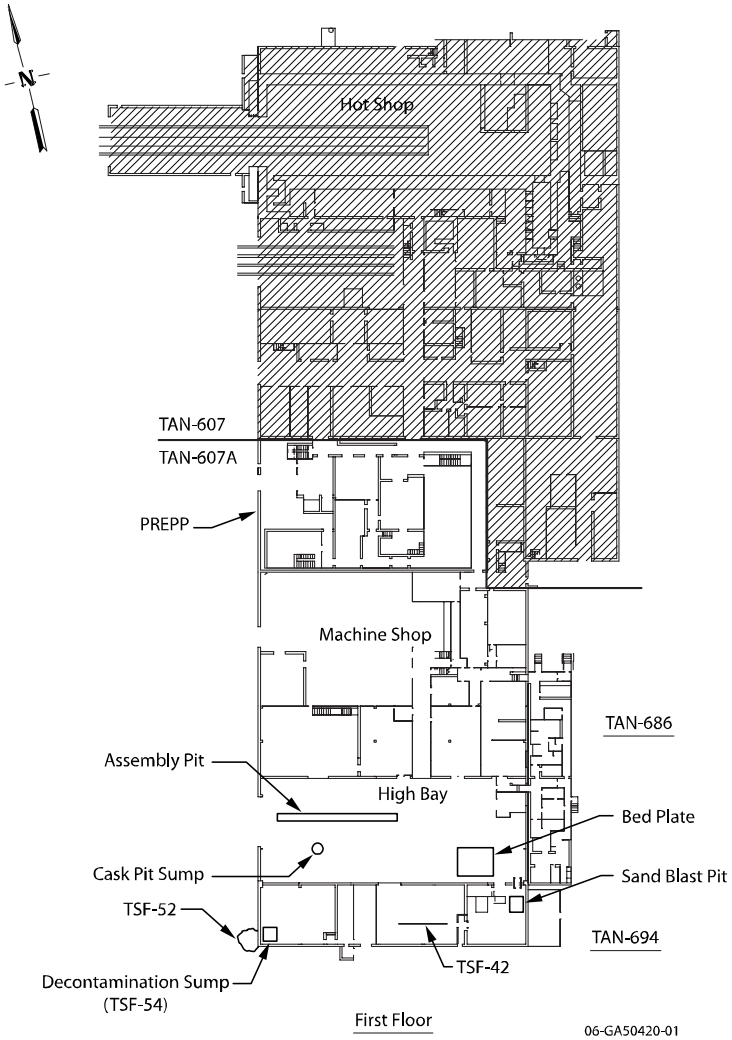

Figure 3. TAN-607A interior view.

2.2 Previous Closure/Cleanup Activities at TAN-607A

Recent CERCLA activities at TAN have been focused predominantly at the TSF area, which is where TAN-607A is located. In addition, over the last 2 years, 32 buildings and structures have been decommissioned at the TSF and at the LOFT facility along with the completion of several HWMA/RCRA closure activities.

2.2.1 CERCLA Activities

CERCLA remedial actions have occurred or will occur in accordance with the *Final Record of Decision, Test Area North, Operable Unit 1-10* (DOE/ID-10682) (ROD). These CERCLA remedial actions are addressed as follows:

- V-Tanks (TSF-09 and TSF-18)—This action is scheduled for completion during the summer of 2006.
- PM-2A Tanks (TSF-26)—This action was completed during the summer of 2005.
- Soil Contamination Area South of the Turntable (TSF-06, Area B)—This action was completed during the summer of 2004.
- Disposal Pond (TSF-07)—This action is on-hold as long as TAN-607 is operational.
- Burn Pits (TSF-03 and WRRTF-01)—This action was completed during the summer and fall of 2004.
- Fuel Leak (WRRTF-13)—This action was completed during the summer of 2004.

As noted above, some CERCLA remediations have been completed (e.g., the PM-2A Tanks, Burn Pits, etc.) while others are still ongoing. The V-Tanks are currently undergoing remediation. For two sites, the TSF Injection Well (TSF-05) and the Contaminated Ground Water Beneath TSF (TSF-23), the CERCLA remedial action is being implemented under the Operable Unit 1-07B ROD.

One existing CERCLA site (TSF-42) and two new sites (TSF-52 and TSF-54) are beneath or adjacent to TAN-607A. These sites will be remediated under this EE/CA, if feasible. If the extent of the contamination is greater than the footprint to be remediated, then follow-on actions will be addressed under the terms of the FFA/CO.

2.2.2 HWMA/RCRA Interim Status Closure Activities

Two interim status units were closed in compliance with the HWMA/RCRA. The two units were the PREPP incinerator and the waste stabilization unit. The closure was performed in compliance with the *Hazardous Waste Management Act Closure Plan for the Process Experimental Pilot Plant Incinerator and Waste Stabilization Units* (DOE/ID-10525, January 1999, Rev. 1). Closure actions were performed during 1999 and certification was obtained in March 2000.

PREPP was designed and constructed to demonstrate a full-scale method for processing transuranic waste into an acceptable form for disposal in the Waste Isolation Pilot Plant. A single campaign using circuit boards containing characteristic metals was completed. No radionuclides were processed through the PREPP.

HWMA/RCRA closure activities included cleaning treatment process equipment identified for reuse and auxiliary equipment not part of the treatment process, and removing scrap metal for reuse and recycling. PREPP facility walls and floors were cleaned by vacuuming, mopping, or wiping. The hazardous waste, consisting of unusable and/or contaminated equipment, was sent offsite for disposal.

2.2.3 Voluntary Consent Order HWMA/RCRA Closure Activities

Voluntary Consent Order (VCO) actions have been implemented to ensure compliance with HWMA/RCRA regulations. The VCO is a consent order between the DOE-ID and Idaho Department of Environmental Quality (DEQ) to address potential HWMA/RCRA waste issues. These VCO HWMA/RCRA closure actions were closing a sump located in the Decontamination Room (see Figure 3) and associated pump and piping as documented in *HWMA/RCRA Closure Plan for the TAN/TSF Intermediate-Level Radioactive Waste Management System, Phase I: Treatment Subsystem (TAN-616)*, (DOE/ID-11021, January 2004). Closure actions were performed during 2005 and closure certification was obtained in November 2005. DEQ approved the closure certification on March 2, 2006.

Closure activities for the piping included removing the piping, rinsing, and cleaning (decontamination). Closure activities for the sump included removing the sump pump, equipment, and waste residuals; stripping paint from the liner; removing stained areas or areas with elevated radiation levels; and inspecting the liner and underlying concrete. The initial closure actions for the sump were not completely successful at removing all residual contamination from the sump, so the stainless steel liner and much of the underlying grout and concrete, including the sump floor were removed. Where structural walls of the building were located around the sump, scabbling of the walls was performed. HWMA/RCRA closure-generated waste was dispositioned as outlined in the closure plan. Following removal of the sump liner and underlying concrete, soil sampling was completed. The sump was backfilled and a cover was placed over the soils for future identification. Because of the unacceptable risk posed by the contamination beneath the sump, a New Site Identification Form was completed and approved by DOE-ID, EPA, and DEQ, which is identified as TSF-54. This residual contamination is further addressed in Section 2.4 below.

2.3 Cleanup Activities Currently Ongoing at TAN-607A

Currently, deactivation actions are being performed. The actions include asbestos abatement, utility isolation, and decontamination, removing the radiologically-contaminated ventilation system, and sampling and removing the radiologically contaminated filter banks. All potential HWMA/RCRA and Toxic Substance Control Act (TSCA) materials are also being removed. This includes, but is not limited to, lead, circuit boards, mercury switches, ballasts, and fluorescent tubes. These materials will be characterized and dispositioned per appropriate regulatory requirements as they are removed. In the decontamination room, the high-efficiency particulate air (HEPA) filters were removed from the banks and managed appropriately.

2.4 Extent of Contamination and Remaining Inventories

2.4.1 Remaining Radionuclide Inventory

Extensive surveys performed to date show little or no removable surface contamination in TAN-607A. Removable surface radiological contamination is confined to the decontamination room and some of the sumps in TAN-607A. An elevation drawing showing the first floor slab area of TAN-607A, including the sumps and pits associated with TAN-607A is shown in Figure 4.

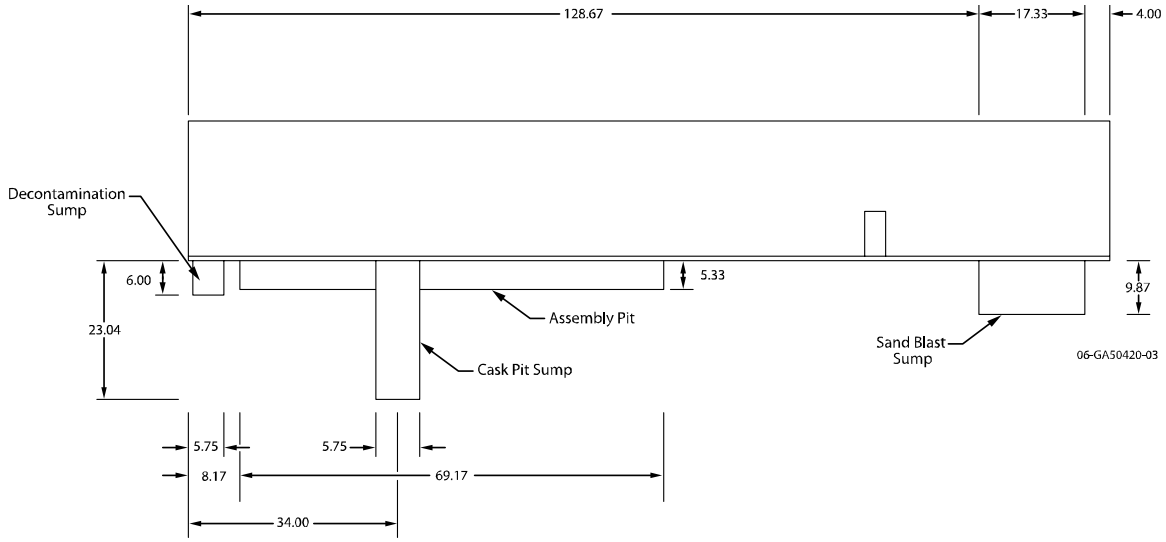

Figure 4. TAN-607A elevation view showing sumps and pits (looking north).

To determine the radiological source term for the TAN-607A slab, in-situ gamma spectroscopy measurements were taken from 70 locations. In addition, historical sampling and analytical data were used for those radiological isotopes that can not be measured by gamma spectroscopy. The radiological inventory for the slab at TAN-607A was determined as described in *TAN-607A Maintenance & Assembly Area Slab Radiological Status, April 2006* (EDF-6900). Key assumptions in determining the radiological characterization are:

- A majority of the radiological activity in the TAN-607A slab is fixed in paint or sealed in grout or concrete.

- Some residual radiological contamination is above the concrete floor slab. However, that contribution is not included as part of the radiological source term since under Alternative 1 it will be removed, and under Alternative 2 the above grade radiological contamination would be removed as part of deactivation and would not remain long term.

- Residual radiological contamination exists in several inaccessible areas in TAN-607A such as drains and piping or sumps grouted under or in the concrete slab. The in-situ gamma spectroscopy characterization included several biased measurements near drains or sumps to provide an estimate of the radiological inventory in these inaccessible areas.

- Soil samples were collected and analyzed after the stainless steel liner and concrete were removed from the TAN-607A decontamination room sump in accordance with the HWMA/RCRA Closure Plan. The analytical data indicates elevated radionuclide concentrations of Cesium-137 ranging from 55 pCi/g to 12,100 pCi/g.

- In-situ gamma spectroscopy measurements were used since the radiological isotopes present in TAN-607A are known and supported by samples spanning the life of the facility. This allows for identifying radiological contamination at depth, and using conservative assumptions allows the generation of bounding estimates of the radiological inventory.

- The TAN-607A slab thickness is 8 in. and in some areas there is additional concrete, such as in the Assembly Pit in the High Bay. All concrete is assumed to be radiologically contaminated to the level estimated for the first 6 in.

- The primary isotopes based on historical information are: depleted uranium (U-238), the fission product Cesium 137, and the activation product Cobalt 60. These isotopes all have characteristic gamma rays that can be readily identified by gamma spectroscopy.

- Historical sampling and analytical data from previous characterization activities were used for those radiological isotopes that cannot be measured by gamma spectroscopy. This historical radiological isotopic information was added as a percentage to the total curies identified by gamma spectroscopy, which derives a total TAN-607A slab radioactive inventory as listed in Table 1. The current (2006) radiological inventory is .042 curies and the activity for 2095, following radioactive decay, is .014 curies. The inventory for 2095 is included since that is currently the date assumed for loss of DOE-ID institutional control of the TAN area.

Table 1. Year 2006 current inventory and 2095 decayed maximum TAN-607A slab inventory.

Isotope	Current Fractional Abundance	Half-life (yrs)	Current (April 2006) Inventory (curies)	2095 Inventory (curies)
Co-60	1.84×10^{-02}	5.27	7.99×10^{-04}	6.60×10^{-09}
Cs-137	5.90×10^{-01}	30.07	2.58×10^{-02}	3.32×10^{-03}
C-14	8.55×10^{-06}	5715	3.63×10^{-07}	3.59×10^{-07}
H-3	2.82×10^{-03}	12.32	1.20×10^{-04}	8.02×10^{-07}
I-129	5.13×10^{-05}	1.57×10^{07}	2.18×10^{-07}	2.18×10^{-07}
Np-237	2.57×10^{-07}	2.14×10^{06}	1.09×10^{-08}	1.09×10^{-08}
Pu-239	3.08×10^{-04}	2.41×10^{04}	1.31×10^{-05}	1.30×10^{-05}
Sr-90	1.41×10^{-01}	28.78	5.99×10^{-03}	7.03×10^{-04}
Tc-99	4.28×10^{-05}	2.13×10^{05}	1.82×10^{-06}	1.81×10^{-06}
U-234/235	2.57×10^{-04}	2.46×10^{05}	1.09×10^{-05}	1.09×10^{-06}
U-238	2.47×10^{-01}	4.47×10^{09}	9.68×10^{-03}	9.68×10^{-03}
Total	1.00		4.24×10^{-02}	1.37×10^{-02}

The maximum dose rate in TAN-607A is 0.100 mR/hour, which is localized to a relatively small area of TAN-607A. This localized area is less than 2,000 square feet surface area with a total volume of concrete less than 10% of the total. For comparison, the natural background radiological dose rate at the INL North Gate is 0.013 mR/hour.

2.4.2 Remaining Nonradionuclide Inventory

Based on previous characterization and ongoing deactivation activities, the known nonradionuclide inventory in TAN-607A is confined to the decontamination room sump in the southwest portion of the building. The 600-gallon sump that measures 1.2 m (4 ft) by 1.2 m (4 ft) by 1.6 m (5 ft) in depth was HWMA/RCRA closed in 2005. Samples of soils were collected from beneath the TAN-607A decontamination room sump to evaluate the potential for release of contaminants because the integrity of the sump structure could not be confirmed. The list of nonradiological contaminants detected in the soil beneath TAN-607A decontamination room sump is shown in Table 2.

For comparison purposes, the contaminants identified in Table 2 are compared against EPA Region 9 Preliminary Remediation Goals (PRG). Region 9 PRGs are risk-based tools for evaluating and cleaning up contaminated sites. They are used to streamline and standardize all stages of the risk decision-making process. PRGs should be viewed as agency guidelines, not legally enforceable standards. The PRGs combine current human health toxicity values with standard exposure factors to conservatively estimate contaminant concentrations in environmental media (soil, air, and water) that are considered by the agency to be health protective of human exposures (including sensitive groups), over a lifetime. Chemical concentrations above these levels would not automatically trigger a response action. However, exceeding a PRG suggests that further evaluation of the potential risks that may be posed by site contaminants is appropriate.

The decontamination sump was backfilled and a cover was placed over the soils. As required in the HWMA/RCRA closure plan for the decontamination room sump, a risk assessment was performed to determine if the residual contamination posed an unacceptable risk that requires further actions. The risk assessment identified an unacceptable risk and, therefore, the area was identified and included in the FFA/CO for future CERCLA actions. This site is identified as CERCLA site TSF-54. This site will be remediated under this EE/CA, if the preferred alternative is selected. If TSF-54 can not be adequately remediated under this EE/CA, it will be addressed under the FFA/CO.

CERCLA site TSF-52 is located outside the decontamination room door on the west side of the southwest corner of TAN-607A. The site was discovered while completing the HWMA/RCRA closure activities for the decontamination room as previously discussed. Radiological surveys of the soil under the asphalt revealed radiation levels at varying degrees of contamination with the highest at 40,000 cpm (400,000 dpm) in the soil. Historical information indicated that there was at least one release from the firewater system in the decontamination room. The firewater system is located next to the overhead door and the falling water could have easily leaked under the door, resulting in the soil contamination observed during excavation. The agencies agreed that this is a release site to soils that should be addressed under the FFA/CO. The site has not been completely characterized for nonradiological contaminants. This site will be further characterized and remediated under this EE/CA if the preferred alternative is selected.

TSF-42 is the site of a 6-in. diameter pipe known to be internally radiologically contaminated. The pipe is surrounded by concrete and is located under the floor of room 161 in TAN-607A. Under the FFA/CO process, TSF-42 was identified as a No Action site in 1993; however, the FFA/CO documents indicated the TSF-42 site would be remediated when the TAN-607A facility is decommissioned. The site has not been completely characterized for nonradiological contaminants. This site will be further characterized and remediated under this EE/CA if the preferred alternative is selected. If TSF-52 and TSF-42 cannot be adequately characterized and remediated under this EE/CA, they will be addressed under the FFA/CO.

Table 2. Soil sample results from beneath the TAN-607A decontamination room sump.

Group and Detected Constituents	Parameters Defining Sump Sample Results (in mg/kg)		*Group* and Detected Constituents	Parameters Defining Sump Sample Results (in mg/kg)	
	Maximum Detected	PRGs		Maximum Detected	PRGs
Metals and Cyanide			VOCs		
Arsenic	17.3	0.39[b]	Acetone	0.0514	14000
Barium	225	5400	**Tetrachloroethene**	**3.01**	0.48
Beryllium	1.02	150	Toluene	0.0055	520
Cadmium	1.9	37	1,1,1-Trichloroethane	0.0066	1200
Chromium	**34.4**	30	**Trichloroethene**	**1.09**	0.053
Cobalt	8.6	900	Trichlorofluoromethane	0.0019	390
Copper	44.6	3100	Xylene (total)	0.012	370
Lead	79	400	SVOCs		
Mercury	**226**	23	Aramite	0.519	19
Nickel	43.2	1600	Di-n-butyl phthalate	0.105	NA [a]
Selenium	2.11	390	Di-n-octyl phthalate	0.0897	2400
Silver	0.612	390	Disulfoton	0.113	2.4
Vanadium	41.8	78	Isophorone	1.32	510
Zinc	151	23000	Phenol	5.11	18000
Cyanide	0.919	1200	PCBs		
			Aroclor-1260	**2.80**	0.2

a. NA – Not Applicable – The constituent is not listed in the Region 9 Prelininary Remediation Goals Table (Region 9 PRGs 2004 Table).

b. The background for arsenic at the INL is averaged at 27 mg/kg (INEL-94/0250).

2.4.3 Risk Assessment

Currently residual PCB contamination beneath the slab in the decontamination shop presents an unacceptable risk to human health under a future residential use scenario. In addition, localized hotspots of radionuclide contamination and other compounds, such as mercury and trichloroethene, exceed EPA screening criteria. Under Alternative 2 – No Action, the radiological and nonradiological source term identified in Sections 2.4.1 and 2.4.2 are expected to remain. This section addresses the potential risk if Alternative 2, is selected. A risk assessment was not performed for Alternative 1 – Complete Removal. Under Alternative 1, the risk posed by the contaminants is eliminated by the removal of the structures, components, and any residual contamination.

The risk assessment for radiological contamination was completed using the standard residential exposure scenario. This exposure scenario is conservative since it assumes the radiological contamination will be released all at once from the TAN-607A pad immediately at the end of the INL institutional control period (i.e., in the year 2095). The scenario also assumes someone will build a house at the site of the removal action as soon as the institutional control period is over, 10 feet of contaminated material will be excavated while building a basement, and the material will be spread across the surface of the housing site. Finally, the scenario assumes a person will live at the site for 30 years, including 6 years of childhood, while being exposed to contamination through soil ingestion, fugitive dust inhalation, external radiation exposure, and ingestion of contaminated fruits and vegetables grown around the house. (Burns, D. 2006).

In addition to the residential exposure scenario, a screening level groundwater pathway risk assessment was also conducted. The screening level ground water pathway risk assessment is documented in the *Groundwater Assessment for TAN 607A, the Maintenance and Assembly Area Concrete Slab (EDF-6926).* The screening-level risk assessment used a conservative implementation of the groundwater screening model GWSCREEN Version 2.5 (Rood 1999) to calculate groundwater concentrations and carcinogenic risk for the TAN-607A radiological source term. The GWSCREEN model was developed to address CERCLA sites at the INL. The model, coupled with a set of default parameter values, provides conservative estimates of groundwater concentrations and ingestion doses at the INL.

The following is a list of important assumptions made for the screening level groundwater pathway risk assessment:

- The radiological inventory at TAN-607A is assumed to be mixed homogeneously with soil and placed in a soil volume equal to the volume of the TAN-607A concrete slab. The source thickness was assumed to be 8 in. (0.2 m) or the thickness of the floor of the TAN-607A facility.

- Cs-137, Sr-90, and Co-60 have very short radioactive decay half lives and low mobility in the subsurface (much longer travel times to the aquifer) than the other radionuclides considered. Therefore, the resulting aquifer concentrations and risks in the aquifer will be negligible compared to the other nuclides and were therefore not included as input parameters for the screening level groundwater risk assessment.

- The contaminant solubility is conservatively assumed to be infinite.

- The radionuclides are assumed to be exposed to infiltrating water and contaminants are leached into the subsurface. The INL Track 2 default infiltration rate is 10 cm/yr (3.9 in/yr). The conceptual model assumes no containment or engineered barriers that would reduce this infiltration rate.

- The subsurface environment at the INL Site is composed of basalt flows separated by sedimentary interbeds. The basalt flows are often times fractured, allowing water to move freely in the vertical direction. The Track 2 methodology (DOE-ID 1994) recognized this feature of the system and assumed water transport time through the fractured basalt is relatively instantaneous. The overall vadose transit time is controlled by the presence of sedimentary interbeds. Therefore, only transport through sedimentary interbeds was considered when computing contaminant transport in the vadose zone. One-dimensional transport in a 4-m thick vadose zone composed of sedimentary interbeds is assumed.

- Water and contaminants are assumed to move straight down through the vadose zone sediments via plug flow transport. No dispersion is in the vadose zone and no horizontal spreading on interbeds or different layers of basalt.

- Contaminants entering the aquifer from the vadose zone mix with water in the aquifer over a depth defined by a typical well screen of 15 m (49.2 ft). Concentrations are then evaluated at the down gradient edge of the source. This receptor is the point where the highest concentrations in the aquifer are computed.

- The receptor well was placed below the downgradient edge of the TAN-607A concrete slab. This receptor is the point where the highest concentrations in the aquifer are computed.

Table 3 summarizes the risk assessment conducted for the radionuclide contamination and indicates that none of the modeled contaminants will produce estimated risks to a future hypothetical residential receptor greater than 1×10^{-04} (i.e., the upper bound of the EPA acceptable risk range). Therefore, even if Alternative 2 was selected, an unacceptable risk does not result based solely on the radiological source term.

Table 3. Radiological estimated risk results.

Isotope	Residential Scenario Estimated Risk (unitless)	Groundwater Pathway Estimated Risk (unitless)
C-14	7.0×10^{-14}	2.0×10^{-13}
H-3	4.0×10^{-14}	3.0×10^{-12}
I-129	5.0×10^{-11}	1.0×10^{-10}
Np-237	5.0×10^{-12}	2.0×10^{-13}
Pu-239	3.0×10^{-10}	2.0×10^{-10}
Tc-99	1.0×10^{-12}	2.0×10^{-12}
U-234	1.0×10^{-10}	2.0×10^{-10}
U-238	7.0×10^{-07}	2.0×10^{-07}

NOTE: Cs-137, Sr-90, and Co-60 were not calculated since these isotopes are expected to decay before reaching the aquifer.

A risk assessment for the known nonradionuclide contamination was also conducted for the soils beneath the decontamination room sump based on the HWMA/RCRA closure of the sump (ICP/EXT-05-00899). The nonradiological contaminants evaluated were the contaminants listed in

Table 2. Based on process knowledge and previous characterization activities, the decontamination room sump is the only known source of nonradiological contamination at TAN-607A. Nonradiological carcinogenic and noncarcinogenic risks were calculated for the exposure pathways of ingestion of surface soil, dermal absorption, and inhalation of airborne particulates. The risk assessment for the nonradiological source term did not consider the groundwater pathway since it was developed based on an occupation exposure scenario only. The total risk and hazard index (HI) were calculated. Tetrachloroethene, trichloroethene, chromium, and mercury did not exceed risk and hazard quotient calculations even though they exceeded the PRG's as noted in Table 2.

The overall risk and Hazard Quotient (HQ), for the Aroclor-1260 polychlorinated biphenyl (PCB) from the combined sources of dermal absorption, ingestion, and inhalation of volatiles is 1.87×10^{-06} and 2.15×10^{-01}, respectively. Therefore, the risk for Aroclor-1260 is higher than acceptable levels while the HQ is within acceptable levels as defined in the approved HWMA/RCRA closure plan (DOE-ID 2004). The acceptable risk level for the nonradiological contaminants, as identified in the HWMA/RCRA closure plan was the lower bounds of the EPA risk guidance at 1×10^{-6} and an HI of less than 1. The risk assessment and HQ results for nonradiological contamination in the decontamination room sump is shown is Table 4.

Table 4. Nonradiological estimated risk results.

Pathway	Risk	HQ
Dermal Absorption	1.16×10^{-06}	2.84×10^{-02}
Ingestion	7.09×10^{-07}	1.85×10^{-01}
Inhalation	1.38×10^{-09}	1.27×10^{-03}
TOTALS	1.87×10^{-06}	2.15×10^{-01} (HI)

Because of the unacceptable risk posed by the PCB contamination beneath the decontamination room sump site TSF-54 will be remediated as part of this nontime critical removal action of TAN-607A. The new site TSF-52 and No Action site TSF-42 will require further characterization and will be remediated if feasible under this EE/CA. If TSF-42, TSF-52, and TSF-54 cannot be adequately remediated due to nature and extent of contamination, they will be addressed under the FFA/CO.

3. IDENTIFICATION OF REMOVAL OBJECTIVES AND SCOPE

3.1 Removal Action Objectives

The removal action objective for this nontime critical removal action is as follows: Reduce risk from external radiation exposure to a total excess cancer risk of less than 1 in 10,000 for a hypothetical resident at 2095 and the current and future worker. Per the Operable Unit (OU) 1-10 ROD, the TAN area is expected to be under the control of the government until 2095. In addition, general CERCLA protectiveness standards at INL Site seek to prevent future releases to the Snake River Plain Aquifer that would result in migration of contaminants to the aquifer such that drinking water maximum contaminant levels may be exceeded and to ensure cumulative excess cancer risks from multiple contaminants of concern remain less than 1 in 10,000 for a hypothetical resident at 2095.

The removal action objective is consistent with the remedial action objectives of the ROD. The removal action objective is predicated on the current and future land uses established for the TAN area in the ROD, which includes industrial land use until at least 2095 and possible residential land use thereafter. If any newly identified release sites are discovered during implementation of the selected alternative, DOE-ID will consult with DEQ and EPA regarding potential inclusion of the newly identified

release site for evaluation under this EE/CA, the FFA/CO or whether to address the newly identified release site under other regulatory programs.

4. IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES

Two alternatives were identified for this removal action. Alternative 1 is complete removal and Alternative 2 is a no action alternative.

4.1 Alternative 1 – Complete Removal

Alternative 1 consists of the removing TAN-607A aboveground structures and components, removing below ground components such as sumps and trenches, removing structural walls to 3 feet below grade, removing residual radiological and nonradiological contamination, and filling the void to grade with clean solid inert material. In addition, three CERCLA sites (TSF-42, TSF52, TSF-54) will be remediated, if possible. If the nature and extent of contamination of these CERCLA sites is greater than the footprint to be remediated, follow-on actions will be addressed under the FFA/CO. The specific components of Alternative 1 are as follows:

- Isolate utilities from TAN-607 (Hot Shop)
- Remove equipment, ducting, and piping
- Remove any loose contamination or components with fixed contamination
- Remove contaminated piping
- Collapse entire structure and remove debris
- Remove slab and all sumps
- Remediate sites TSF-42, TSF-52, and TSF-54
- Backfill area with clean soil.

4.2 Alternative 2 – No Action

The no action alternative will leave the building in a cold, dark, and dry condition. In this condition the TAN-607A facility will require surveillance and maintenance until a later date when decommission actions would be complete. Under this alternative, the residual radiological and nonradiological contamination will remain in the concrete floor slab and sumps in the building floor. CERCLA sites TSF-42, TSF-52, and TSF-54 will be addressed solely under the terms of the FFA/CO.

5. ALTERNATIVE ANALYSIS

In accordance with the *Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA* (EPA 1993), each alternative is evaluated with respect to effectiveness, implementability, and cost.

Effectiveness is evaluated in terms of overall protectiveness of public health and the environment and ability to achieve nontime critical removal action objectives. Protectiveness of public health and the environment is evaluated in terms of protection of public health and the community, protection of workers during implementation, protection of the environment, and compliance with applicable or relevant and appropriate requirements (ARARs). (*Note:* ARARs are also discussed in Section 6.1.) Ability to achieve

removal objectives is evaluated in terms of expected level of containment, residual effects, and ability to maintain long-term control.

Implementability of alternatives is evaluated based upon the following: technical feasibility, availability, and administrative feasibility. Technical feasibility is evaluated in terms of construction and operational considerations, demonstrated performance/useful life, adaptability to environmental conditions, contribution to remedial performance, and ability to be implemented in 1 year. Availability is evaluated in terms of equipment, personnel and services, outside laboratory testing capacity, offsite treatment and disposal capacity, and post-removal site control. Administrative feasibility is evaluated in terms of permits required, easements or right-of-ways required, impact on adjoining property, ability to impose institutional controls, and likelihood of obtaining exemptions from statutory limitations, if needed.

Cost of the alternatives is evaluated by considering capital costs, cost for post-removal control (e.g., continued surveillance and maintenance under Alternative 2), and present worth cost.

On September 30, 2005, Battelle Energy Alliance, LLC (BEA) developed an *Infrastructure Transformation Plan* that contains a time phase list of buildings that are proposed to be excessed by 2015. This plan also includes the current TAN buildings, including TAN-607A, that are not owned by the U.S. Department of Energy Office of Nuclear Energy, Science, and Technology (DOE-NE). DOE-ID has explored several potential missions for the TAN-607A facility through marketing initiatives with DOE Headquarters Programs, all without success. The *Infrastructure Transformation Plan* concludes that no new uses, construction, or modifications are planned at TAN.

5.1 Effectiveness of the Alternatives

5.1.1 Protectiveness of Public Health and the Environment

Protectiveness of public health and the environment is evaluated in terms of protection of public health and the community, protection of workers during implementation, protection of the environment, and compliance with ARARs.

5.1.1.1 Protective of Public Health and the Community. Actions associated with Alternative 1 are the most protective of public health and the community since all contaminants will be remediated and dispositioned appropriately. Actions associated with Alternative 2 would require continued surveillance and maintenance and would still require remediation of site TSF-54, and possibly TSF-42 and TSF-52 once characterized, to remove the unacceptable risk posed by residual contaminants in the decontamination room sump as detailed in Section 2.4.2.

5.1.1.2 Protection of Workers. Protection of workers during implementation varies to some degree between the two alternatives. Current INL workers would be exposed to industrial hazards and hazardous materials during actions associated with implementation of Alternative 1. Although current workers would not be exposed to the same level of hazards in the no action alternative, the same level or greater worker hazards would be expected in the future when TAN-607A is demolished. Near term, Alternative 1 would expose workers to high risk work evolutions as identified by the Occupational Safety and Health Administration (OSHA). These include excavation and demolition activities.

Excavation activities will place employees at an increased risk to cave-in/inundation by soils and other loosely unconsolidated materials associated with this undertaking. The excavation of the Cask Pit Sump located in the high bay area of TAN-607A would be greater than 25 feet to completely remove the sump. Employees will be at risk to unintentional contact (struck-by, caught between) with heavy equipment that would be required to perform this work. Additionally, the excavation and handing of

excavated materials (cubic yards of soil/material) would be significant due to the requirement to ascertain/maintain an angle of repose (side slope of excavation) to a maximum of 34 degrees from horizontal. This angle of repose for Class C 60 soil is required to be at a ratio of 1.5 (horizontal) to 1.0 (vertical).

Demolition work would further expose employees to the risks associated with falling from heights, material handling, haulage, hoisting and rigging, heavy equipment, etc. The use of the hydraulic processor shear and hammer would reasonably be anticipated as a significant "tool" in performing demolition activities associated with this alternative.

Each work situation associated with implementation of the alternatives would require a hazards identification and analysis as well as proper mitigation to reduce risks. Ergonomic hazards presented by the handling of equipment and building debris include lifting, reaching, repetitive motion, and the use of hand tools. Cutting and grinding would be required to remove structural steel associated with TAN-607A. Work at high elevations and near excavations would require utilization of fall protection equipment. Scaffolding, ladders, cranes, and man lifts could be used to access high elevation areas. To minimize industrial hazards, activities associated with implementation of removal actions associated with the alternatives would be planned and conducted in compliance with safety management systems, and OSHA requirements.

Radioactive contamination is in sumps and in the slab of the TAN-607A building and would be encountered during removal activities. Radiation exposure to workers would be a possibility during implementation of either of the two alternatives, but the risk of radiation exposure would be increased in the near term during implementation of Alternative 1. Potential radiation exposures resulting from implementation of Alternative 2 could occur during the ultimate decontamination and removal of structures and equipment, and could reasonably be expected to increase as the TAN-607A slab continues to age and degrade. During implementation of either alternative, radiation exposure would be limited by administrative and engineering controls. Exposures would be managed in accordance with as low as reasonably achievable principals, which strives to minimize occupational radiation exposure to workers. Activities would be performed following established radiological practices and procedures.

In summary, implementation of Alternative 1 would pose the most risk to the worker in the short term. However, under Alternative 2, as the building deteriorates the risk posed to workers in the future would be substantially greater during surveillance and maintenance and final demolition.

5.1.1.3 Protection of the Environment. Complete protection of the environment would be accomplished via implementation of Alternative 1 based on the removal and disposition of contaminants. Under Alternative 2, protection of the environment would be provided to a lesser degree, but would be accomplished via long term surveillance and maintenance.

5.1.1.4 Compliance with ARARs. Section 121 of CERCLA (42 USC § 9621) requires the responsible CERCLA implementing agency to ensure that the substantive standards of HWMA/RCRA and other applicable laws will be incorporated into the federal agency's immediate removal actions. The DOE-ID is the implementing agency for this nontime critical removal action. Compliance with ARARs will be accomplished for both alternatives.

5.1.2 Ability to Achieve Nontime Critical Removal Action Objectives

Ability to achieve removal objectives is evaluated in terms of expected level of containment, residual effects, and ability to maintain long-term control. Under the Alternative 1 scenario, the entirety of TAN-607A would be removed and disposed of in the TAN Demolition Landfill, the Idaho CERCLA Disposal Facility (ICDF) Landfill, other INL Site landfills, or an appropriate non-INL disposal facility. There would be no residual effect concerns regarding waste management and disposal and control would be maintained without the need to seek an alternative long-term solution. Implementation of Alternative 2 would consist of continued surveillance and maintenance. The expected level of containment would diminish as the TAN-607A slab continued to age and degrade. Moreover, the ability to maintain control until implementation of a long-term solution would also diminish as TAN-607A continues to age and degrade.

5.2 Implementability of the Alternatives

Implementability of alternatives is evaluated based upon the following:

- Technical feasibility
    - Technical feasibility is evaluated in terms of construction and operational considerations, demonstrated performance/useful life, adaptability to environmental conditions, contribution to remedial performance, and ability to be implemented in 1 year
- Availability
    - Availability is evaluated in terms of equipment, personnel and services, outside laboratory testing capacity, offsite treatment and disposal capacity, and post-removal site control
- Administrative feasibility.
    - Administrative feasibility is evaluated in terms of permits required, easements or right-of-ways required, impact on adjoining property, ability to impose institutional controls, and likelihood of obtaining exemptions from statutory limitations, if needed.

5.2.1 Technical Feasibility

Alternative 1 would require an intensive demolition effort to remove interior structures and to remove the concrete foundations associated with TAN-607A in order to remove any sumps, equipment, and structures. Excavations would be just below grade with the exception of the sumps. The deepest sump is 23 feet. To meet OSHA requirements for excavations, the excavation must be 1.5 times as wide as it is deep. Under this alternative, radiologically-contaminated piping and sumps, nonradiologically-contaminated piping and sumps, conduit, concrete and rebar, and miscellaneous demolition debris would be removed and disposed at ICDF or the TAN Demolition Landfill. It is anticipated that implementation of Alternative 1 would take less than 1 year. Implementation of Alternative 1 would be technically feasible, but at an increased short-term cost in terms of time, materials, transportation, exposure to industrial hazards, and services compared to Alternative 2.

Alternative 2 would require minimal immediate expenditure of time, resources, engineering, or development to decontaminate and/or remove structures and equipment. However, continued surveillance, maintenance, and monitoring would require an expenditure of resources through the year 2095. The primary deterrent to the implementation of this alternative would be the potential radiation exposure of workers and the environment and the hazards of entering an aging facility as TAN-607A. Therefore, although implementation of Alternative 2 would be technically feasible, a potential threat to worker health and the environment would remain.

5.2.2 Availability

Availability of equipment, personnel, and services; outside laboratory testing capacity; offsite treatment and disposal capacity; and post-removal site control would not impose any limitations on either of the alternatives. In short, the resources required to implement each of the alternatives would be available.

5.2.3 Administrative Feasibility

Administrative feasibility is evaluated in terms of permits required, easements or right-of-ways required, impact on adjoining property, ability to impose institutional controls, and likelihood of obtaining exemptions from statutory limitations, if needed. No permit requirements, easement or right-of-ways requirements, or exemptions from statutory limitations would be associated with either of the two alternatives. Alternative 1 would impact the other operations at TAN TSF due to power and fire protection outages associated with the demolition effort required to completely remove all structures and components associated with TAN-607A. Alternative 2 would ultimately place the facility in a cold, dark, and dry condition by implementing the same power and fire protection outages.

5.3 Cost of the Alternatives

The cost of the alternatives is based on detailed cost estimates (see Table 5). These estimates do not include general and administrative costs and are based on 2006 dollars (no escalation). These estimates include the direct costs such as labor, fringe, materials, equipment, supplies, and subcontracts.

Table 5. Cost estimates for alternatives.

Cost Description	Alternative 1	Alternative 2
TAN-607A Decommissioning	$20,867,637	$6,662,641
Continued Surveillance and Monitoring Until 2095 (Quarterly)	$0	$6,714,400
TOTAL	$20,867,637	$13,377,041

The cost estimates cited in Table 5 are based upon performing the work associated with the proposed actions over the next 2 calendar years. The cost estimate cited for Alternative 2 assumes that the facility will be maintained in a cold, dark, and dry configuration and condition through at least FY 2095, and does not include an estimate for the ultimate demolition of the facility.

5.4 Evaluation Summary

This section provides a summary of the effectiveness of the alternatives.

- Actions associated with Alternative 1 are the most protective of public health and the community since all contaminants will be remediated and dispositioned appropriately.

- Implementation of Alternative 1 would pose the most risk to the worker in the short term. However, under Alternative 2, as the building deteriorates the risk posed to workers in the future would be substantially greater during surveillance, maintenance, and final demolition.

- Complete protection of the environment would be accomplished via implementation of Alternative 1 based on the removal and disposition of contaminants. Under Alternative 2, protection of the environment would be provided to a lesser degree, but would be accomplished via long term surveillance and maintenance**.**

- ARARs would be met under both alternatives.

- Alternative 1 achieves the nontime critical removal objectives by remediation of the current risk posed by the residual contaminants in the decontamination room sump.

- The implementation of both alternatives is technically feasible. Alternative 1 would take less than 1 year. Implementation of Alternative 1 would be a short-term increase in terms of time, materials, transportation, exposure to industrial hazards, and services compared to Alternative 2.

- The resources required to implement each of the alternatives is available and both are administratively feasible.

- A comparison of the costs associated with each alternative shows that Alternative 1 would be the most costly due to the up front expenditure necessary to eliminate the risks by completing the full demolition and remediation of the CERCLA sites in the near term. The cost estimate for Alternative 2 does not include the ultimate demolition of the facility.

6. RECOMMENDED ALTERNATIVE

An evaluation of the alternatives in terms of effectiveness, implementability, and cost shows that Alternative 1 is the preferred action alternative. Implementation of Alternative 1 would ensure protection of human health and the environment at less long-term cost than Alternative 2. The primary deterrent to the implementation of Alternative 2 would be the potential degradation of TAN-607A and consequential environmental concerns as well as the health and safety concerns of limited decontamination and decommissioning, and surveillance and maintenance activities required as the facility continues to age and deteriorate, and the cost associated with long-term surveillance and maintenance. Alternative 1 supports the DOE-ID long term mission for risk reduction and building footprint reduction.

The following sections identify the requirements that will be met during the implementation of this nontime critical removal action.

6.1 Compliance with Environmental Regulations, Including Those that are Applicable or Relevant and Appropriate Requirements

6.1.1 CERCLA

Section 121 of CERCLA (42 USC § 9621) requires the responsible CERCLA implementing agency to ensure that the substantive standards of HWMA/RCRA and other applicable laws will be incorporated into the federal agency's design and operation of its long-term remedial actions and into its more immediate removal actions. The DOE-ID is the implementing agency for this nontime critical removal action. The EPA and DEQ will have reviewed the EE/CA and will concur if appropriate in the Action Memorandum.

Implementation of Alternative 1 will result in the generation and subsequent management of radioactive and nonradioactive wastes. Table 6 lists the proposed ARARs that have been identified for this alternative. These ARARs are a compilation and expansion of the ARARs identified in the OU 1-10 ROD (DOE-ID 1999). The ARARs list is based on several key assumptions:

- Management of CERCLA waste generated during the removal action will most likely be disposed at the ICDF Landfill and the TAN Demolition Landfill subject to meeting the waste acceptance criteria.

- If decontamination liquids are generated, they will be disposed at the ICDF Evaporation Ponds subject to meeting the waste acceptance criteria.

- Debris generated during demolition of TAN-607A may have paint that has PCBs. If encountered, such wastes may trigger substantive requirements of the TSCA. Lead-contaminated paint may be generated during demolition, which will be subject to the substantive requirements of RCRA hazardous waste regulations. These wastes are planned for disposal at either the ICDF Landfill or TAN Demolition Landfill if they are found to be eligible for disposal as solid waste.

- Asbestos-containing material may be encountered incidental to performance of the nontime critical removal action. This waste will be subject to specific asbestos regulations and will be acceptable for disposal at the ICDF and/or, if not radiologically contaminated, at the TAN Demolition Landfill. Friable asbestos will be removed and disposed as required by National Emission Standards for Hazardous Air Pollutants.

A summary of ARARs for TAN-607A are found in Table 6.

6.1.2 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, requires agencies to consider the impact of undertakings on properties listed or eligible for listing in the National Register of Historic Places, and to consult with the Idaho State Historic Preservation Officer (SHPO) and other interested parties when impacts are likely. It also requires federal agencies to invite the Advisory Council on Historic Preservation (ACHP) to participate in consultation when impacts may be adverse. The Section 106 process has been tailored to meet the unique needs of the INL Site and is described in the INL Cultural Resources Management Plan.

TAN-607 Proper (including TAN-607A) is a historic property eligible for nomination to the National Register of Historic Places. TAN-607 Proper has been designated a Signature Property by DOE-HQ. DOE-ID has made the decision to proceed with demolition of the TAN 607A. As a Signature Property, public review of the disposition of the facility is required. To mitigate the adverse impacts caused by such action, DOE-ID, through formal consultation with the Idaho SHPO, has developed a Memorandum of Agreement (MOA) that outlines measures to preserve the TAN-607 Proper history, as well as, commitments to edit and republish a public history book on the INL, publish and distribute historical reports that are written for inclusion in the Library of Congress collections, endow a university scholarship for students pursuing a degree in a preservation-related discipline, and to preserve technical reports, engineering drawings, historic photographs, and other important documents in an INL archive via the support of a professional archivist. DOE-ID invited ACHP to participate in consultation and to be a signature to the MOA. However, the ACHP declined to participate. The MOA was signed by DOE-ID and the Idaho SHPO in October 2005 and outlines a schedule for completing each stipulated mitigation measure.

Table 6. Summary of ARARs for TAN-607A, nontime critical removal action.

Requirement (Citation)	ARAR Type	Comments
Clean Air Act and Idaho Air Regulations		
"Toxic Substances," IDAPA 58.01.01.161	A	Applies to any toxic substances emitting during implementation of the removal action.
"National Emission Standards for Hazardous Air Pollutants" <10 mrem/yr, 40 CFR 61.92, "Standard"	A	Applies to building demolition and the waste-handling activities.
"National Emission Standards for Hazardous Air Pollutants" "Emission Monitoring and Test Procedures," 40 CFR 61.93	A	Applies to building demolition and the waste-handling activities.
"National Emission Standards for Hazardous Air Pollutants" "Compliance and Reporting," 40 CFR 61.94(a)	A	Applies to building demolition and the waste-handling activities.
"National Emission Standards for Hazardous Air Pollutants" "Standards for Demolition and Renovation," 40 CFR 61.145	A	Applies to any asbestos-containing materials removed during the decommissioning.
"Rules for Control of Fugitive Dust," and "General Rules," IDAPA 58.01.01.650 and .651	A	Applies to building demolition and the waste-handling activities.
RCRA and Idaho Hazardous Waste Management Act		
"Standards Applicable to Generators of Hazardous Waste," IDAPA 58.01.05.006, and the following, as cited in it:		
"Hazardous Waste Determination," 40 CFR 262.11	A	Applies to waste that would be generated during the removal action.
General Facility Standards:		
IDAPA 58.01.05.008, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," and the following, as cited in it:		
"Temporary Units (TU)," 40 CFR 264.553	A	Waste may be treated or temporarily stored in a temporary unit prior to disposal.

Table 6. (continued).

Requirement (Citation)	ARAR Type	Comments
"Staging Piles," 40 CFR 264.554	A	Waste may be temporarily staged prior to disposal.
"General Inspections Requirements," 40 CFR 264.15	A	Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Preparedness and Prevention," 40 CFR 264, Subpart C	A	Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Contingency Plan and Emergency Procedures," 40 CFR 264, Subpart D	A	Applies to a facility staging, storing, or treating hazardous waste prior to transfer to the ICDF or an off-Site facility.
"Disposal or Decontamination of Equipment, Structures, and Soils," 40 CFR 264.114	A	Applies to contaminated equipment used to remove, treat, or transport hazardous waste.
"Use and Management of Containers," 40 CFR 264.171–178	A	Applies to containers used during the removal and treatment of hazardous waste.
Land Disposal Restrictions		
IDAPA 58.01.05.011, "Land Disposal Restrictions," and the following, as cited in it:		
"Applicability of Treatment Standards," 40 CFR 268.40(a)(b)(e)	A	Applies to hazardous waste and secondary waste, if treatment is necessary to meet the disposal facility's waste acceptance criteria or if treatment is required before placement.
"Treatment Standards for Hazardous Debris," 40 CFR 268.45	A	Applies to hazardous debris, if treatment is necessary to meet the disposal facility's waste acceptance criteria or if treatment is required before placement.
"Universal Treatment Standards," 40 CFR 268.48(a)	A	Applies to non-debris hazardous waste and secondary waste, if treatment is necessary to meet the disposal facility's waste acceptance criteria or if treatment is required before placement.
"Alternative LDR Treatment Standards for Contaminated Soil," 40 CFR 268.49	A	Applies to contaminated soil, if treatment is necessary to meet the disposal facility's waste acceptance criteria or if treatment is required before placement.
Idaho Groundwater Quality Rules		
"Ground Water Quality Rule," IDAPA 58.01.011	A	The waste-handling activities must prevent migration of contaminants from the facility that would cause the Snake River Plain Aquifer groundwater to exceed applicable State of Idaho groundwater quality standards in 2095 and beyond.

Table 6. (continued).

Requirement (Citation)	ARAR Type	Comments
TSCA		
"Decontamination Standards and Procedures: Decontamination Standards," 40 CFR 761.79(b)(1)	A	Applicable to decontamination of equipment with PCB contamination, if PCB waste is generated.
"Decontamination Standards and Procedures: Self-Implementing Decontamination Procedures," 40 CFR 761.79(c)(1) and (2)	A	Applicable to decontamination of equipment with PCB contamination, if PCB waste is generated.
"Bulk Product Disposition," 40 CFR 761.62(b)	A	Applicable to disposition of waste in a NMSWLF with concentrations of PCBs greater than 50 ppm.
"Decontamination Standards and Procedures: Decontamination Solvents," 40 CFR 761.79(d)	A	Applicable to decontamination of equipment used to manage PCB-contaminated waste, if PCB waste is generated.
"Decontamination Standards and Procedures: Limitation of Exposure and Control of Releases," 40 CFR 761.79(e)	A	Applicable to decontamination activities of equipment with PCB-contaminated waste, if decontamination is performed.
"Decontamination Standards and Procedures: Decontamination Waste and Residues," 40 CFR 761.79(g)	A	Applicable to management of decontaminated waste and residuals from PCB-contaminated equipment, if PCB waste is generated.
Solid Waste Management Rules		
IDAPA 58.01.06.012, Solid Waste Management Rules for Tier II Landfills	A	Applicable to operation and management of TAN Demolition Landfill.
To-be-Considered Requirements		
"Radiation Protection of the Public and the Environment," DOE Order 5400.5, Chapter II(1)(a,b)	TBC	Applies. Substantive design and construction requirements would be met to keep public exposures as low as reasonably achievable.
"Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities," May 3, 1999 (EPA 1999)	TBC	Applies to residual waste following completion of the removal action.

A = applicable requirement; R = relevant and appropriate requirement
ARAR = applicable or relevant and appropriate requirement
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
CFR = Code of Federal Regulations
DOE = U.S. Department of Energy
EPA = U.S. Environmental Protection Agency
ICDF = Idaho CERCLA Disposal Facility
IDAPA = Idaho Administrative Procedures Act
NMSWLF= Non-Municipal Solid Waste Landfill
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
TBC = to be considered
TSCA = Toxic Substances Control Act

DOE-ID is required to review as guidance the most current United States Fish and Wildlife Service list for threatened and endangered plant and animal species. DOE-ID determined that none of the alternatives would impact any threatened and endangered species and also determined that formal consultation with the U.S. Fish and Wildlife Service is not required for this action.

6.2 Compliance with Non-INL Disposal Facility Waste Acceptance Criteria

Waste disposal facilities available at the INL Site are expected to be able to accommodate the waste generated during this removal action. It is anticipated that waste generated during decommissioning activities associated with implementation of the selected alternative will meet the waste acceptance criteria for either the TAN Demolition Landfill or ICDF Landfill. Any waste generated that does not meet the waste acceptance criteria of these INL site facilities will be staged for disposal at an off-site facility, subject to meeting its waste acceptance criteria.

6.3 TAN Demolition Landfill Waste Acceptance Criteria

Construction and demolition debris with painted or treated surfaces, may be accepted at the TAN Demolition Landfill so long as the debris does not qualify as a hazardous waste pursuant to the RCRA and does comply with the state and federal disposal requirements for PCBs as identified in the TSCA. The following types of nonhazardous and non-radioactive construction and demolition waste may be taken to the TAN Demolition Landfill for disposal: asphalt; concrete; masonry block; brick; flooring material; gypsum board; scrap metal; steel roofing; steel siding; insulated siding; gravel; rock; building lumber; wiring; soil; inert waste; and non-friable asbestos-containing material. Regulated asbestos containing material (RACM) will be removed and disposed of at the CFA Asbestos Landfill during the deactivation of TAN-607A under an existing National Environmental Policy Act action. Any RACM encountered during TAN-607A decommissioning will be appropriately removed and disposed of in the CFA Asbestos Landfill. Only waste that meets the requirements of IDAPA 58.01.06.012, Solid Waste Management Rules for Tier II Landfills, will be disposed of in the TAN Demolition Landfill.

6.4 INL CERCLA Disposal Facility Waste Acceptance Criteria

The ICDF Landfill will accept only low-level, mixed low-level, hazardous, and Toxic Substances Control Act waste generated from INL Site CERCLA activities. The ICDF Landfill is one option for disposing the radioactively-contaminated decommissioning waste. Decommissioning waste not requiring treatment to meet land disposal restriction requirements can be sent to the ICDF Landfill, if it meets the waste acceptance requirements as outlined in, *Waste Acceptance Criteria for ICDF Landfill* (DOE/ID-10865). Based on data currently available on the waste that will be generated from the TAN-607A decommissioning process, it is not expected that treatment will be required to meet the land disposal restrictions for the ICDF. Waste that will be considered for disposal at the ICDF includes such items as piping, sump pumps, contaminated portions of the slab, and other pieces of equipment that might be radioactively-contaminated and do not meet the criteria for the TAN Demolition landfill.

7. REFERENCES

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