Department of Energy
Idaho Operations Office
1955 Fremont Avenue
Idaho Falls, ID 83415

December 17, 2008

SUBJECT: Release of Draft Environmental Assessment for the Remote-Handled Waste Disposition Project (WDP-RWMC-08-075)

Dear Citizen:

Thank you for your interest in the Draft Environmental Assessment (EA) for the Remote-Handled Waste Disposition Project.

Your comments on this project and the potential environmental impacts are important to us. Please submit your comments either by e-mail to ljungbc@id.doe.gov, or by mail to Chuck Ljungberg, 1955 Fremont Ave., Idaho Falls, ID 83415-1222. The environmental assessment can be accessed on the DOE website at www.id.doe.gov. Comments must be received or postmarked by January 19, 2009.

All comments will be addressed in a Response to Comment section of a final EA that will be released in February 2009. At that time, either a Finding of No Significant Impact (FONSI) or a determination that an Environmental Impact Statement for the proposed action will be issued.

Again, thank you for your interest in this important endeavor.

Sincerely,

Elizabeth D. Sellers
Manager

DOE/EA-01386

Draft
Environmental Assessment
for the
Remote-handled Waste Disposition Project

December 2008

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Remote-handled Waste Disposition Project

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ACRONYMS

BEA	Battelle Energy Alliance, LLC
CFR	Code of Federal Regulations
CH	contact-handled
DOE	Department of Energy
DOT	Department of Transportation
EDF	Engineering Design File
EA	environmental assessment
EPA	Environmental Protection Agency
FAST	Fluorinel Dissolution Process and Fuel Storage
FDP	Fluorinel Dissolution Process
FFTF	Fast Flux Test Facility
GTCC-like	Greater-Than-Class-C-like low-level radioactive waste
HEPA	high-efficiency particulate air
HFEF	Hot Fuel Examination Facility
HWMA	Hazardous Waste Management Act
IDAPA	Idaho Administrative Procedures Act
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LLW	low-level waste
MEDE	melt-drain-evaporate
MEI	maximally exposed individual
MFC	Materials and Fuels Complex
MLLW	mixed low-level waste
MTRU	mixed transuranic
NaK	sodium-potassium alloy
NCRP	National Council on Radiation Protection

NESHAP	National Emission Standards for Hazardous Air Pollutants
NQA	Nuclear Quality Assurance
NRC	Nuclear Regulatory Commission
NWCF	New Waste Calcining Facility
PM	particulate matter
RCRA	Resource Conservation and Recovery Act
RH	remote-handled
RH-SCs	remote-handled special components
RSWF	Radioactive Scrap and Waste Facility
RTR	real-time radiography
RWMC	Radioactive Waste Management Complex
RWPD	Remote-handled Waste Disposition Project
SNF & INEL EIS	*Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement*
STP	Site Treatment Plan
TRU	transuranic
WIPP	Waste Isolation Pilot Plant

GLOSSARY

as low as reasonably achievable. An approach to radiation protection to control or manage exposures (both individual and collective to the work force and general public) and releases of radioactive material to the environment as low as social, technical, economic, practical, and public-policy considerations permit.

contact-handled waste. Packaged waste with external surface dose rates less than 200 mrem/hr.

curie (Ci). The basic unit used to describe the radioactivity in any material.

defense-related waste. (1) Radioactive waste from any activity performed in whole or in part in support of DOE atomic energy defense activities. Excludes waste under the purview of the Nuclear Regulatory Commission or generated by the commercial nuclear power industry. (2) Nuclear waste derived mostly from the manufacturer of nuclear weapons, weapons-related research programs, the operation of naval reactors, and the decontamination of nuclear weapons production facilities.

Greater-Than-Class-C-like low-level waste (GTCC-like). Low-level radioactive waste in which concentrations of radionuclides exceed the limits for Class C low-level waste established by the Nuclear Regulatory Commission (NRC) found in 10 CFR 61. GTCC is generated in the commercial sector under NRC or state agreement license activities. The NRC has categorized low-level waste (LLW) into four classes (A, B, C, and GTCC) based on the concentration of specific short-lived and long-lived radionuclides given in two tables in 10 CFR 61.55. The NRC LLW classification system does not apply to DOE radioactive waste. However, DOE radioactive waste includes LLW and transuranic waste having characteristics similar to GTCC LLW and which may not have an identified path to disposal (hereinafter referred to as GTCC-like waste). The GTCC-like waste is owned or generated by DOE. The use of the term *GTCC-like* does not have the intent or effect of creating a new classification of radioactive waste.

high-level waste. Highly radioactive waste material resulting from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from such liquid waste that contains fission products in sufficient concentrations, and other highly radioactive material that is determined, consistent with existing law, to require permanent isolation.

isotope. Atoms of a particular element with a unique number of neutrons.

latent cancer fatality. The estimated number of cancer fatalities that may result from exposure to a cancer-causing element. The risk of a latent cancer fatality is estimated by converting radiation doses into possible number of cancer fatalities for an entire exposed population group. The latent cancer fatality numerical value is the chance that the group would experience an additional cancer fatality in the future because of radiation exposure (i.e., otherwise would not occur).

low-level waste (LLW). Radioactive waste that is not high-level radioactive waste, spent nuclear fuel, transuranic waste, by-product material (as defined in Section 11e. (2) of the Atomic Energy Act of 1954, as amended [42 USC § 2011–2259]), or naturally occurring radioactive material.

maximally exposed individual. A hypothetical individual defined to allow dose or dosage comparison with numerical criteria for the public. For this assessment, a hypothetical individual located at the INL Site boundary nearest the affected facility was selected.

mixed waste. Waste that contains both source, special nuclear or by-product material subject to the Atomic Energy Act of 1954, as amended (42 USC § 2011-2259), and a hazardous component subject to the Resource Conservation and Recovery Act (42 USC § 6901).

radioactive waste. Any garbage, refuse, sludge, and other discarded material, including solid, liquid, semisolid, or contained gaseous material, that must be managed for its radioactive content.

radioactivity. The property or characteristic of material to spontaneously disintegrate with the emission of energy in the form of radiation. Approximately 5,000 natural and artificial isotopes have been identified.

radionuclide. A radioactive element characterized according to its atomic mass and atomic number that can be man-made or can occur naturally.

roentgen equivalent, man (rem). A unit of radiation dose equivalent (average background radiation dose is 0.3 rem/yr). The unit of biological dose equal to the product of the absorbed dose in rads; a quality factor, which accounts for the variation in biological effectiveness of different types of radiation; and other modifying factors.

scrap nuclear material. The various forms of nuclear material generated during chemical and mechanical processing, other than recycle material and normal process intermediates, which are unsuitable for continued processing, but all or part of which will be converted to useable material by appropriate recovery operations.

spent nuclear fuel. Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not been separated by reprocessing.

transuranic (TRU) waste. Radioactive waste that contains more than 100 nanocuries (nCi) of alpha-emitting TRU isotopes per gram of waste, with half-lives greater than 20 years, except for: (1) high-level radioactive waste; (2) waste that the Secretary of Energy has determined, with the concurrence of the Administrator of the Environmental Protection Agency, does not need the degree of isolation required by disposal regulations specified in 40 CFR 191 (2002), or (3) waste that the NRC has approved for disposal on a case-by-case basis in accordance with 10 CFR 61.

waste. Nuclear material residues that have been determined to be uneconomical to recover.

Draft Environmental Assessment for the Remote-handled Waste Disposition Project

1. PURPOSE AND NEED

The U.S. Department of Energy (DOE) has approximately 327 cubic meters (over 980 containers), of remote-handled (RH) waste stored at the Materials and Fuels Complex (MFC) and the Idaho Nuclear Technology and Engineering Center (INTEC) on the Idaho National Laboratory (INL) Site. These RH wastes require further processing before being disposed. A portion of this RH waste is RH transuranic (TRU). The DOE must take action to comply with the Idaho Settlement Agreement and Consent Order (Idaho 1995) mandating that INL TRU waste be shipped out of Idaho by a target date of December 31, 2015, and no later than December 31, 2018. The DOE is also required to comply with the INL Site Treatment Plan Consent Order (DOE-ID 1995), which defines firm and enforceable actions (near-term milestones) to meet the legal and regulatory storage prohibitions and treatment requirements of the Resource Conservation and Recovery Act (RCRA) (42 USC § 6901), the Hazardous Waste Management Act (HWMA) (Idaho Code § 39-4401), and Federal Facility Compliance Act of 1992 (Public Law 102-386).

The majority of RH waste requiring processing was generated during the 40 years DOE conducted research on defense related activities, advanced nuclear reactor concepts, nuclear safety, and nuclear fuel development at MFC (formerly Argonne National Laboratory-West) and Argonne National Laboratory-East, which is located near Chicago, Illinois. It consists of debris and process waste, such as gloves, tools, steel hardware, and elemental sodium and spent nuclear fuel fragments. The RH waste also consists of process components, such as filters, sump pumps, and drain tanks. Similar waste from MFC and Argonne National Laboratory-East reactor operations and research activities has already been classified as defense related waste and it is anticipated that the waste determination for this waste will result in the same determination (ANL-NT-192).

Processing the RH waste would include disassembling the liners and containers, characterizing; sorting and segregating; chemically treating and reducing the size of the container contents, as necessary; and repackaging to meet the waste acceptance criteria of the designated land disposal site. Because this waste is highly radioactive, all processing activities to prepare it for shipment and disposal must be performed in a heavily shielded, air-atmosphere waste processing cell. The cell must be designed to ensure particulate radioactive materials and hazardous constituents are contained, reactive metals are handled safely, and intense radiation fields are shielded.

In April 1995, DOE issued the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (SNF & INEL EIS) (DOE 1995a). That document addressed DOE’s programmatic need for developing appropriate facilities and technologies to manage waste and spent nuclear fuel at the INL Site including waste that requires remote handling. In addition, the environmental impacts were evaluated in Section C.4.6.6, “Remote Mixed Waste Treatment Facility.” That section describes a facility for removing and converting sodium and treating other waste from an MFC storage facility, the Radioactive Scrap and Waste Facility (RSWF). It further states that the facility would be designed to meet all requirements for removing sodium metal from the Experimental Breeder Reactor-II components stored at the MFC facility.

In June 1995, DOE issued the Record of Decision for the SNF & INEL EIS (DOE 1995b). A decision regarding this project, “Remote Mixed Waste Treatment Facility” was deferred. Section 3.2.2.3

of the Record of Decision states, “Decisions regarding these projects will be made in the future pending further project definition, funding priorities, or appropriate review under the National Environmental Policy Act.” This environmental assessment (EA) tiers from the SNF & INEL EIS (DOE 1995a) and evaluates the potential environmental impacts of the preferred and alternative actions related to processing the RH waste. This environmental assessment was prepared in accordance with the following requirements:

- National Environmental Policy Act of 1969 (Public Law 91-190; 42 USC § 4321 et seq.), as amended
- Council on Environmental Quality National Environmental Policy Act Regulations (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508)
- DOE National Environmental Policy Act Implementing Regulations (10 CFR 1021)
- DOE Order 451.1B, “National Environmental Policy Act Compliance Program.”

In addition to the INL waste discussed above, the DOE has 5 cubic meters (m^3) of RH low-level waste (LLW) located at the Hanford’s Fast Flux Test Facility (FFTF), and are identified as RH-special components (RH-SCs) that need additional processing prior to disposal. The FFTF RH-SCs consist of “traps” that were used to maintain the purity of the FFTF sodium coolant. DOE will not decide whether to package and ship this waste to the INL Site for treatment as part of this EA. That decision and associated impacts will be addressed as stated in the Notice of Intent for the Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington (DOE 2006). However, since it is reasonably foreseeable that a decision may be made in the future to send the FFTF RH-SCs (RH-LLW) to INL for treatment, the impacts of managing that waste at the INL Site are included in this EA such that the waste can be treated if it is shipped to INL. The FFTF wastes are mixed wastes that would be covered by the INL Site Treatment Plan (STP), and if a decision is made to bring this waste to INL, the State of Idaho approval and other applicable provisions of the STP would be followed.

This EA will serve as the basis for the determination to issue a finding of no significant impact or to prepare an environmental impact statement.

2. BACKGROUND

2.1 Unique Characteristics of Remote-handled Waste in the Scope of this Environmental Assessment

The radioactive waste in the scope of this EA is characterized as RH because it generates a radiation field greater than 200 mrem/hr at its surface (background radiation in the environment is approximately 0.01 mrem/hr).

In addition to its classification by radiation dose rate, this waste is classified as TRU or LLW by the type and concentration of radionuclides present (radionuclide composition). The TRU and LLW include a subcategory referred to as Greater-Than-Class C-like (GTCC-like) waste. The GTCC-like waste is DOE waste that exceeds the Nuclear Regulatory Commission's (NRC's) Class C concentration limits for LLW radionuclides and the TRU concentration limits. Using the term "GTCC-like" does not have the intent or effect of creating a new classification of radioactive waste. A portion of the inventory also may contain co-mingled spent nuclear fuel rods. Together these classifications determine how the waste would be segregated and packaged for transportation and disposal, and the type of disposal required, either near surface or geological, based on the degree of isolation required.

The waste may contain constituents considered hazardous because of chemical or physical characteristics such as toxicity, reactivity, ignitability, or corrosivity. When radioactive waste contains hazardous waste, it is called mixed waste. The categories of mixed waste include mixed transuranic (MTRU) and mixed low-level waste (MLLW), which are regulated by the federal Atomic Energy Act (42 USC § 2011-2259), RCRA (42 USC § 6901), and HWMA (Idaho Code § 39-4401).

TRU waste contains isotopes such as plutonium-239 and americium-243, which remain radioactive for tens of thousands of years. These elements are classified as TRU because they have an atomic number greater than uranium. By definition, TRU waste contains more than 100 nanocuries TRU per gram (nCi/g) of waste of alpha-emitting TRU isotopes with half-lives greater than 20 years. A nanocurie is a unit of measure based on how many atoms of a radioactive substance disintegrate per second. The DOE has constructed the Waste Isolation Pilot Plant (WIPP) as a special geologic disposal facility near Carlsbad, New Mexico, for defense-related contact-handled (CH) TRU waste and RH TRU waste disposal. TRU and most MTRU waste can be disposed of at the WIPP without treatment; however, certain reactive MTRU waste requires treatment before shipment and disposal. At minimum, the RH TRU waste stored at the INL Site will require repackaging before being shipped to the WIPP**.**

Final disposal for GTCC-like waste is not currently available. DOE published a Notice of Intent on July 23, 2007 (DOE 2007). The Notice of Intent states DOE's intention to prepare an environmental impact statement for a proposal to establish a disposal facility for GTCC low-level radioactive waste, which will include GTCC-like waste. The GTCC-like waste would be stored on-Site until this facility is established and becomes available.

Final disposal for RH LLW is currently available at the Radioactive Waste Management Complex (RWMC) and the Nevada Test Site. Treatment (non-sodium-contaminated) and disposal of RH MLLW is also currently available at the Nevada Test Site. However, both of these facilities are currently scheduled to be closed or may no longer be available to accept these waste streams within the needed timeframe. Appropriate on-Site or off-Site facilities would be used to dispose of RH LLW and RH MLLW. If no disposal options are available during project operation, the waste would be returned to the RSWF for storage until final disposition is available.

2.2 Remote-handled Waste Inventory and Current Storage Facilities

This section describes the RH waste storage facilities at the INL and Hanford Sites where over 980[a] containers (see Table 1) filled with approximately 327 m^3 of waste[b] are stored. It also details the types of RH waste stored in each facility (chemical and radiological characteristics and container types), and describes the potential waste streams considered for sorting, characterizing, treating, and repackaging under the proposed action. Not all of this waste may require final processing, but is included to fully ascertain the environmental and health effects of proposed and alternative actions.

Table 1. Remote-handled waste stored at the Idaho National Laboratory and Hanford Sites.

Site	No. of Remote-handled Waste Containers
Idaho National Laboratory Site	979
Hanford Site	4
Total	983

2.2.1 Remote-handled Waste Storage at the Idaho National Laboratory Site

The 979 containers (approximately 322 m^3) of RH waste are stored at MFC and INTEC facilities at the INL Site. Table 2 shows the total number of waste containers currently stored at each facility.

Waste stored at the INL Site must be characterized, sorted and segregated, and treated as necessary and/or repackaged in a remote-handling facility to prepare it for final disposal (see Section 2.1). Treatment and repackaging requirements are set forth in State of Idaho and federal hazardous waste and mixed waste regulations and legal agreements (see Section 1.)

Table 2. Remote-handled waste stored at the Idaho National Laboratory Site.

Facility	No. of Remote-handled Waste Containers
Materials and Fuels Complex	949
Idaho Nuclear Technology and Engineering Center	30
Total	979

2.2.1.1 Remote-handled Waste Storage at Materials and Fuels Complex. The 949 containers (approximately 317 m^3) of RH waste at MFC are stored in the RSWF and other miscellaneous storage facilities. Table 3 summarizes the quantity of waste stored at the MFC facilities.

Radiological surveys indicate that radiation fields from almost all RH waste in these MFC facilities exceed 200 mrem/hr at contact by an order of magnitude. A few containers produce substantially higher radiation fields, up to 14,000 rem/hr. Safe handling requires thick shielding with dense materials (e.g., lead, concrete, and steel) to protect workers who handle the materials from harmful amounts of penetrating radiation.

Table 3. Remote-handled waste stored at the Materials and Fuels Complex.

Facility	No. of Remote-handled Waste Containers
Radioactive Scrap and Waste Facility	924
Miscellaneous Storage Facilities	25
Total	949

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a. This number represents the number of containers that may be transferred into the facility for either or both repackaging and treatment before final land disposal.

b. Increasingly accurate actual net volumes of remote-handled waste will be identified in future waste stream documents. This estimate is based on information provided to date.

2.2.1.2 Remote-handled Waste Storage at Radioactive Scrap and Waste Facility.
Currently, 924 containers (approximately 300 m^3) of RH waste are stored at the RSWF, a 4-acre fenced plot of land (see Figure 1). The waste containers are in liners, which are sealed carbon-steel pipes and buried vertically, with the top of the liners protruding above ground by several inches. In some cases, the inner containers would be removed from the liners and maintained separately. In other cases, the liners and their contents would have to be removed from the ground and managed as the waste package. In this case, the liner becomes the container. In this EA, the waste packages, inner containers, and removed liners are referred to as *containers* and the in-ground storage vaults are referred to as *liners* (see Figure 2).

Figure 1. Remote-handled waste storage at Radioactive Scrap and Waste Facility.

The waste stored at RSWF consists of sodium-contaminated and nonsodium-contaminated TRU, MTRU, LLW, MLLW, and GTCC-like waste and spent nuclear fuel material. Before 1992, these materials were often co-mingled within the same container. The radiological inventory primarily consists of uranium, plutonium, other TRU isotopes, and shorter-lived isotopes such as cesium and cobalt. The hazardous constituents in the waste primarily consist of reactive metals (sodium and sodium-potassium alloy), which are categorized as reactive and ignitable, making the waste difficult to handle and treat. Ignitability depends on such variables as temperature, humidity, exposure to moisture, and the physical form of the material. Also, some of the material is contaminated with other hazardous components (e.g., toxic metals). The waste containers at RSWF primarily are filled with debris that emits a higher radiation field than the RH waste stored at other MFC facilities. Each container holds one or more of the following: steel cans, sodium/sodium-potassium alloy, process compactables, spent nuclear fuel assemblies, steel liners, steel hardware, gravel, lead shield plugs, toxic metals, and process components (ANL-W 2004). This waste originated from operations of three major hot-cell facilities at MFC and Experimental Breeder Reactors-I and –II as well as Argonne National Laboratory-East.

Through the years, four different liner sizes and inner container configurations have been used to safely store waste at RSWF (see Figure 2). These liners are fabricated from carbon steel and protected from corrosion by a cathodic protection system (the first-generation liners were not cathodically protected). Smaller individual containers of waste (referred to as canisters or cans) are lowered into the liners from a transfer cask. Then a lid/shield plug assembly is installed in the top of the liner. The soil provides radiation shielding, which, in conjunction with the radiation shield plug, provides the shielding to meet radiological exposure requirements. Before 1978, the smaller waste containers were not designed to be removed from the liners to access waste.

The first type of liner (see Figure 2A) and inner container configuration used to store waste at RSWF is referred to as a first-generation liner. These liners are 16 in. in diameter, 12.4 ft long, and filled with waste loaded into thin-walled inner containers known as “paint cans.” All of these paint cans were dropped into the liners and most were covered with gravel to provide radiation shielding. It is assumed that some of the paint cans ruptured when dropped because of their thin walls and the fact they were loaded with up to 1,000 lb of steel components. These first-generation liners were not cathodically protected, which resulted in severe corrosion. In the worst cases, corrosion caused perforation of some of the liners. Beginning in 1990, as a result of the potential for breaching, the first-generation liners were overpacked into new 24-in.-diameter, 13.67-ft-long, cathodically protected liners. Figure 2A illustrates a paint can within a 16-in.-diameter liner overpacked in a 24-in.-diameter liner.

The second type of liner and inner container configuration used at RSWF consists of a cathodically protected 16-in.- diameter, 12.4-ft-long carbon-steel tube filled with waste in a double-walled container known as the Hot Fuel Examination Facility (HFEF)-5 can assembly (see Figure 2B). The HFEF-5 can assembly was lowered by a crane into the liner, and the lid/shield plug assembly was installed on top of the liner. Figure 2B shows the HFEF-5 can within a 16-in.-diameter liner.

The third type of liner is a 26-in.-diameter, 12.33-ft-long cathodically protected carbon-steel liner loaded with a container known as the Sodium Loop Safety Facility can. Figure 2C shows a Sodium Loop Safety Facility can within a 26-in.-diameter liner.

The remaining liners, which are loaded with waste, are referred to as nonstandard. These liners, which range in diameter from 30 to 60 in., contain large process components, such as cold traps and nuclide traps. Figure 2D shows the 60-in.-diameter liner with an Experimental Breeder Reactor-II primary cold trap.

2.2.1.3 Remote-handled Waste Storage at Materials and Fuels Complex Buildings.

Currently, seven waste containers (approximately 6 m^3) are stored in the Sodium Components Maintenance Shop. The containers, called cold traps, removed impurities from the Experiment Breeder Reactor-II sodium systems. Although the containers are shielded to reduce the surface radiation field to CH levels (less than 200 mrem/hr), the waste inside is RH. An additional 18 waste containers (approximately 11 m^3) are in storage at other miscellaneous facilities located at MFC. This waste includes filters, debris, sludge, light bulbs, and analytical laboratory waste. Waste types vary, and include MTRU, TRU, and MLLW.

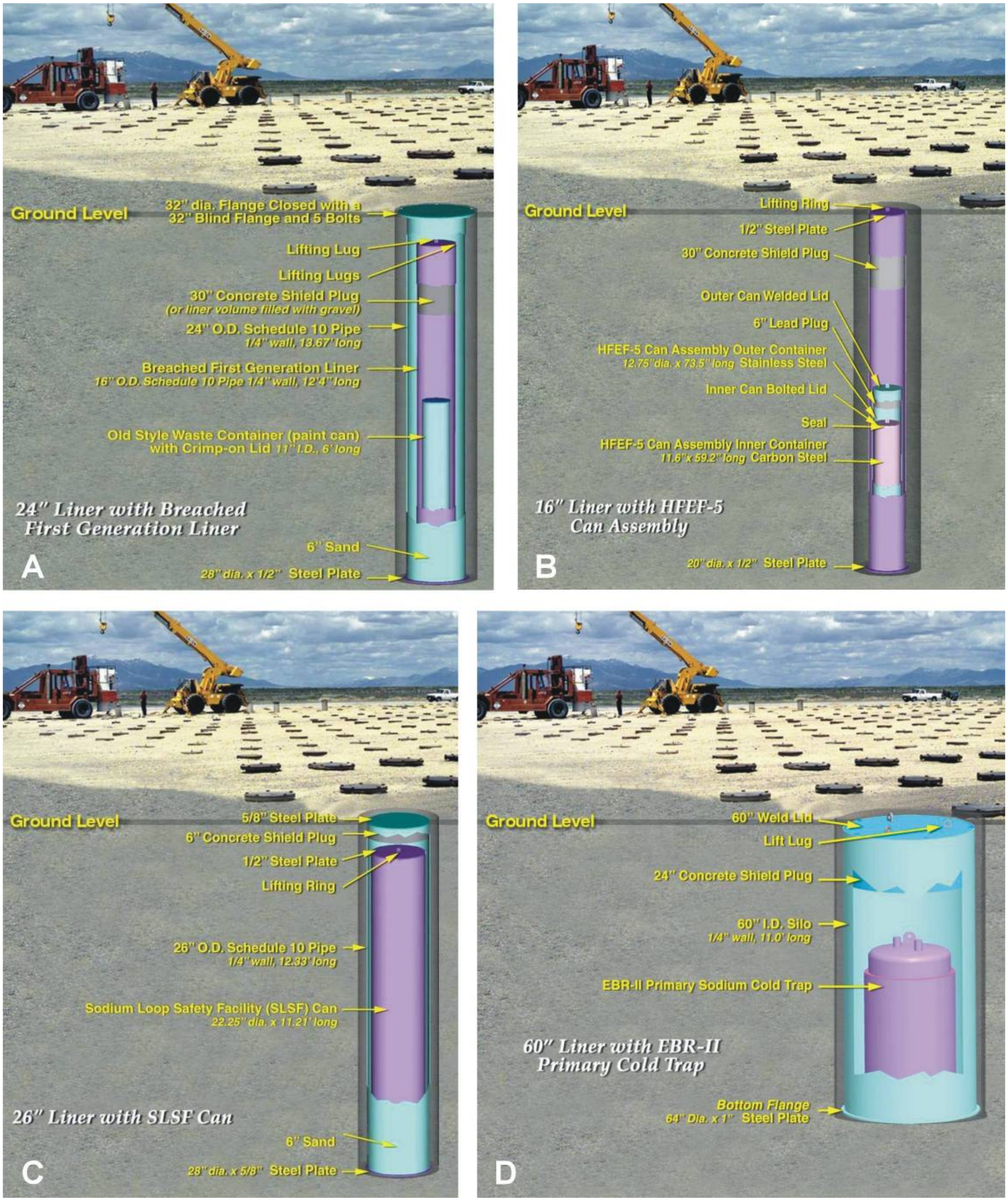

Figure 2. Radioactive Scrap and Waste Facility storage liner configurations.

2.2.1.4 Idaho Nuclear Technology and Engineering Center Interim Storage Facility.

Thirty waste containers (approximately 5 m^3) are stored at INTEC in CPP-1789, which is located southeast of CPP-1617. CPP-1789 is a fenced asphalt/concrete pad, approximately 154 ft by 194 ft, located inside the INTEC facility fence near the southwest corner of the INTEC area. The 30 HFEF-5 cans, referred to as inserts, are stored in interim storage containers that can each hold up to four HFEF-5 cans. The HFEF-5 cans would remain in the interim storage containers at CPP-1789 until they are processed.

The waste in the 30 HFEF-5 cans was generated from destructive examination of fuel elements irradiated in the Experimental Breeder Reactor-II reactor. The waste consisted of laboratory equipment and disposable material contaminated with radioactive material during the destructive examination, but did not include the fuel elements themselves.

2.2.2 Remote-handled Waste Storage at the Hanford Site

Six special components, four "traps" and two filter traps, are located in-cell in the FFTF at the Hanford Site. They are referred to as the Special Components because they may have high radiation fields requiring either or both shielding and special handling and are expected to contain large quantities of sodium. In addition, they are large and heavy, and, therefore a challenge to remove, package, store, ship, and process.

The dimensions and weight of the traps are summarized in Table 4, but may not represent the actual size of the components as cut from the cells in the facility. The final dimensions depend on the procedures used to remove and package these components. A primary goal of the procedures is to minimize the overall dimensions by cutting and capping piping close to the components and removing attached material, such as trace heaters and insulation.

Table 4. Fast Flux Test Facility special component dimensions and weights.

Component Number	Name/Function	Dimensions (Approximate)	Weight[a] (Estimated) lb
N-5	Primary Cold Trap	103 in. long by 61 in. diameter	16,000
N-3	Cesium Trap	77 in. long by 56 in. diameter Crystallizer tank diameter = 20 in.	2,000
U-527[b]	5 scfm[c] Condenser Vapor Trap (Type I)	Assembly minus preheater length = 100 in. Width across flanges = 42 in. Tank diameter = 30 in.	4,850
U-532[b]	1 scfm Condenser Vapor Trap (Type II)	61 in. long by 20 in. across mounting flanges Tank diameter = 10.75 in.	575
VT-63, VT-64	U-527 Filter Vapor Trap Type I, 58 ft^2	82 in. long by 25 in. diameter across mounting flanges	665
VT-61, VT-62	U-532 Filter Vapor Trap Type II, 15 ft^2	35 in. long by 19 in. across mounting flanges	241

a. Weights are as manufactured without sodium or added structure, pipe, trace, heat, and insulation.
b. Each Condenser Vapor Trap has two associated filters.
c. scfm = standard cubic feet per minute

The function of the Primary Cold Trap was to remove sodium oxide and sodium hydride impurities from the sodium coolant. The Cesium Trap was installed to remove cesium from the primary sodium known to have escaped from fuel pin “leakers” during reactor operation. The sodium vapor trap consists of a condenser vapor trap followed by a pair of filter vapor traps (one on-line and a spare). Preceding the condenser is a high temperature section of piping called a preheater, which heats the sodium from an aerosol form and converts it to a vapor. The condenser unit works by cooling the gas and condensing the sodium on to a borosilicate glass medium called “Raschig rings.” The condensed sodium flows back to the original sodium pool. The filter vapor trap has sintered metal media and catches any re-entrained aerosol.

3. PROPOSED ACTION AND ALTERNATIVES

The DOE developed selection criteria to determine potential alternatives that would meet its purpose and need identified in Section 1. The following is a list of those selection criteria:

- The alternative must allow for complete processing and shipping of TRU/MTRU waste by a target date of December 31, 2015, and no later than December 31, 2018, based on the court-approved 1995 Settlement Agreement (Idaho 1995)
- The alternative must ensure containment of particulate radioactive materials and hazardous constituents, safe handling and passivation of reactive metals, and minimize worker exposure from intense radiation fields
- The facility must be located near existing utilities not scheduled for removal before 2018
- The alternative must minimize schedule impacts caused by transportation
- The alternative must not impact other DOE programmatic and operational activities
- The alternative must result in final waste forms that meet transportation and disposal requirements.

These criteria provided the basis for determining the alternatives considered and analyzed, which include:

Alternative 1 - INTEC Existing Facilities Alternative (Preferred Alternative)
Alternative 2 - MFC/INTEC Existing Facilities Alternative
Alternative 3 - INTEC Existing Facility and New Construction at MFC Alternative
Alternative 4 - MFC Existing Facilities and New Construction Alternative

The No Action Alternative and eliminated alternatives are also discussed in this section. The two eliminated alternatives were considered, but not analyzed (see Section 3.3).

3.1 Description of Proposed Action

3.1.1 Waste Processing Phases

The waste would likely be processed in four phases. Waste processing activities for the first three phases include receiving retrieved containers, opening the containers, removing the shield plugs, and removing filler material to expose the waste. The final processing step would characterize, size, and repackage the waste as RH or CH LLW, MLLW, TRU, or GTCC-like waste. Phases I, II, and III would not include any sodium-contaminated waste or waste comingled with fuel pieces. This waste would be processed under Phase IV. A description of each phase follows:

<u>Phase I</u>: Move the 30 HFEF-5 cans of TRU waste currently stored at the INTEC Interim Storage Facility to a hot cell. Waste processing activities include receiving retrieved containers, opening the containers, and removing shield plugs and filler material to expose the waste. Real-time radiography (RTR), waste sampling, sizing, and waste repackaging would be performed. These activities would support waste certification for disposal at WIPP if determined to be defense-related waste. Shipment of the waste to WIPP would complete the phase.

<u>Phase II</u>: Phase II activities would include the processing of 44 HFEF-5 cans stored at the RSWF that do not contain sodium or sodium-contaminated components and that are not comingled with fuel pieces.

Most of this waste is TRU, but other waste streams may be encountered (such as MTRU) or generated through processing. The waste would be processed similarly to Phase I to support waste certification for disposal at WIPP.

Phase III: This phase would be similar to the previous two; however, MLLW, TRU and MTRU waste would be addressed in this phase and the waste would not necessarily be stored in HFEF-5 cans. This waste stream may be stored in 18 standard waste containers. Like Phase II, waste consists of TRU and MTRU, but consists of waste from other miscellaneous MFC facilities. Because the waste may contain hazardous constituents (see description in Section 2.2.1.3), TRU and MTRU waste would be segregated prior to repackaging for certification for WIPP disposal if determined to be defense-related waste.

MLLW would be repackaged for shipment to an off-Site treatment, storage, and disposal facility, as the hot cells are not permitted for the treatment(s) necessary to make this waste compliant with land disposal restriction standards. If commercial treatment is unavailable at the time waste is repackaged, the waste would be returned to MFC to be stored until the required treatment becomes available. The MLLW would be tracked in the INL Site Treatment Plan (INL 2008) until it is shipped off-Site for treatment.

Phase IV: Retrieve remaining 788 waste containers currently in storage at the RSWF (see description in Section 2.2.1.2). This phase could also include processing of the RH-SCs from FFTF and this waste may contain sodium and be comingled with fuel pieces. Transport the waste to a cell for processing for disposition at WIPP if determined to be defense-related waste. Refer to Section 2.1 for a discussion of the disposal paths for all waste types.

3.1.2 Waste Processing Steps

To satisfy the complete processing of TRU/MTRU waste by the target date, the following actions would be performed under any of the alternatives except the No Action Alternative.

3.1.2.1 Retrieval. Most waste addressed in this action is stored at MFC. Most waste containers at MFC are stored in the RSWF, as discussed in Section 2.2.1.2. Retrieval actions would be performed by facility personnel and include the following steps:

1. Retrieve waste containers using a backhoe, crane, forklift, and transfer cask (see Figure 3)

2. Ensure containers meet the Remote-handled Waste Disposition Project (RWDP) Waste Acceptance Criteria

3. Load containers into shipping casks

4. Seal casks in accordance with transportation requirements

5. Load casks on truck or trailer.

Facilities may be constructed at or near the RSWF to perform the above-listed steps. Figure 4 shows the location of the proposed facilities as well as the functions they would support. The facilities may also provide interim storage to support waste retrieval and transportation. Additional interim storage could be placed in the center, i.e., the BB row of the RSWF, where currently, there are no storage liners (see Figure 4). Along with the new liners, concrete tracks could be placed in selected areas and within some of the rows of waste stored in the RSWF. The tracks would allow a backhoe, forklift (see Figure 3), and other similar equipment to continue retrieval operations during wet weather, which could otherwise create soil conditions unable to support the equipment's weight.

Figure 3. Forklift and cask.

If the hot cells at INTEC are used to perform the proposed action, the existing available RSWF roadway may not accommodate the transport trucks. Therefore, the following modifications would be required. Approximately 1 mile of existing roads would be improved to accommodate the large transport trucks. The road from the northeastern corner of the RSWF to the paved road that intersects with the MFC access road (see Figure 5) would require improvement. Improvements would include leveling and widening the road, as well as constructing bridges to withstand the weight and prevent damage to existing buried utilities. The modifications described in this section would be within previously disturbed areas. The modifications would minimize costs and impacts of transportation and ensure process efficiency.

3.1.2.2 Transportation. The following transportation information would apply to the waste requiring transporting from one facility to the other, but would not apply if the waste is transferred within a facility. When transporting radioactive waste on a DOE site, two options are available. The first option is an "in-commerce" shipment that complies with all applicable Department of Transportation (DOT) regulations. This would mean that the material would be moved in an NRC or DOE cask licensed for Type B radioactive materials. Additionally, all applicable radiation protection and emergency response requirements would be met.

In some instances, full compliance with DOT or NRC regulations is impossible (oversized loads) or impracticable (unavailability of casks) when transporting radioactive materials on a DOE site. In such cases, an equivalent level of safety is achieved by using alternate engineering or administrative controls to protect the public and workers. The shipment is taken "out of commerce" by blocking public access, providing security escorts, and adding radiation shielding, as needed. These shipments are called nonroutine shipments and undergo an extensive safety analysis and review process to ensure proper safety plans are developed and implemented.

3.1.2.2.1 In-Commerce Shipments—An extensive search of the available casks has revealed no NRC or DOE licensed casks that meet the configuration requirements of the RH waste discussed in this document. Therefore, to transport this waste as a compliant, in-commerce shipment, the project would have to design and build a cask. Based on previous industry experience, it is estimated to take from three to four years to design, build, and license a new cask for in-commerce shipments. This timeframe is impractical for in-commerce shipments of INL waste.

The RH-SC waste stored at the Hanford Site FFTF would be shipped in-commerce from FFTF to a hot cell at INTEC or at MFC using NRC-licensed casks.

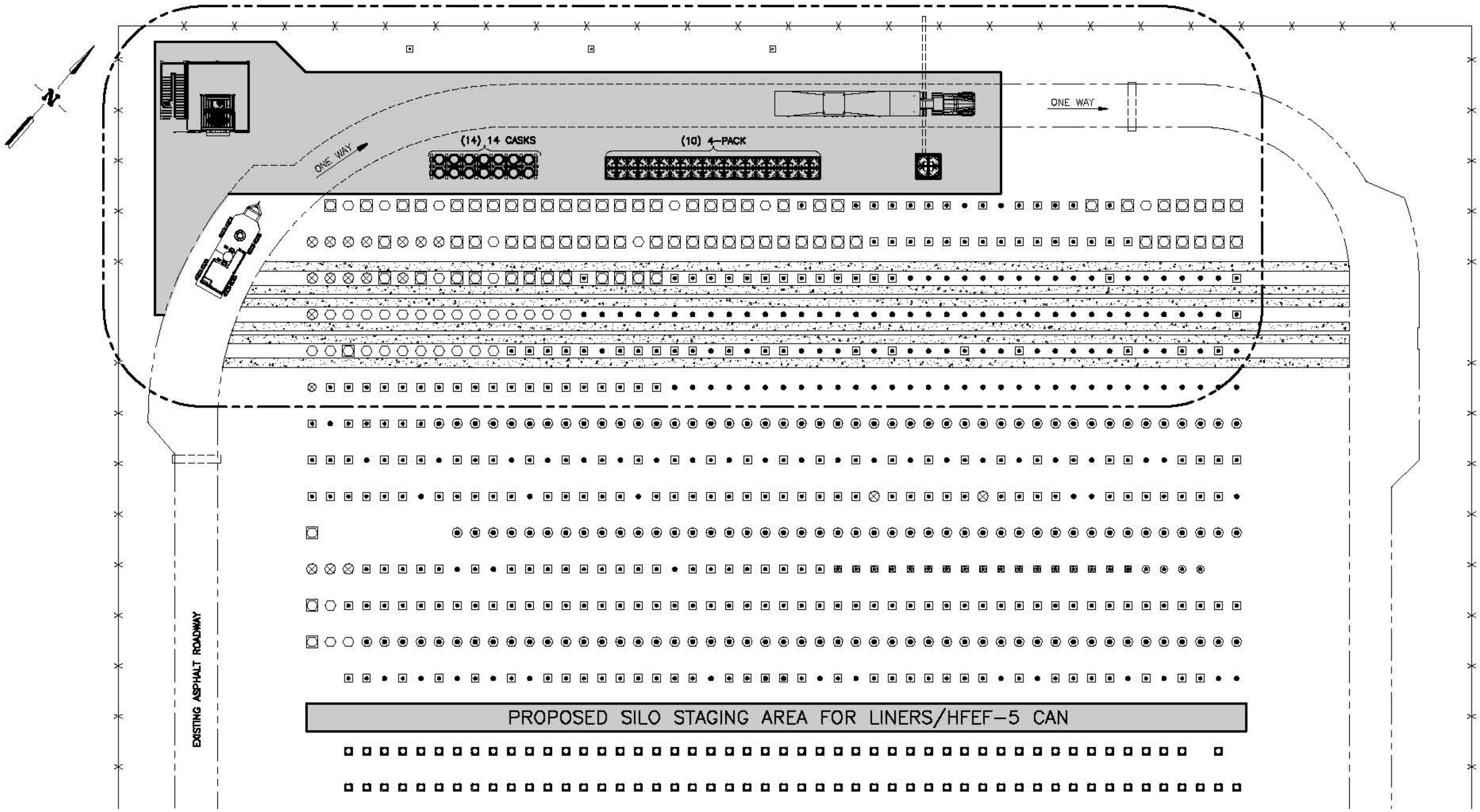

Figure 4. Radioactive Scrap and Waste Facility with proposed interim storage facilities.

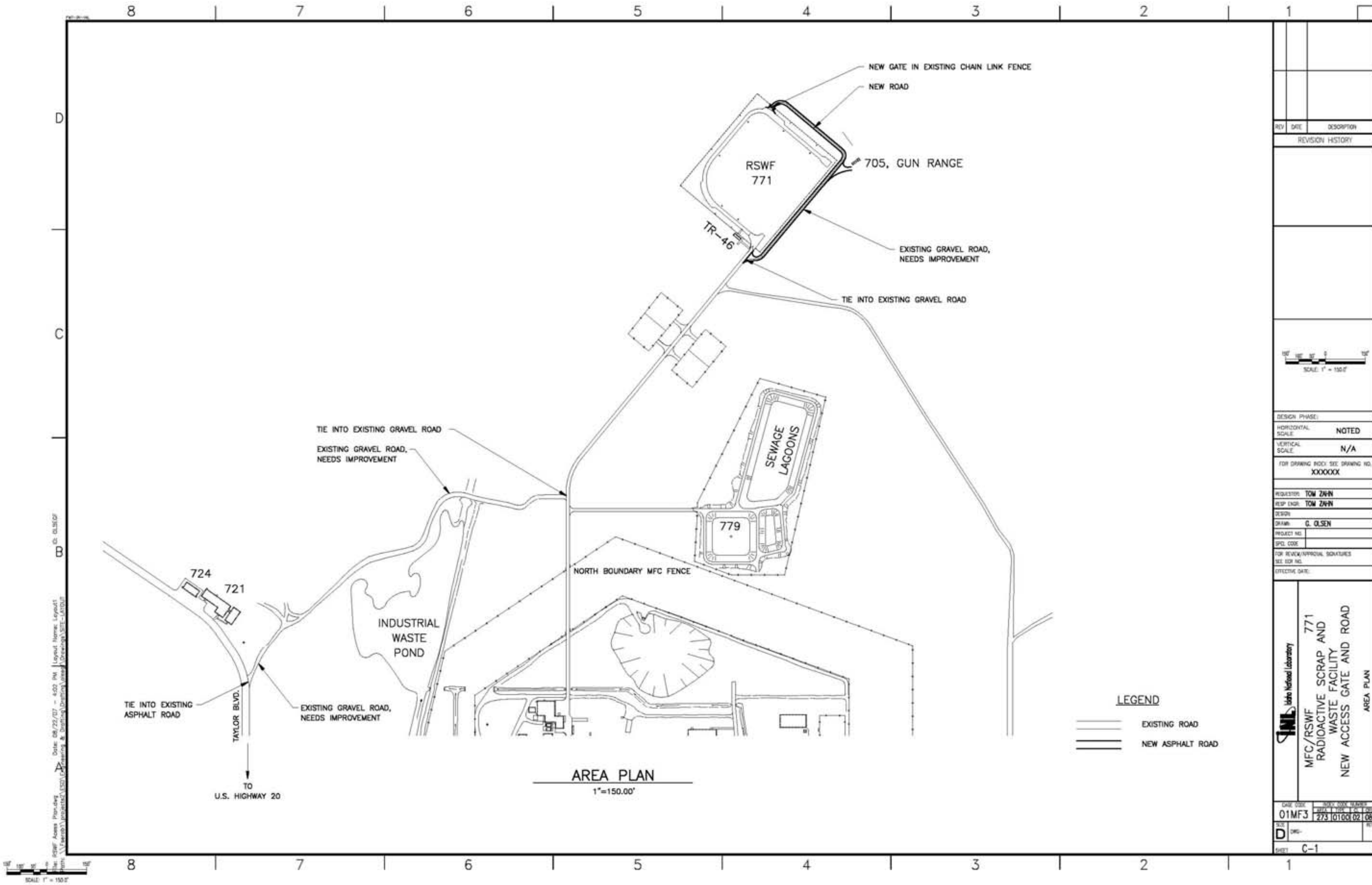

Figure 5. Existing roads requiring improvements near the Radioactive Scrap and Waste Facility.

3.1.2.2.2 Out-of-Commerce (Nonroutine) Shipments—Out-of-commerce shipments would likely be used to transport waste from MFC to INTEC or from INTEC to MFC. Should U.S. Highway 20 be used, access would be restricted by blocking U.S. Highway 20 east of the entrance to MFC and west of the U.S. Highway 20 and Fillmore Boulevard or the East Portland Avenue intersection (see Figure 6). The shipments would be escorted by INL security guards from MFC to Fillmore Boulevard or East Portland Avenue via U.S. Highway 20 and then generally north to INTEC via on-Site roads that are restricted from public access. Closure of the public portion of the highway would be communicated and coordinated with the Idaho DOT.

Typically, the road would be closed less than 1 hour. To minimize impact to the traveling public, the road would be closed between 12:01 a.m. and 5:00 a.m. when traffic is lightest. However, occasional daytime transports may be necessary to support project needs or accommodate inclement weather.

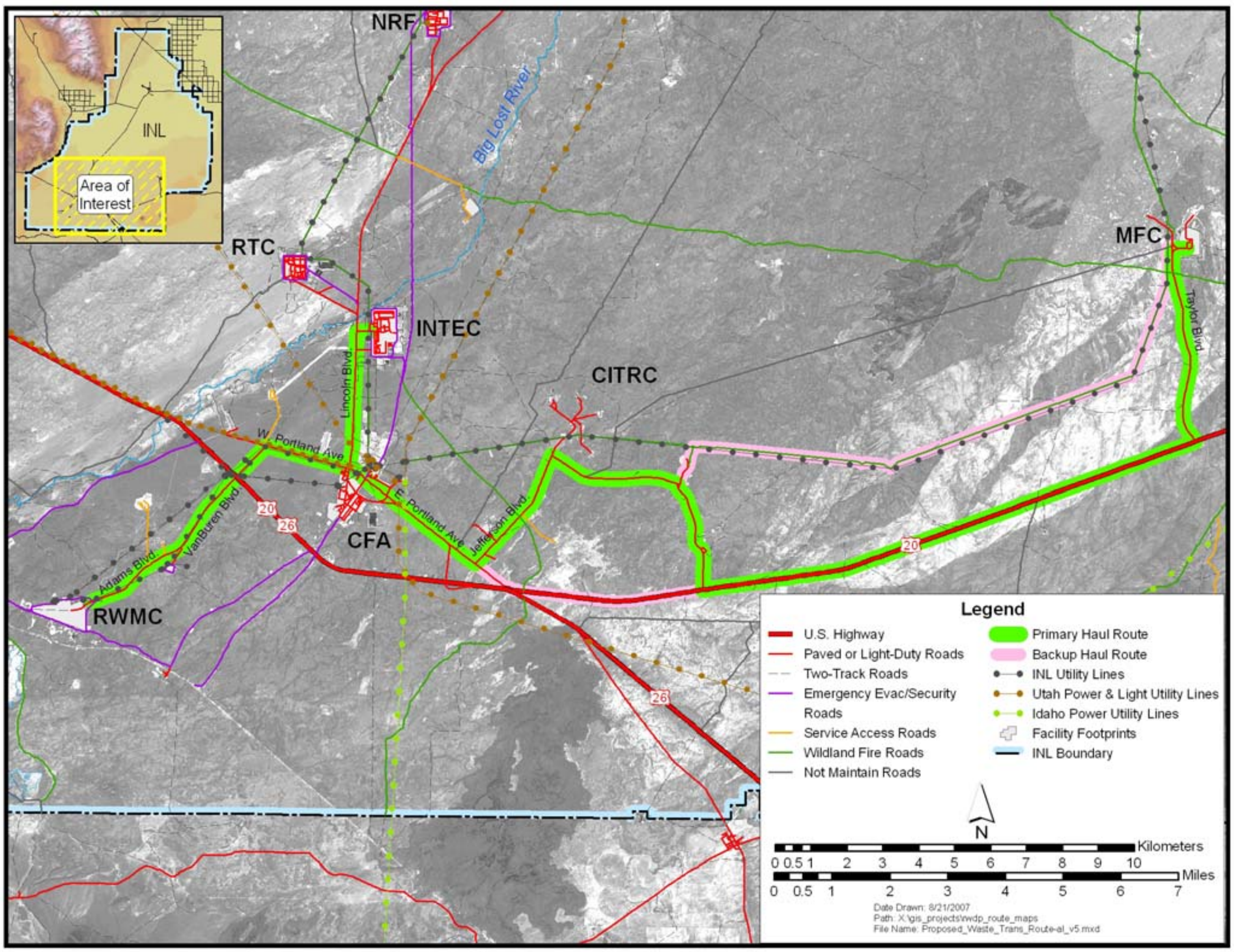

Figure 6. Transportation routes from the Materials and Fuels Complex to Idaho Nuclear Technology and Engineering Center.

New shielded shipping casks would provide transportation flexibility. The cask would provide sufficient shielding to protect workers. These casks could be built and designed to interface with the RSWF storage area and the hot cell. The following is an example of the process: fabricate 15 shielded shipping casks, five casks would be used for a loaded convoy of RH TRU containers, while five would be returned as empty, leaving five available for temporary interim storage.

Nonroutine waste shipments could also be accomplished using an existing two-track road, the East Powerline Loop Road. (Hereinafter, this road is referred to as T-25 Powerline Road.) The T-25 Powerline Road route would begin at pavement on Taylor Boulevard, the main access road to MFC. From there, the route would follow along a short, 0.10 mile-long stretch of trail T-3 until the T-25 Powerline Road is reached. The route would then turn southwest along the T-25 Powerline Road, meandering along on either side and under the lines to the west-southwest approximately 9.90 miles. At this point, the route would leave the T-25 Powerline Road and follow another existing gravel road south approximately 0.40 mile to connect to rough pavement on Fillmore Boulevard at the Auxiliary Reactor Area-IV Facility (see Figure 6).

The T-25 Powerline Road is classified as a two-track Priority 3 road. A Category 3 road is maintained as passable (but not graded) to 4 × 4 vehicles for wildland fire access and maintenance on the power lines that run through the INL. The road is used seasonally so there is no snow removal. Maintaining Priority 3 roads consists of filling pot holes by dumping gravel fill material in holes or ruts and leveling and compacting the fill by driving back and forth over the new material with the dump vehicle or using hand tools, as necessary. Should the T-25 Powerline Road be used to support the proposed action, it would require modification and upgrades (described below). The upgraded road would be classified as a Category 2 road. Category 2 roads are upgraded to support a project. The project would determine what would need to be done to the road to support their intended use. To support the waste shipments described in this document, the actions described below would be required for the initial use. The road would be used from late spring to late fall, with no snow removal. After a heavy-snow season, sections of the road may require grading and filling for the next series of shipments.

To support the waste transportation, extensive improvements would be necessary along this route. All sections of the existing road would require grading, leveling, graveling, and compaction. In addition, some of the more pronounced curves along the route would need to be straightened out. This may require blasting of basalt bedrock. Low areas and steeper hills would require extensive fill to create grades that are suitable and safe for the waste transports. Drainage channels and culverts would be necessary in some places. The width of the upgraded surface would be approximately 25 ft, with road shoulders of varying widths between 10 – 20 ft, depending on the final design and grade. Final design would be completed if this route is selected. In the interim, to assess the potential impacts of the road improvements, it has been assumed that a 120-ft-wide corridor would accommodate all of the necessary upgrade activities.

If the T-25 Powerline Road was upgraded to provide an optional route for shipment of waste to support the RWDP, other projects may choose to use it as their transportation route. Some examples of potential future use of the T-25 Powerline road include:

- Transport neptunium oxide targets from MFC to Reactor Technology Complex for irradiation. Return of the targets to MFC for processing.
- Transport special nuclear materials from MFC to INTEC
- National Security actions.

This additional future use of the T-25 Powerline Road could add approximately 450 trips per year.

3.1.2.3 Waste Processing. The process equipment systems to support processing activities in the cell are discussed in the following subsections in the sequence that the waste materials would be handled. Figure 7 shows a waste process flow diagram.

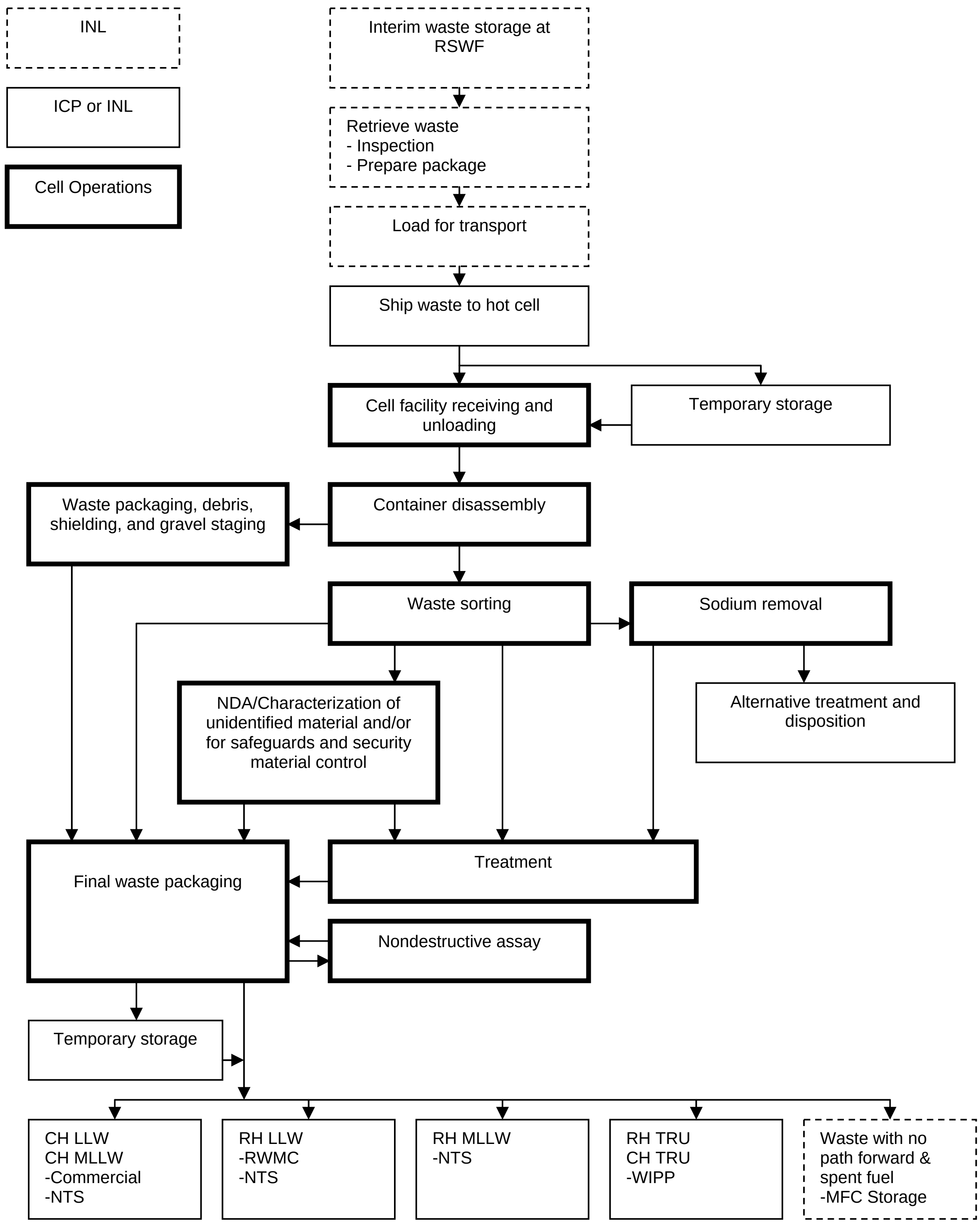

Figure 7. Remote-handled Waste Disposition Project waste flow diagram.

The Container Disassembly and Sorting Station would be located within the cell and used to receive retrieved containers and open the containers, remove shield plugs, and remove filler material to expose fuel or waste. The container and packaging material is anticipated to be sorted as LLW. Once fuel or waste in the inner canister is exposed, the material would be sorted into fuel and nonfuel components, and sodium-contaminated waste would be segregated from other waste. Sodium-contaminated waste would be sent to a processing system within the cell for sodium removal and processing. Any spent fuel would be packaged and placed back in storage at RSWF. The remaining waste would be characterized and sorted as RH or CH LLW, MLLW, TRU, or GTCC-like waste. If the waste is MLLW, it would be treated to land disposal restriction standards, packaged, and shipped to its appropriate disposal site. If treatment or disposal is unavailable at the time that the waste is repackaged, the waste would be returned to MFC to be stored until treatment or disposal becomes available. Figure 7 shows the available disposal sites for each waste stream.

Sodium is ignitable and reactive, which are hazardous characteristics under RCRA regulations. Sodium-contaminated waste components, which exhibit the characteristic of ignitability Environmental Protection Agency ([EPA] Hazardous Waste Number D001) and reactivity (EPA Hazardous Waste Number D003), may not be directly disposed without treating or removing the sodium. Much of the waste is expected to have limited (i.e., residual) quantities of sodium or sodium-potassium alloy (NaK), while only a few of the waste containers contain large quantities of sodium or NaK. Waste components containing sodium or NaK may be effectively treated by direct sodium deactivation using one of the following technologies or a similar technology.

(1) Water Vapor Nitrogen. The water vapor nitrogen process would be conducted in an inert environment (e.g., nitrogen) using a controlled amount of water vapor or water mists and sprays to react with the sodium metal. The water-sodium reaction in an inert environment will form sodium hydroxide and hydrogen. Hydrogen evolution would be monitored and maintained well below the lower explosive limit by controlling the amount of water available to react with the residual sodium. Hydrogen concentration in the off-gas may also be used to determine that the residual sodium has been treated effectively. The sodium hydroxide waste stream resulting from this process would be subsequently neutralized and solidified to meet disposal criteria as LLW. Figure 8 shows a typical process flow for this system.

(2) Larger quantities of sodium or NaK are more difficult to treat using direct sodium deactivation methods. Because sodium metal has a low melting point (97ºC), a low temperature melting process (e.g., melt-drain) may be used to remove larger quantities of sodium from the waste component. NaK, which is liquid at ambient conditions, may also be collected with the liquid sodium for subsequent treatment. Following the melt-drain process, waste components subsequently may be treated with the water vapor nitrogen or similar process to verify any residual sodium or NaK has been treated and the waste component is acceptable for packaging and disposition.

Sodium and NaK collected during the melt-drain process also may be deactivated by using the water-sodium reaction (e.g., the water vapor nitrogen process). The sodium hydroxide waste stream resulting from this process would be subsequently neutralized and solidified to meet disposal criteria as LLW.

(3) Another technology that could be used for treating waste that contains sodium or NaK would be the melt-drain-evaporate (MEDE**)** process. The principal function of the MEDE process equipment would be to remove sodium from RH waste containing sodium metal. The major components of the MEDE system are the furnace, process vessel, condenser and collection tank, and vacuum pump. The sodium would be melted, evaporated under vacuum, recondensed, and accumulated in a holding container. Once the sodium has been separated from the waste, the waste material would be sorted as a nonsodium-

contaminated waste. To treat the elemental sodium extracted by the MEDE process, it is anticipated that an existing MFC facility, the Sodium Process Facility, would be used.

(4) A Variation of the Water Vapor Nitrogen technology that could be applied is using high-temperature, super-heated steam to react with sodium in an inert atmosphere. The resulting sodium hydroxide would be neutralized and then solidified for disposal.

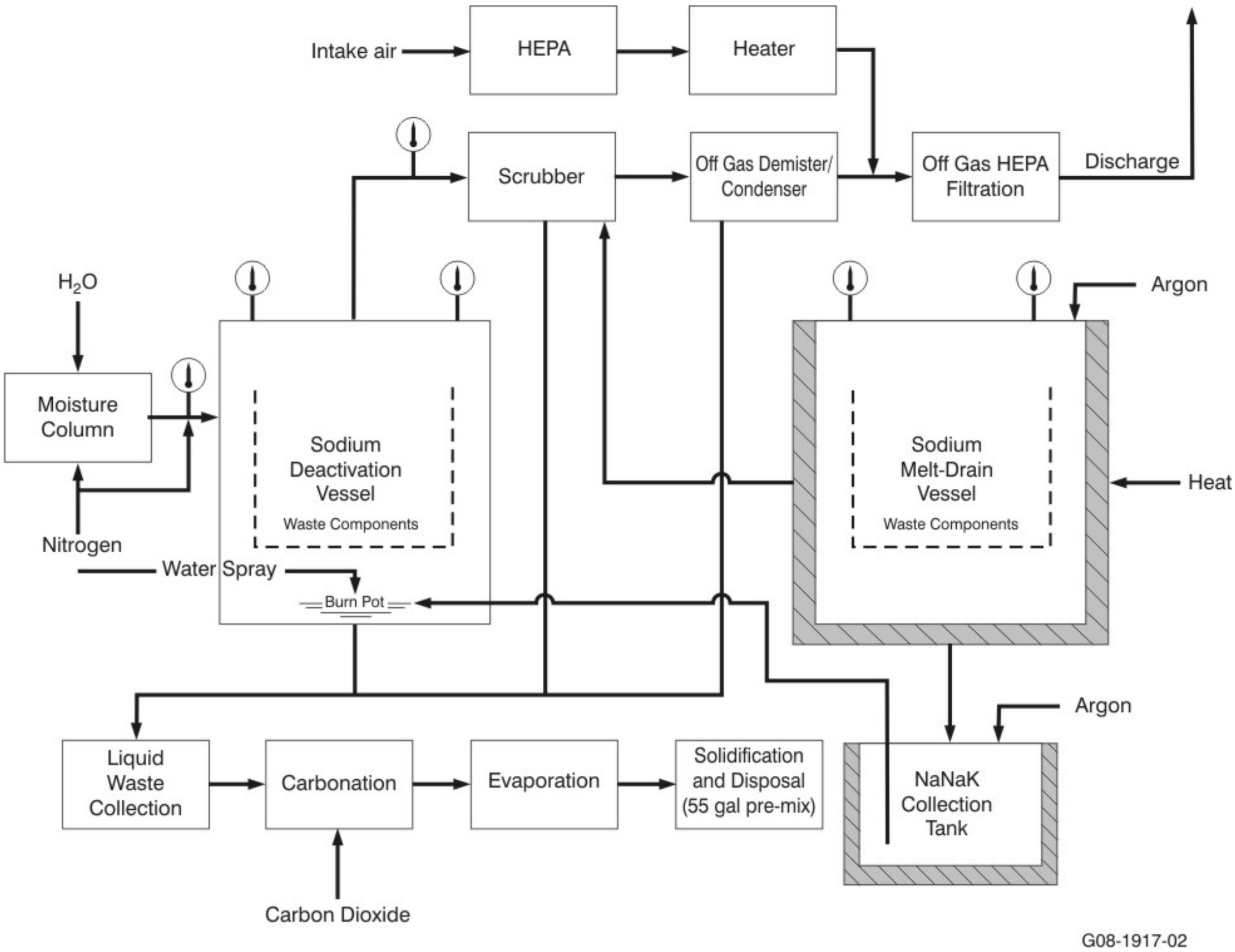

Figure 8. Simplified sodium process flow diagram.

3.2 Alternatives

The following sections describe the alternatives analyzed to complete the proposed action (Section 3.1). They are structured to include performing Phases I, II, and III in an existing modified INL hot cell. Phase IV would be completed in either a modified hot cell (New Waste Calcining Facility [NWCF] or Fluorinel Dissolution Process [FDP]) or a new hot cell (HFEF Annex or Mobile Hot Cell). To help understand this structure, a summary of the waste processing phases are as follows: Phases I, II, and III waste processing include opening the retrieved containers, removing the shield plugs, and removing the filler material to exposure the waste. RTR, waste sampling, sizing, and waste repackaging would also be performed. Waste segregation would be completed for Phase III waste. In addition to these waste processing activities, the sodium and NaK would be removed from the waste as would fuel pieces in Phase IV. Section 3.1.1 includes a detailed description of the phases.

3.2.1 Alternative 1 – INTEC Existing Facilities Alternative (Preferred Alternative)

Either the hot cells located in the NWCF (CPP-659) or the FDP Cell located in Fluorinel Dissolution Process and Fuel Storage (FAST) would be used to perform Phases I, II, III, and IV under Alternative 1, the Preferred Alternative. Modifications to the NWCF cells to support the waste processing actions would be completed as described in Section 3.5.1.2. Decontamination and modification would be performed as necessary for use of the FDP Cell as described in Section 3.5.1.3 to support processing the waste.

The two interim storage facilities available at INTEC (CPP-2707 and CPP-749) would be used for the Preferred Alternative.

3.2.2 Alternative 2 – MFC/INTEC Existing Facilities Alternative

The HFEF Decon Cell would be modified for Phases I, II, and III for Alternative 2. Modifications are described in Section 3.5.2.2. Interim storage needed for this part of Alternative 2 would be minimal since the containers would be delivered on a demand basis.

To complete Phase IV under Alternative 2, either the NWCF Cell or the FDP Cell would be used to perform waste processing actions. Modifications and decontamination would be performed as necessary to support the proposed action. The two interim storage facilities at INTEC (CPP-2707 and CPP-749) would be used for Phase IV under Alternative 2.

3.2.3 Alternative 3 – INTEC Existing Facility and New Construction at MFC

Alternative 3 includes the use of the hot cells located in the NWCF (CPP-659) to perform Phases I, II, and III. The two interim storage facilities available at INTEC (CPP-2707 and CPP-749) would be used for the Preferred Alternative.

Phase IV would be performed in facilities located at MFC for Alternative 3. Either the HFEF Annex or a Mobile Hot Cell would be used. The HFEF Annex would be constructed and operated as described in Section 3.5.2.3. The Mobile Hot Cell would be located near or within the RWSF and operated by a subcontractor. Performing Phase IV at these MFC facilities would require minimal interim storage.

3.2.4 Alternative 4 – MFC Existing Facilities and New Construction Alternative

The HFEF Decon cell would be modified for Phases I, II, and III. Phase IV would be performed in either the HFEF Annex or a Mobile Hot Cell at MFC.

Alternative 4 interim storage needs would be minimal. Containers would be delivered on a demand basis.

3.3 Alternatives Considered, but Eliminated from Detailed Analysis

3.3.1 Fuels Processing Facility

The Fuels Processing Facility, located at INTEC, is a specialized state-of-the-art facility designed in 1983, to recover highly enriched uranium from the dissolution of government-owned nuclear fuels. Construction of the Fuels Processing Facility was terminated in 1992, as part of the overall phase-out of uranium reprocessing at INTEC. The construction project was approximately 50% complete, with the basic structure completed as designed, but none of the process equipment or support systems were installed. The Fuels Processing Facility at INTEC fails to meet the following criterion:

- Complete processing of TRU/MTRU waste by a target date of December 31, 2015 and no later than December 31, 2018, based on the court-approved 1995 Settlement Agreement (Idaho 1995).

The facility does not include a cell that would provide the necessary containment. In addition, the facility was not designed to move large solid materials through a series of processing steps that would be needed for the RWDP process. A cell that includes all the necessary systems could not be constructed by the target dates.

3.3.2 Hanford T-Plant Complex

The Hanford Site T-Plant Complex is designed to handle RH LLW, RH MLLW, TRU waste, and MTRU waste. In accordance with their waste acceptance criteria, this facility will not accept uncharacterized or unsegregated (packaged by waste category) waste, which would require unpackaging, segregating, characterizing, and repackaging all the RSWF waste containers. The Hanford T-Plant Complex fails to meet the following criteria:

- Complete processing of TRU/MTRU waste by a target date of December 31, 2015, and no later than December 31, 2018, based on the court-approved 1995 Settlement Agreement (Idaho 1995)

- Minimize schedule impacts caused by transportation

- Not impact other DOE programmatic and operational activities.

3.4 No Action Alternative

The No Action Alternative would leave the RH waste in storage at MFC facilities. The long-term storage of containers could lead to regulatory compliance and possible environmental release problems because of deterioration of the liners and possible external release of pollutants to the surrounding soil. Surveillance and monitoring activities would continue according to the RSWF RCRA permit.

The RH waste at the INTEC Interim Storage Facility would remain in storage in the aboveground temporary storage containers. Current surveillance and maintenance activities of containers would continue.

The traps located in-cell of the FFTF at the Hanford Site would remain in place for future management, and current surveillance and maintenance activities would continue.

3.5 Potential Locations

Several existing hot cells would accommodate the proposed action with modifications and installation of new equipment. Two of the hot cells are located at INTEC and one cell is located at MFC. A new facility (HFEF Annex) could be constructed at MFC or a Mobile Hot Cell could be assembled and operated near the RWSF. The following sections provide a description of each of the hot cells and applicable modifications and interim storage facilities. The sections are divided by INTEC and MFC, respectively.

3.5.1 Idaho Nuclear Technology and Engineering Center

3.5.1.1 Description of Interim Storage. For operations at INTEC, an interim storage facility to temporarily store containers before or after processing would be needed to ensure operational continuity and process flow (supply chain management adequately meets feed stock requirements). It is anticipated that two existing INTEC facilities located south of CPP-666 (see Figure 9) would be used for interim storage. The CPP-2707 Storage Pad is a concrete storage pad currently used to store casks that were used to transport spent nuclear fuel. The second facility, the Peach Bottom Fuel Storage Facility (CPP-749), would be viable for this purpose, with some expansion. Currently, several silos are empty within CPP-749 that would accommodate the containers. Additional silos could be added within CPP-749, if required.

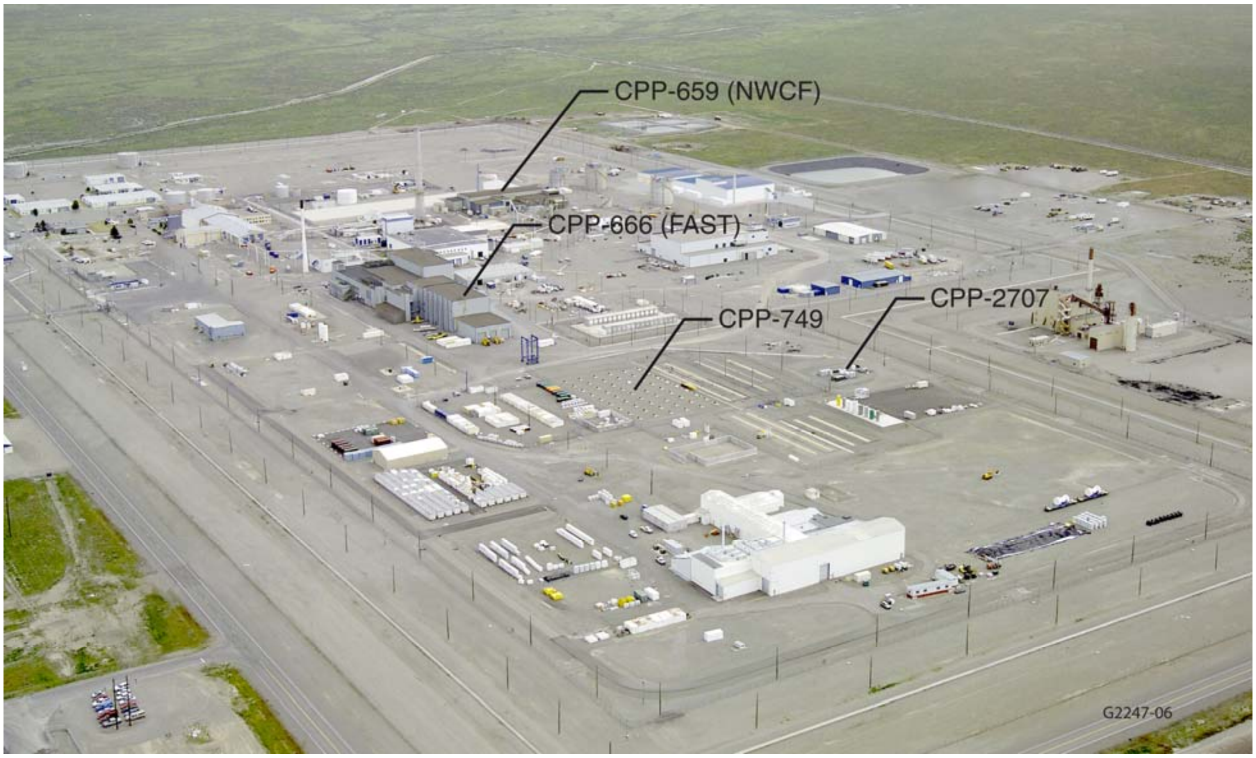

Figure 9. Location of CPP-659, CPP-666, CPP-749, and CPP-2707 at the Idaho Nuclear Technology and Engineering Center.

3.5.1.2 Description of New Waste Calcining Facility Cell. The NWCF is divided into two major functional areas, the calciner area and the decontamination area. The decontamination area contains several hot cells. Cell 308 and Cell 306 are described below.

Cell 308, which would be used for waste processing, has approximately 380 ft^2 of floor space, with 3-ft-thick, high-density, concrete shielding walls up to 8 ft high and a 1-ft-thick concrete floor. Stainless steel lines the entire cell. Equipment provided for remote in-cell work includes an overhead bridge crane; three pairs of master-slave manipulators; an electromechanical manipulator; a turntable; and portable soak tanks and spray wands for decontamination solutions, steam, and water. The interior of Cell 308 is shown in Figure 10.

Cell 306 has approximately 300 ft^2 of concrete floor that is covered by stainless steel, with a 6-in. wainscot. The area walls are coated with epoxy-type paint. The RTR system is located in Cell 306.

Figure 10. New Waste Calcining Facility Cell 308 interior.

Modifications would be necessary to receive the HFEF-5 cans and the shipping containers. Fabrication of an HFEF-5 can receiving unit that receives the can vertically and reorients it to a horizontal position would be installed. The device would also hold and open the container, remove and size the waste materials, and load sized waste into shipping containers. In Cell 306, the RTR unit may require modifications, which could include installation of a turntable to receive and hold the HFEF-5 can and adjustments to and/or replacement of the x-ray generator, image intensifier, dose-to-curie instrumentation stand, and potential modification to the dose-to-curie calculation.

3.5.1.3 Description of Fluorinel Dissolution Process Cell. The FDP cell is located within the FAST facility (Figure 9), which is divided into two operational areas: the FDP area and the fuel storage area. The nominal dimensions of the cell are 20 × 100 × 50 ft deep (Engineering Design File [EDF]-7389). The cell is constructed of reinforced concrete with 5-ft-thick walls and a 3-ft-thick floor. The floors and walls are lined with stainless steel up to the crane rails. There are four primary levels in the cell where operations can take place. The cell walls contain shielding windows equipped with master-slave manipulators. Figure 11 provides a current view of the FDP cell at the 0-ft level (looking south).

Figure 11. Current view of Fluorinel Dissolution Process cell at 0-ft level (looking south).

The FDP cell would be modified and upgraded to provide the necessary remote-handling equipment. The equipment would include a sodium treatment station to stabilize sodium extracted from the contaminated waste to a disposable form. Also, modifications would be made to provide necessary load-out capability from the cell.

To support off-loading the containers into the facility and transporting the containers into the FDP cell for processing, the hatch cover above the cell would be modified. Additionally, the entry door and adjacent structures allowing access to this area would be enlarged to accommodate the shielded cask and transport vehicle.

3.5.2 Materials and Fuels Complex

3.5.2.1 Description of Interim Storage. Utilization of the MFC hot cells would minimize the need for interim storage of a large number of containers out-of-cell. Some interim storage would be maintained at RSWF (e.g., new BB row), with containers being delivered on an on-demand basis rather than the larger batching campaigns required to ensure continuous supply to processing activities at INTEC.

3.5.2.2 Description of Hot Fuel Examination Facility Decontamination Cell. The HFEF (see Figure 12) contains two heavily shielded hot cells: an argon cell (Main Cell) and a decontamination cell (Decon Cell). The Decon Cell would be used for this proposed action.

The air-filled Decon Cell measures 20 ft long, 30 ft wide and 25 ft high. It is separated from the Main Cell by a 4-ft thick concrete wall. The Decon Cell has six workstations, each equipped with a shielding window and a pair of manipulators. The Decon Cell contains a spray chamber for decontaminated equipment and nonfissile materials. There are 10 material transfer penetrations and an air-bearing personnel access door. A roof hatch enables the transfer of materials and equipment or the cell can also be accessed through the two floor penetrations and the tunnel system.

Structural modifications include removing the current processing equipment, and subsequently installing new process equipment necessary for the proposed action. Examples of the equipment include a liner disassembly station, a sorting station, and a general-purpose table.

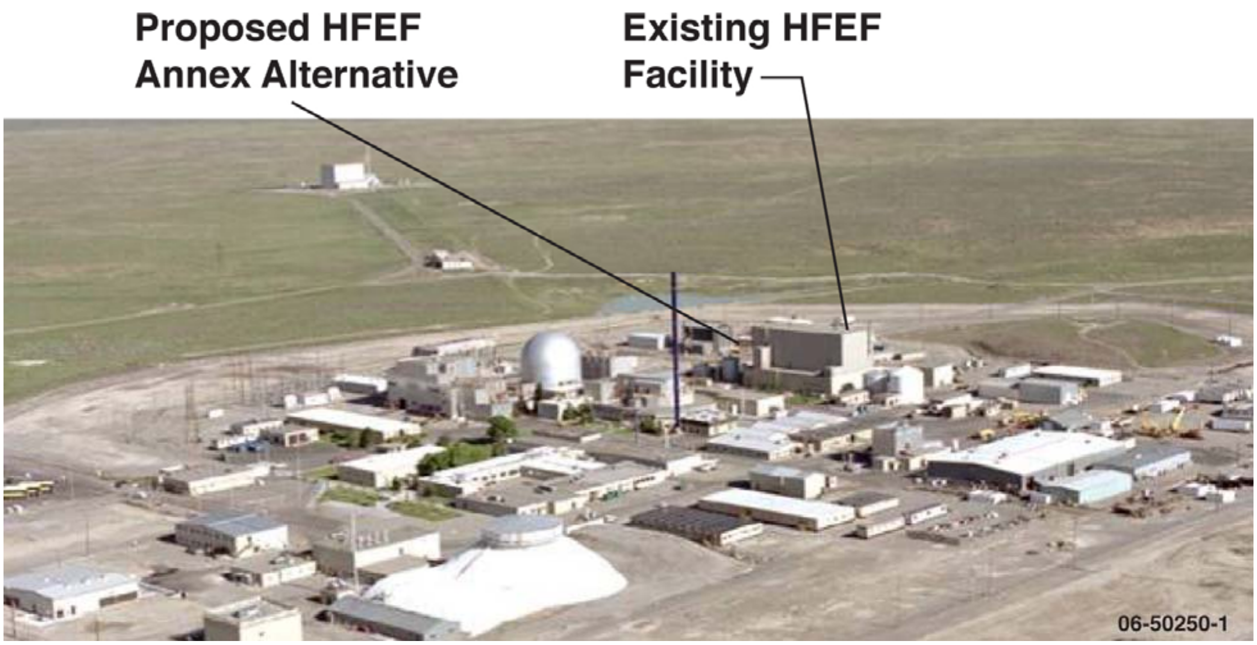

Figure 12. Hot Fuel Examination Facility location and the Proposed Hot Fuel Examination Facility Annex Location at Materials and Fuels Complex.

3.5.2.3 Description of Hot Fuel Examination Facility Annex Design. The HFEF Annex would be located directly west of the HFEF at MFC (see Figure 12). The HFEF Annex would include four separate floors (see Figure 13). The existing equipment in HFEF would be shared with the HFEF Annex and includes cranes, truck lock, cask cart, and cask tunnel. New equipment, such as an MEDE system, would be purchased and installed.

The waste processing cell would be 42 × 22 × 31 ft high and have an air atmosphere. The cell would have 14 windows with provisions for a set of sealed remote manipulators at each window, three floor penetrations, and a roof hatch. The walls, roof, and floor sections of the processing cell would be constructed of high-density concrete. The floor and lower-wall interior surfaces of the processing cell would be covered with an 11-gauge stainless-steel protective liner extending 8 ft up the walls.

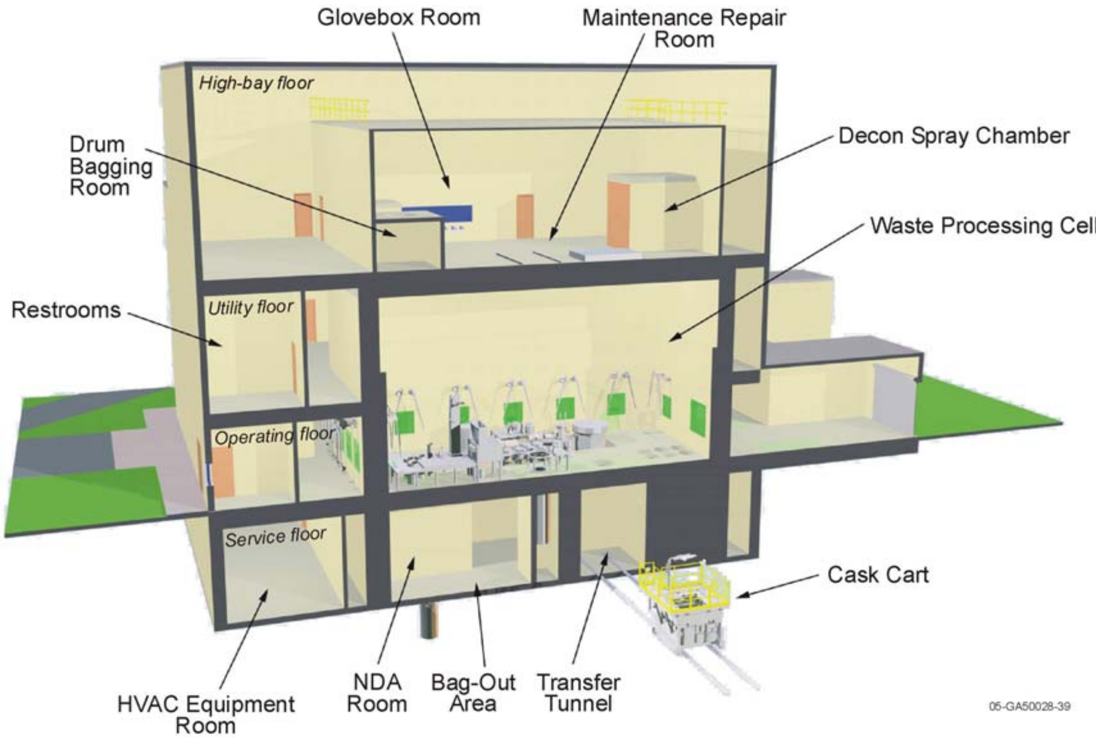

Figure 13. Crosscut 3-D rendering of the Hot Fuel Examination Facility Annex.

3.5.2.4 Description of the Mobile Hot Cell. A subcontractor would assemble, operate, and remove the mobile hot cell. The cell would be located within MFC, in or adjacent to the RSWF. This mobile cell is used for cutting, coring, and characterization of radioactive waste packages. To support the proposed action, satisfaction of the following design criteria would be required.

1. Technology must be based on existing design/equipment/facilities with proven full-scale (proof-of-process) demonstration of remote-handled waste retrieval and repackaging.

2. Treatment methods must be based on existing technology for remote treatment of sodium/NaK with proven, full-scale (proof-of-process) demonstration.

3. Technology must be capable of processing various waste container configurations.

4. Technology must be portable/modular and require minimal onsite fabrication/construction.

5. The safety design requirements of DOE Order 420.1B, Facility Safety, must be satisfied.

6. The technology must provide radiological shielding and must be designed and configured to maintain worker exposure as low as reasonably achievable.

7. The technology must be designed and constructed to the requirements of Nuclear Quality Assurance (NQA)-1.

4. AFFECTED ENVIRONMENT

The Idaho High-Level Waste & Facilities Disposition Final Environmental Impact Statement (DOE 2002) provides an extensive description of the INL Site's affected environment. This section provides a brief background description of only those environmental aspects affected by the proposed action.

The INL Site is an 890-square-mile DOE facility located on the Eastern Snake River Plain. It is primarily located within Butte County, but portions of the INL Site are also in Bingham, Jefferson, Bonneville, and Clark Counties. All land within the INL Site is controlled by DOE, and public assess is restricted to highways, DOE-sponsored tours, special-use permits, and the Experimental Breeder Reactor-I National Historic Landmark.

Public highways U.S. 20 and 26 and Idaho 22, 28, and 33 pass through the INL Site, but off-highway travel within the INL Site and access to INL Site facilities are controlled. Currently, 6,800 people work at the INL Site; including 806 people at MFC, and 1,121 people at INTEC. No permanent residents reside on the INL Site. Population centers in the region include large cities (more than 10,000 residents), such as Idaho Falls, Pocatello, and Blackfoot, located to the east and south, and several smaller cities (less than 10,000), such as Arco, Fort Hall, Howe, and Atomic City, located around the INL Site.

Vegetation is dominated by low shrubs, such as sage and rabbitbrush, a wide variety of grasses, and some juniper trees. The area is populated with animals that inhabit sagebrush grasslands. Animals include pronghorn, deer, elk, coyotes, badgers, rabbits and many birds including raptors, game birds, and waterfowl, a variety of small rodents, and several small reptiles. Many of the plants and animals that live within the boundaries of INL are culturally significant to the Shoshone-Bannock Tribes.

Cultural resources are numerous on the INL Site (DOE-ID 2007). Resources that have been identified include:

- Prehistoric archaeological sites representing aboriginal hunter-gatherer use over a span of approximately 12,000 years

- Historic archaeological sites representing settlement and agricultural development during the period from 1805 and the late 1920s

- Historic architectural properties associated with World War II and with the development of nuclear science and technology

- Areas of cultural importance to the Shoshone-Bannock Tribes.

Many of these resources are eligible for nomination to the National Register of Historic Places. Archaeological sites and Native American resources are generally located in undeveloped areas, while historic architectural properties are found within facility perimeters at the INL Site. A tailored approach to management of these resources and compliance with relevant federal and state law is included in DOE-ID's INL Cultural Resource Management Plan (DOE-ID 2007), which is based on a Programmatic Agreement between DOE-ID, the Idaho State Historic Preservation Office and the Advisory Council on Historic Preservation as well as an Agreement in Principle between DOE-ID and the Shoshone-Bannock Tribes.

The area surrounding the INL Site is classified as a Prevention of Significant Deterioration Class II area, designated under the Clean Air Act (42 USC § 7401) as an area with reasonable or moderately good air quality while still allowing moderate industrial growth. Craters of the Moon Wilderness Area, which is approximately 6.4 miles southeast from the INL Site boundary, is classified as a Prevention of Significant Deterioration Class I area, and is the nearest area to the INL Site where additional degradation of local air quality is severely restricted. The INL routinely monitors air quality using a network of air monitors. The monitors collect samples to measure particulate matter, radioactivity, and other air pollutants.

Releases of radionuclides to the environment from current INL operations can expose individuals near the INL Site to radiation. Types and quantities of radionuclides released from INL operations are listed in the National Emission Standards for Hazardous Air Pollutants annual reports (DOE-ID 2006), along with estimated doses caused by these releases. Historically, the dose to the maximally exposed individual (MEI) has been in the range of hundredths of an mrem/yr, and therefore less than 1% of the 10-mrem/yr federal standard.

INL Site workers receive the same dose as the general public from background radiation, but they also receive an additional dose from working in facilities with nuclear materials. The average dose to the individual worker (involved worker) and the cumulative dose to all INL Site workers (total workers) fall within the radiological regulatory limits of 10 CFR 835. According to the accepted risk estimator of 6.0×10^{-4} latent cancer fatality per person-rem among workers, 0.066 latent cancer fatality is projected for INL Site workers from normal operations in 2004 (DOE 2003).

5. ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

Several of the environmental consequences for the alternatives are the same or very similar. These consequences include air quality (nonradiological and radiological), public and occupational health, the T-25 Powerline Road upgrade (cultural and biological resources), and accidents. Because there are no substantial differences, the environmental consequences have been combined for the four alternatives and are discussed in Section 5.1. The environmental consequences that have substantial differences for each alternative include transportation, historic cultural resources, and waste management. They are presented by alternative in Section 5.2.

5.1 Environmental Consequences Common to all Alternatives

5.1.1 Air Quality

5.1.1.1 Nonradiological Emissions. Nonradiological emissions would be minimal during both building modification and operational stages. Particulate matter (PM), both PM-2.5 and PM-10, would be expected in both stages. During the building modification or construction stage, fugitive dust, in the form of PM, would be controlled using industry standards. Based on the minimal proposed modification or construction, no ambient air quality standard would be expected to be exceeded (Idaho Administrative Procedures Act [IDAPA] 58.01.01.577). During the operational stage, emissions of toxic metals and particulate matter are projected.

All emissions from operations in the existing hot cells or the new cells (HFEF Annex or Mobile Hot Cell) would be abated using two high-efficiency particulate air (HEPA) filters. Any particulate material released from this waste matrix during examination, processing, sizing, and repackaging would be captured in the HEPA filters before release to ambient air. Little or no release of volatile compounds is anticipated based on historical knowledge and the waste matrix.

5.1.1.2 Radiological Emissions. Radiological emissions are not anticipated during the modification or construction stage of any of the alternatives. Based on the proposed waste processing operations, the potential for release of particulate contamination is greatest when the waste is exposed and handled. Potential for release of gaseous/vapor-phase radionuclides is greatest during treatment of sodium and NaK-contaminated waste. During waste processing operations, the amount of radioactive material suspended during sorting/segregation operations would be the same for each alternative. Sorting/segregation operations planned for all of the alternatives would have heating, ventilating, and air conditioning systems with equivalent cleanup efficiencies, i.e., two stages of HEPA filtration each with 99.97% removal of airborne particulate material.

A fraction of the total waste inventory would pass through the sodium removal process. Based on current design information for all the potential sodium treatment technologies proposed for this action, the sodium removal process equipment would incorporate a scrubber and HEPA filter, and would be located in a hot cell. The scrubbed and filtered off-gas from the sodium removal process would be exhausted to the hot cell containing the process. The hot cell would be exhausted through two stages of HEPA filters. The sodium removal process has additional abatement and a relatively small fraction of the total inventory of particulate-forming radionuclides would pass through the sodium removal process. Consequently, particulate radionuclide emissions from the sodium removal process would cause less than 1% of the dose caused by particulate material emissions from the sorting process. However, the sodium removal process would free the entire 1,045-Ci inventory[c] of tritium present in the sodium metal. This tritium would be released, unabated, to the atmosphere as a gas. Overall, radiological impacts from the proposed project are predominantly from tritium emissions during Phase IV.

The composition of the inventory of particulate radionuclides affected by waste sorting was estimated using an inventory developed for dose consequence analysis of the HFEF Annex design basis accidents (EDF-6812). The original inventory was based on analysis of Argonne National Laboratory fuel examination wastes, and included a large number of radionuclides. This inventory was screened using National Council on Radiation Protection ([NCRP] 123, 1996) screening factors to identify the radionuclides causing 99.95% of the dose for the entire inventory. Doses were estimated using the screened list of radionuclides. The estimated emissions caused by waste sorting are based on the assumption that waste containing a total of 12.7 mCi of radioactivity would be sorted over the operating lifetime of the project. It is also assumed that the entire radioactive inventory is associated with material that could become suspended in air (e.g., fines, surface contamination). This is a conservative assumption – a large fraction of the inventory is expected to be associated with nonsuspendable material such as fuel fragments. Suspension of radioactive material was calculated (DOE 2000) for the removal of waste from liners and placement on the sorting table, and for entrainment in the airflow through the sorting area. The suspended material was assumed to pass through two stages of HEPA filters, with an efficiency of 99.97% efficiency per stage. Table 5 presents the inventory and emissions estimates for waste-sorting operations.

Table 5. Screened inventory of radionuclides in solid/particulate form and emissions for normal waste-sorting operations.

Nuclide	Fractional Abundance in Inventory Relative to Cs-137	Total Project Emissions During Normal Operations (Ci)
Am-241	4.22E-03	2E-06
Co-60	1.25E-03	5E-07
Cs-134	1.15E-03	4E-07
Cs-137	1.00E+00	4E-04
Eu-154	3.10E-03	1E-06
Eu-155	1.60E-02	6E-06
Sb-125	4.20E-03	2E-06
Sr-90	6.76E-01	3E-04
Pu-238	7.01E-04	3E-07
Pu-239	4.74E-03	2E-06
Pu-240	4.86E-03	2E-06
Pu-241	1.71E-01	7E-05
Pu-242	4.22E-03	2E-06
U-234	6.85E-04	3E-07

c. Personal communication from John Espinosa, email to Paul Ritter, August 13, 2007, 9:17 AM; subject: Cs/nuclide trap information, attachment titled COLD AND NUCLIDE TRAPS STORED AT MFC.doc, and personal communication with David Polzin (Hanford), documented in email from Paul Ritter to Wendy Savkranz, September 30, 2008, 4:02 pm., Subject: Telecon with Dave Polzin Re: FFTF Large Component Inventories for the RWDP EA.

5.1.2 Public and Occupational Health

5.1.2.1 Public Health. Doses and risks were calculated for releases during waste sorting and sodium removal operations using the CAP88-PC, Version 3.0 (EPA 2007) code. The CAP88-PC code is required by EPA to show compliance with the limit on dose to members of the public caused by radionuclide emissions to air from DOE facilities (40 CFR 61, National Emission Standard for Hazardous Air Pollutants, Subpart H). The CAP88-PC code calculates environmental concentrations of radionuclides caused by emissions, and calculates dose and risk based on Federal Guidance Report 13 (EPA 1999) methods. Emissions from the FDP cell pass through the FAST stack, which satisfies the "good engineering practice" criterion for stack height relative to the height of nearby structures (40 CFR 51.100). Emissions from the FAST stack are modeled as elevated releases using appropriate meteorological data and stack parameters. The potential emissions from other alternative facilities are modeled as ground-level releases. The MEI and population doses were calculated for each facility-specific MEI location and population distribution. Population dose was calculated using the 2000 census data. The hypothetical MEI was assumed to live at the off-Site location having the highest time-integrated exposure to emissions resulting from each processing phase and alternative location.

Doses caused by the total emissions during sorting (all phases) and emissions during sodium removal processing were calculated and compared to determine the relative importance of releases caused by these two processes. Population dose was calculated for emissions from INTEC and MFC using the 2000 census data. The hypothetical MEI was assumed to live at the off-Site location having the highest time-integrated exposure to emissions resulting from that processing phase. Based on these dose calculations, the MEI and collective doses and risks potentially caused by the RWDP are determined by tritium emissions during sodium removal processing, and the results for each alternative are determined by the location of sodium removal processing for each. The dose to the MEI is several orders of magnitude less than the dose received from natural background radiation, and well below the applicable standard (40 CFR 61, Subpart H), which limits doses caused by atmospheric releases of radioactivity from a DOE facility to 10 mrem/y. Table 6 summarizes the results of the MEI and population dose calculations and latent cancer fatality estimates. There are no regulatory standards limiting population dose; however, the population dose resulting from the proposed operation is also several orders of magnitude less than the population dose received because of natural background.

Table 6. Population and maximally exposed individual dose for releases during normal operations.

Receptor Group	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Population within 50 miles				
Dose (person rem)	6.5×10^{-1}	6.5×10^{-1}	$1.1 \times 10^{+0}$	$1.1 \times 10^{+0}$
Cancer Fatality Risk (per year)	5.3×10^{-6}	5.3×10^{-6}	8.6×10^{-6}	8.6×10^{-6}
Maximally Exposed Individual				
Dose (mrem)	2.6×10^{-2}	2.6×10^{-2}	3.6×10^{-2}	3.6×10^{-2}
Latent Cancer Fatality Risk	1.6×10^{-8}	1.6×10^{-8}	2.2×10^{-8}	2.2×10^{-8}

5.1.2.2 Worker Health. The dose received by workers would be monitored and limited similarly for operations at any of the proposed facilities. Although the actual dose allowed for workers would be determined when more definite operational conditions have been defined, it is assumed that the same allowable dose would be applied regardless of the facility used for the waste processing operations.

5.1.3 T-25 Powerline Road Upgrade

Impacts to cultural and biological resources would occur only if the T-25 Powerline Road route is selected for waste shipments rather than U.S. Highway 20. This route (Section 3.1.2.2.2) could be used for all the alternatives and so the cultural and biological impacts do not differ among the alternatives.

5.1.3.1 Archaeological Cultural Resources. Archaeological investigations of the T-25 Powerline Road (Pace 2008) have shown that eleven prehistoric archaeological sites with potential for nomination to the National Register of Historic places are located within a 120 ft-wide area of potential effect associated with the T-25 Powerline Road upgrade. These sites are important because they may contain subsurface cultural deposits with information that can be used to understand local and regional prehistory. Native American cultural resources and values may also be identified along the T-25 Powerline Road through continued communication with the Shoshone-Bannock Tribes.

Should this route be selected for use, final design plans addressing the road modifications would be completed. At that time, actions would be taken to complete identification of any Native American resources in the project area and develop strategies to protect these resources and the identified archaeological resources during road upgrade activities. The measures could include:

- Development of a Cultural Resource Protection Plan in coordination with the Shoshone-Bannock Tribes and Idaho State Historic Preservation Office

- Archaeological investigations, including test excavation, in advance of ground disturbance to catalog and preserve the important information present at each locality

- Modification of project plans to avoid damage to identified resources

- Cultural resource monitoring of ground disturbance with authority to temporarily halt work to salvage any sensitive materials uncovered

- Cultural resource sensitivity training for project personnel to prevent unauthorized artifact collection, off-road vehicle use, and other activities that may impact cultural resources.

An additional cultural resources-specific evaluation would be completed prior to any of the road upgrade activities, which may identify additional measures, particularly in regard to natural resource concerns that could be raised by the Shoshone-Bannock Tribes.

5.1.3.2 Biological Resources. Eight distinct plant community types are found along the T-25 Powerline Road between MFC and the Auxiliary Reactor Area-IV facility (DOE 2005a). About one-third of the length of the road is in the Sagebrush Steppe community type. The understory is primarily native perennial grasses, other shrubs, including green rabbitbrush, and native perennial forbs.

A number of small mammals and reptiles permanently reside in the area around the T-25 Powerline Road, while other bird species and large mammals use this habitat in a seasonally transitory manner. Wildlife species of concern include all migratory birds (including greater sage-grouse and raptors), pygmy rabbits, and Great Basin rattlesnakes, and all large mammal species (Hafla et. al. 2008). The INL is included in a geographical area where the gray wolf is listed by US Fish and Wildlife Service as an experimental, nonessential population. Although it has been reported, its presence has not been confirmed. No critical habitat for threatened or endangered species, as defined in the Endangered Species Act, exists on the INL site. However, if a species such as the greater sage grouse or pygmy rabbit are listed before or during upgrade of the T-25 Powerline Road, DOE would initiate formal consultation with the US Fish and Wildlife Service.

The effects of upgrading the road on this same route in terms of the ability to meet Natural Resource Management Objectives was analyzed (DOE 2005a). The results of the analysis determined that this route would not fully meet any of the stated natural resource objectives. However, if appropriate controls were incorporated it may be possible to meet resource objectives associated with sensitive species (including sage grouse and pygmy rabbits) and their habitat. The controls would include preventing animal and vehicle collisions, and minimizing weed invasion (DOE 2005a). The analysis concluded the impacts regarding the resource management objectives would be minimal given appropriate controls. Objectives related to reducing the need for revegetation, habitat fragmentation, maintenance of a large undeveloped sagebrush steppe ecosystem and protection of biodiversity may be met, but may also result in other impacts to ecological resources regardless of control attempts. However, for the natural resource objectives, a note of caution that control attempts may not provide adequate protection against habitat fragmentation, loss of the large parcel of undeveloped sagebrush steppe necessary as habitat for many sagebrush-obligate species, or loss of biodiversity (DOE 2005a).

Potential impacts to vegetation communities along the road would be controlled by minimizing the footprint of the soil disturbance, revegetating the areas that have been disturbed, and weed control. Revegetating with a diverse mix of native species similar in composition to the existing plant community may help maintain the diversity of those communities. The revegetation effort would need to consider the sagebrush steppe and the sandy soils near the T-25 Powerline Road. Sagebrush steppe is generally successful in only one of three years. The sandy soils are not suitable for replanting and are susceptible to wind erosion.

The T-25 Powerline Road upgrade would have unavoidable impacts common to all road development such as: (1) loss of ground-dwelling wildlife species and associated habitat, (2) displacement of certain wildlife species due to increased habitat fragmentation, and (3) an increase in the potential for collisions between wildlife and motor vehicles. The following control measures would be implemented to lessen the impact on wildlife: seasonal timing of activities, lower speed limits to 15 mph, and awareness programs. It has been determined by implementing the appropriate control measures, the biological impacts would be minimal (DOE 2005a).

An additional biological resources specific evaluation would be completed prior to any of the road upgrade activities which identify additional measures to aid in lessening the impacts to the biological resources.

5.1.4 Accidents

Safety analyses would be performed to address hazard and accident analyses for processing RH waste and scrap materials at FAST and NWCF. In addition, HWMA/RCRA permits covering RH waste management activities at FAST, NWCF, and CPP-2707/749 interim storage areas would include written contingency plans and prevention and preparedness plans. Those plans, as well as the INTEC emergency plans, would describe the response measures used to deal with potential emergencies involving hazardous materials, RH waste, and mixed waste.

Nuclear materials, reactive metals, and other hazardous materials at the HFEF Annex or the Mobile Hot Cell would be handled similarly to previous routine and ongoing activities at other MFC hot cells, i.e., HFEF hot cells. The hazard and accident analyses for processing RH waste and scrap materials at MFC would be documented in a Safety Analysis Report. In addition, HWMA/RCRA permits covering MFC RH waste management activities would include written contingency plans and prevention and preparedness plans. Those plans and the MFC emergency plans would describe the response measures used to deal with emergencies involving hazardous materials, RH waste, and mixed waste.

The principal material hazard is the large inventory of RH waste streams currently stored in INL Site facilities. The most likely accident scenarios are listed in order of probability in the following subsections. The following subsections present potential impacts and controls that are currently in place. All of these accidents produce similar results—primarily, radiation exposure to workers. The amount of dose received would depend on the severity of the accident. A full breach of the shipping cask (or other loss of shielding) that exposed a shipping container could result in accessibility to radiation fields as high as 15,000 rem/hr at the surface of the container; however, most of the waste would produce exposures in the range of 1,000 rem/hr at direct contact.

5.1.4.1 Container Penetration by Backhoe. If a container is penetrated by a backhoe, radioactive contamination could be released to the soil and air. Additionally, highly radioactive components or spent nuclear fuel could be released from the container. Impacts would be additional waste generation and could result in additional worker dose. This accident would result in immediate work shutdown and evacuation of the immediate area. Emergency recovery procedures would be implemented and remain in effect until full recovery.

The controls currently in place include excavation procedures that require direct visual observation of excavation activities. As necessary, this would be accomplished directly by an observer or by video cameras and monitors. All workers would be fully trained and qualified for their roles and responsibilities and would be trained on all aspects of liner excavation. Workers would attend pre-job briefings on the sensitive nature of the excavation, the associated hazards, and the critical importance of the equipment not contacting the liner. Additionally, a radiological control technician would be present to monitor radiological conditions as the container is exposed, and a supervisor would be present to observe all activities. Personnel could immediately implement emergency action plans.

5.1.4.2 Abnormal Transportation Operations. A variety of transportation accidents are conceivable and could include:

- Dropping the shipping container
- Improper loading of the shipping container
- Single vehicle crash during transport
- Multiple vehicle crash during transport.

Dropping an unlicensed shipping cask could result in a cracked, but largely intact, shipping cask. This could pose contamination and penetrating radiation hazards. Dropping a licensed cask is not likely to produce any adverse effects to workers or public exposure because the casks are specifically engineered to provide protection from such events.

Vehicle crashes involving just the transport vehicle or other cars could happen from MFC to INTEC. A safety analysis of similar material analyzed a truck accident with ensuing diesel fuel fire as a credible event (PLN-1851). For an unlicensed but shielded shipping cask, that analysis resulted in a public exclusion distance of 650 meters. In addition, as stated in PLN-1851, the transport vehicle driver would be trained as appropriate to meet all appropriate DOT driver qualifications.

As previously discussed, out-of-commerce shipments likely would be used for transporting this waste. For U.S. Highway 20, road closures and security escorts are required controls that would be implemented. For use of the T-25 Powerline Road, security escorts or road barricades would be used to ensure no other vehicles entered the road during the shipment.

For the waste shipments from Hanford to the INL, a licensed Type B shipping cask would mitigate radiological exposures during transport because of the cask's massive shielding. Such casks are specifically designed to withstand severe transportation incidents.

5.1.4.3 Facility Operations. A feasible accident during cell operations includes mishandling of sodium or NaK, that results in a fire. Ignition could occur if sufficient amounts of fine particulate sodium or NaK material are created and exposed to air, an uncontrolled reaction with water is initiated, or an ignition source is applied. A sodium or NaK fire would generate large quantities of sodium oxide fumes and particulate material (e.g., sodium hydroxide and sodium carbonate) within the confines of the cell. This accident would result in immediate work shutdown and activation of the emergency response systems. Emergency recovery procedures would be implemented and would remain in effect until full recovery. The consequence of releasing such hazardous materials to the cell is estimated to be low for the facility worker, and negligible for the co-located worker, the off-Site public, and the environment (SAR-126, 2007).

For worker protection, several controls are in place as required by 29 CFR 1910 (2007) and 40 CFR and implemented by procedures and manuals. Additional controls to manage a fire would be defined in the Fire Hazard Assessment and implemented by a combination of engineered design features (e.g., metal fire extinguishers), procedures, training, and staffing. All workers would be fully trained and qualified for their roles and responsibilities. Workers would attend pre-job briefings on cell operations, the associated hazards, and the critical importance of proper handling of hazardous materials.

5.1.5 Intentional Destructive Acts

The plausible impacts from intentional destructive acts are bounded by potential accident scenarios identified in Section 5.1.4. The potential for intentional destructive acts is reduced by the routine screening processes and access controls currently in place at the INL. Additional screening of the transport drivers for behavioral issues, having several personnel involved in all aspects of the operations, and strictly limiting public access to the waste during retrieval, transport, and processing operations would enhance existing controls.

5.2 Environmental Consequences That Differ Among Alternatives

5.2.1 Transportation

Due to the characteristics or properties of the material being transported, radiation exposure to humans poses the most prevalent potential adverse consequence. Radiation exposure during transportation operations is most likely to occur during material handling operations, when the waste is being loaded into or out of the shipping container. Consistent with DOE's as-low-as-reasonably-achievable policy (DOE 1999, pg vii), the dose rate for material handling workers will be controlled to ensure no worker exceeds the administrative control limit, which is always set considerably less than the 5-rem/yr dose allowed by regulation (10 CFR 835). This will be achieved using engineering controls to ensure that shielding and distance are maintained when the material is transferred from one container to another. Engineering and administrative controls also will be used to ensure that material handling operations do not place the material in an unrecoverable position.

For transporting the waste from MFC to INTEC, radiation exposure is expected to be low during actual movement of the material. The DOE's policy is to strive to maintain shipment dose rates at or below the DOT limits. During transit, the driver would be the person most likely to receive the highest dose, which would be less than 6.7 mrem per shipment.

The shipping cask shielding and, for out-of-commerce shipments, the distance provided by the public access restrictions, would ensure radiation dose to the public from transportation would be virtually immeasurable.

5.2.1.1 INTEC Existing Facilities Alternative – (Alternative 1 [Preferred Alternative]). Under the Preferred Alternative, all the waste would be processed at INTEC. Therefore, all but 30 canisters would be transported from MFC. The RH-SC waste from FFTF would also be shipped approximately 643 miles to the INL Site. Eighty-four road closures would be required traveling a total of 23,814 road miles. This alternative would have the highest potential adverse transportation consequence. The driver would be the person most likely to receive the highest dose, which would be less than 6.7 mrem per shipment. Approximately 821 shipments would be completed under this alternative not including the 30 facility waste transfers to address the waste stored at INTEC.

5.2.1.2 MFC/INTEC Existing Facilities Alternative (Alternative 2). Under this Alternative, Phases I, II, and III waste would be processed at the HFEF Decon Cell. Phase IV would be processed at either the NWCF or FDP Cell at INTEC. Phase I waste would be transported to MFC from INTEC and Phase IV waste would be transported from MFC and FFTF to INTEC. Phases II and III waste would be transported to the HFEF Decon Cell using established waste transport processes. Alternative 2 would result in environmental impacts similar to Alternative 1. The 822 shipments would travel 23,840 public road miles and 83 road closures would be required to support moving the waste.

5.2.1.3 INTEC Existing Facility and New Construction at MFC (Alternative 3). Under this Alternative, Phases I, II, and III waste would be shipped to INTEC for processing and Phase IV waste would be processed at MFC. The Phase IV waste would be transported to either the new HFEF Annex or the Mobile Hot Cell using established waste transport processes. The transportation impacts for Alternative 3 would be minimal (33 shipments, four road closures, and 3,326 public road miles).

5.2.1.4 MFC Existing Facility and New Construction (Alternative 4). All the waste would be treated at MFC. Phase I waste and the waste from FFTF would require transportation to MFC. Therefore, Alternative 4 would result in a limited number of public road miles traveled similar to Alternative 3. Thirty-three shipments, 3 road closures, and 3,352 total road miles traveled.

5.2.2 Historic Cultural Resources

The Preferred Alternative would have no impact to historic cultural resources because the facilities to be modified at INTEC are not eligible for the National Register. However, the HFEF building, integral to Alternatives 2 and 4, is eligible for nomination to the National Register of Historic Places. Under DOE-ID's "INL Cultural Resource Management Plan" (DOE-ID 2007), standardized methods for documenting the important elements of historic properties like HFEF have been developed in consultation with the Idaho State Historic Preservation Office. These strategies are employed for historic buildings at all INL facilities.

5.2.2.1 INTEC Existing Facilities Alternative – (Alternative 1 [Preferred Alternative]). The INTEC facilities proposed for Alternative 1 are not eligible for the National Register. There would be no historic cultural resources impact from implementation of the Preferred Alternative.

5.2.2.2 INTEC/MFC Existing Facilities Alternative (Alternative 2). Alternative 2 would modify the Decon Cell in the HFEF for Phases I, II, and III. Structural modifications to HFEF under this alternative would cause impacts to this National Register-eligible building. Prior to modifying HFEF, standard documentation methods developed for Category 2 buildings (e.g., large format [4 × 5] photos, gathering architectural and engineering drawings, and processing these records to archival standards) would be completed to ensure that the impacts are not adverse. The Category 2 requirements would be documented prior to making modifications to the HFEF Decon Cell.

5.2.2.3 INTEC Existing Facility and New Construction at MFC (Alternative 3). Alternative 3 includes modification of the NWCF Hot Cells for Phases I, II, and III. Either the HFEF Annex or the Mobile Hot Cell would be used for Phase IV. Implementation of Alternative 3 would not impact historic cultural resources.

5.2.2.4 MFC Existing Facility and New Construction (Alternative 4). Modification of the HFEF Decon Cell for Phases I, II, and III is proposed for Alternative 4. Therefore, historic cultural resources impact from Alternative 4 is the same as described for Alternative 2. Category 2 requirements would be documented prior to making modifications to the HFEF Decon Cell.

5.2.3 Waste Management

Under all of the alternatives, secondary waste generation would be minimal comprising a small fraction of overall INL Sitewide waste generation. It is estimated that small amounts of secondary (newly generated waste in excess of repackaged input waste) would be generated during life-cycle operations. Table 7 summarizes the types and amounts of waste to be shipped for disposal or interim storage, if a final disposal site is not available. The amounts are calculated assuming a 10-year operating period.

Waste minimization strategies would be implemented throughout the life-cycle of hot cell operations. Decontaminated or clean materials would be reused and recycled to minimize final waste disposal volumes.

Table 7. Estimated operational secondary waste generation and disposal.

Waste Type	Annual Waste Generation	Waste Disposition
Transuranic	1 m^3	Dispose of at Waste Isolation Pilot Plant
Low-level	5 m^3	Dispose of in Department of Energy or commercial low-level disposal facility
Greater-Than Class-C-Like	1 m^3	Store at Radioactive Scrap and Waste Facility
Hazardous	1 m^3	Recycled or returned to vendor

5.2.3.1 INTEC Existing Facilities Alternative – (Alternative 1 [Preferred Alternative]). In addition to the operational waste (Table 7), the Preferred Alternative would generate waste from modification and decontamination activities to existing facilities. The FDP Hot Cell could be used to complete any of the Phases under Alternative 1. If old equipment, piping, and vessels are removed from the FDP Hot Cell, an additional 2 to 20 m^3 of waste could be generated. Remote decontamination efforts would be used to remove hazardous constituents and decrease the level of radioactivity. Both internal and external decontamination would be performed. The quantities and types of waste would depend on the success of the decontamination methods and identification of equipment for reuse. Based on decontamination evaluations, most of the newly generated waste is expected to be radioactive waste. Decontamination solution could be generated if equipment and piping requires decontamination before removal. The NWCF Cells would require some decontamination also. The decontamination actions would generate approximately 2,200 gallons of decontamination solution. Both of the decontamination solutions are anticipated to be MLLW based on past operations, and the solution would be sent to the Process Equipment Waste Evaporator, if it is available. Otherwise, the solution would be stored and then processed through the Integrated Waste Treatment Unit or disposed of off-Site at a commercial treatment facility.

5.2.3.2 MFC/INTEC Existing Facilities Alternative (Alternative 2). Waste generation from Alternative 2 would be similar to Alternative 1. Again, operational waste would be generated (see Table 7) and waste would be generated from modification and decontamination activities to existing facilities. Should decontamination solution be generated from use of the HFEF Decon Cell, it would be disposed of off-Site at a commercial treatment facility.

5.2.3.3 INTEC Existing Facility and New Construction at MFC (Alternative 3). This Alternative would use the NWCF Hot Cells for Phases I, II, and III. Phase IV would either be performed in a new constructed HFEF Annex or a Mobile Hot Cell. Therefore, large quantities of industrial waste would be generated from new construction activities. This waste stream would consist of typical construction debris that would be disposed of at the INL Landfill Complex. Small quantities of industrial waste would be generated from assembly of the Mobile Hot Cell. This waste stream would be disposed of at the INL Landfill Complex. Waste would also be generated from modification and decontamination activities of the existing Hot Cells in the NWCF. Operational waste is identified in Table 7.

Also, if the Mobile Hot Cell is used, it would require decontamination prior to return to the subcontractor. This waste stream would be radioactive waste and the quantity would be less than 5 m^3. Small quantities of decontamination solution would also be generated.

5.2.3.4 MFC Existing Facility and New Construction (Alternative 4). Waste generation from Alternative 4 would be similar to Alternative 3. Rather than using the NWCF Hot Cells for Phases I, II, and III, the HFEF Decon Cell would be used. Similar activities would be performed to modify the facilities in order to support the first three phases of the proposed action, which would generate similar modification and decontamination waste types and quantities. Industrial waste generation from new construction would the same as Alternative 3. Secondary operational waste is identified in Table 7.

5.3 No Action Alternative

The No Action Alternative would result in DOE missing legal and regulatory milestones, receiving penalties, and could impede DOE INL missions. In addition, removing the waste from belowgrade storage, and processing, repackaging, and disposing of the waste in an approved facility would reduce the risk to the environment, which the No Action Alternative would not achieve.

5.3.1 Air Quality

No impacts to air quality would result from the No Action Alternative.

5.3.2 Public and Occupational Health and Safety

All activities under the No Action Alternative would occur within existing RH waste-storage configurations. Adverse impacts to worker and public health and safety could occur if the waste liners in the RSWF failed because of long-term storage of the RH waste.

5.3.3 Cultural Resources

There would be no impacts to archaeological, Native American, or historic cultural resources under the No Action Alternative.

5.3.4 Biological Resources

Biological resources would not be impacted from the No Action Alternative.

5.3.5 Accidents

Because waste would not be actively managed under the no action alternative, accident scenarios were not evaluated. The HWMA/RCRA permit covering the RSWF waste management activities includes written contingency plans and prevention and preparedness plans. Those plans, as well as the MFC emergency plans for the RSWF, describe the response measures implemented during potential emergencies involving hazardous materials, RH waste, and mixed waste.

5.3.6 Intentional Destructive Acts

The DOE considered the possibility of intentional destructive acts. Existing security at the storage facilities makes such destructive acts extremely unlikely. The security system includes fences, alarms, electronic surveillance devices, vehicle barriers, and a trained security force. The greatest potential for an intentional act of destruction is from an authorized employee, however, the physical configuration of the waste, i.e., the construction and emplacement of the vaults and liners is very robust and a significant effort would be required to destroy one or cause a release of the liner contents.

5.3.7 Transportation

There would be no impacts from transportation actions under the No Action Alternative.

5.3.8 Waste Management

Under the No Action Alternative, all RH waste would remain in storage. Continued storage of MLLW would violate the INL Site Treatment Plan (INL 2008). An agreement would be required between the State of Idaho and DOE to continue storing MLLW. The Settlement Agreement (Idaho 1995) requires shipping all RH TRU out of Idaho by 2018. Waste can be stored past 2018 only if the state concurs and adjusts the deadlines. Implementing the No Action Alternative, would generate no new waste streams.

5.4 Summary of Environmental Consequences of Alternatives

Tables 8 and 9 summarize the information provided in this section; however, only data that differ among alternatives are presented. These include transportation and public health.

The No Action Alternative would result in DOE missing legal and regulatory milestones, receiving penalties, and could impede DOE INL missions. In addition, removing the waste from belowgrade storage, and processing, repackaging, and disposing of the waste in an approved facility would reduce the risk to the environment, which the No Action Alternative would not achieve.

Table 8. Potential transportation impacts based on total road miles for each alternative.

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative[a]
Transportation					
Total Road Miles	23,814	23,840	3,326	3,352	
Total Driver Dose (49 CFR 173.441)	953 mrem	953 mrem	133 mrem	133 mrem	No impact

a. All RH waste would remain in storage. This may result in noncompliance with HWMA/RCRA regulations and existing operating permits. Failure to treat the waste and ship off-Site would result in noncompliance with the Site Treatment Plan and the Settlement Agreement.

Table 9. Summary of public health consequences that differ among alternatives.

Receptor Group	Alternative 1	Alternative 2	Alternative 3	Alternative 4	No Action Alternative[a]
Population within 50 miles					
Dose (person rem)	6.5×10^{-1}	6.5×10^{-1}	$1.1 \times 10^{+0}$	$1.1 \times 10^{+0}$	No impact
Cancer Fatality Risk (per year)	5.3×10^{-6}	5.3×10^{-6}	8.6×10^{-6}	8.6×10^{-6}	No impact
Maximally Exposed Individual					
Dose (mrem)	2.6×10^{-2}	2.6×10^{-2}	3.6×10^{-2}	3.6×10^{-2}	No impact
Latent Cancer Fatality Risk	1.6×10^{-8}	1.6×10^{-8}	2.2×10^{-8}	2.2×10^{-8}	No impact

a. All RH waste would remain in storage. This may result in noncompliance with HWMA/RCRA regulations and existing operating permits. Failure to treat the waste and ship off-Site would result in noncompliance with the Site Treatment Plan and the Settlement Agreement.

5.5 Cumulative Impacts

Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. While they may be insignificant individually, cumulative impacts potentially accumulate over time from one or more sources, and can result in the degradation of important resources. Because federal projects cause or are affected by cumulative impacts, assessment of cumulative impacts is required under the National Environmental Policy Act (42 USC § 4321 et seq., 1970).

Environmental impacts from performing the proposed action were evaluated in the SNF & INEL EIS (DOE 1995a), specifically, Section C.4.6.6, “Remote Mixed Waste Treatment Facility.” The evaluation included constructing a new facility (50 m long, 26 m wide, and 13 m high). The facility included an inert-atmosphere cell, hot repair area, covered truck loading area, equipment access area, control room and operating corridor, equipment transfer tunnel, and decontamination cell.

Impacts identified in this EA from each of the alternatives to the environment would be minor. Currently, no new projects have been identified that would contribute to the cumulative impacts addressed for the RWDP. The RWDP alternatives impacts would not contribute substantially to INL Site cumulative environmental impacts and are within those analyzed in the SNF & INEL EIS (DOE 1995a) for this work, see Section 5.15, "Cumulative Impacts and Impacts from Connected or Similar Actions."

5.5.1 Air Quality

Particulate emissions of radionuclides and toxic air pollutants would be abated using two-stage HEPA filtration systems for all of the alternatives. All of the alternatives are conservatively estimated to cause doses in the range of 0.026 to 0.036 mrem/yr. In the 8-year period beginning in 2000, INL Site-wide doses reported for National Emission Standards for Hazardous Air Pollutants (NESHAP) compliance (DOE-ID 2006) have ranged from 0.034 to 0.077 mrem/yr. Therefore, the cumulative impacts of the project are estimated to be in the range of 0.060 to 0.113 mrem/yr, well below the 10 mrem/yr NESHAP standard and well below the 0.63 mrem/yr cumulative impacts analyzed in the SNF & INEL EIS (DOE 1995a). Emissions of PM-10 during construction will be controlled as necessary to assure compliance with ambient air concentration standards. Emissions of particulate toxic and criteria air pollutants during operations would be minimal for all of the alternatives. Due to the waste's age and storage configuration, volatile chemical emissions are expected to be below regulatory thresholds for New Source Review permitting. Once an alternative is selected, a more thorough speciation and regulatory applicability determinations will be performed based on emission sources existing at the time.

5.5.2 Public and Occupational Health

The involved worker dose (based on releases during sorting operations) is the same for all the alternatives. Specific dose and risk calculations for the public are provided in Table 9. In recent years, INL operations have been estimated to cause annual doses in the range of hundredths of a millirem to members of the public (DOE-ID 2006). All of the proposed alternatives would potentially cause dose to the public much less than the potential dose caused by current INL operations. Appropriate engineering and administrative controls would be implemented to ensure worker and public protection.

5.5.3 Transportation

Transportation impacts for the hot cells located at MFC (HFEF, the HFEF Annex, or the Mobile Hot Cell) would be minimal based on the limited number of public road miles traveled. All but 34 waste shipments would be within MFC. The transportation impacts from the INTEC hot cells (FDP Cell or the NWCF hot cells) would include over 100 road closures and over 23,000 public road miles traveled. The most considerable impact from transporting the waste from MFC to INTEC would be to the driver during transit. The driver's exposure would be less than 6.7 mrem per shipment. Several engineering and administrative controls would be implemented to control the potential impacts.

Transportation impacts, including cumulative impacts for on-Site waste shipments, were evaluated in the SNF & INEL EIS (DOE 1995a), which provided a bounding analysis for performing the on-Site waste shipments (Section 5.11). For comparison, the largest number of waste shipments (Alternative 2) would be 822 shipments. The total number of INL waste shipments (all waste types) in 2007 was 2,819. The total number of shipments analyzed in the SNF & INEL EIS was 17,145. In addition, a supplement analysis to the SNF & INEL EIS was prepared in 2005 (DOE 2005b). The transportation analysis is addressed in Section 6.3.10 and shows the number of LLW shipments between 1996 and 2005 was 2,087. The supplement analysis documents that the actual total number of shipments currently completed are well below what was originally analyzed in the SNF & INEL EIS.

This EA nor the SNF & INEL EIS analyzed the transportation impacts of transporting the FFTF RH-SCs from the Hanford Site to INL. That analysis is in the forthcoming "Tank Closure and Waste Management Environmental Impact Statement."

5.5.4 Waste Management

The total quantity of secondary waste generated from processing the RWDP waste would be 8 m^3 for all the alternatives. For comparison, 1,886.94 m^3 of waste was generated in calendar year 2007. (These amounts do not include waste generated as a result of decontamination or cleanup activities.) The cumulative impacts of waste generation analyzed in the SNF & INEL EIS (DOE 1995a) was 157,000 m^3 (Table 5-15-2 – Alternative B). Secondary waste generation for the RWDP is much less than what is analyzed in the SNF & INEL EIS.

The waste streams requiring processing would also be the same for all alternatives. There would be a difference in waste generation of deactivation and decommissioning waste generated from Alternative 1 (Preferred Alternative), Alternative 2, and Alternative 3 and new construction waste for Alternatives 3 and 4. Waste disposition has been identified for all the waste streams.

6. PERMITS AND REGULATORY REQUIREMENTS

In compliance with the Federal Facility Compliance Act (Public Law 102-386, 1992), DOE prepared a detailed Site Treatment Plan (INL 2008). The Site Treatment Plan established time tables for developing treatment technologies. It also identified existing or planned treatment capabilities and established milestones for the construction and operation of these facilities. Lastly, the Site Treatment Plan identified milestones for the treatment of backlog waste inventories. The proposed action would satisfy the Site Treatment Plan commitments.

The Site Treatment Plan delineates constructing and operating a waste facility as the path forward for the INL Site RH waste. The plan contains milestones based on the critical decisions associated with the waste processing facility, which culminate in a facility startup milestone date of 2012. Failure to comply with the milestones and terms of the INL Site Treatment Plan Consent Order can result in an enforcement action for administrative and judicial relief under the law, including fines. Additionally, the Settlement Agreement (Idaho 1995) stipulates that transuranic portions of this waste be shipped out of Idaho by a target date of December 31, 2015, and no later than December 31, 2018.

The EPA defines and identifies hazardous waste, establishes requirements for its transportation, treatment, storage, and disposal, and requires permits for hazardous waste activities. Section 3006 of RCRA (42 USC 6926) allows states to establish and administer these permit programs with EPA approval. The EPA regulations implementing RCRA are found in 40 CFR, Parts 260 through 282. The State of Idaho has authority to regulate hazardous and mixed waste within its boundaries in lieu of the federal regulations. However, Idaho’s hazardous waste program simply incorporates the federal regulations by reference through IDAPA 58, Department of Environmental Quality, Title 1, Chapter 1 (IDAPA 58.01.01). The CPP-666 RCRA Permit would be modified to address the use of the FDP Cell for the proposed action. The CPP-659 RCRA Permit would be evaluated to determine if modifications would be required for the NWCF hot cells. The MFC Sodium Process Facility and the Decon Cell in the HFEF are RCRA permitted. Modifications may be required to the permits to perform the proposed action. A new RCRA permit would be required for the operation of the HFEF Annex. Using the Mobile Hot Cell would require modifications to the existing MFC RCRA permit. In addition, the RSWF RCRA permit would be modified to address the interim storage facility and other proposed modifications.

Transportation of hazardous and radioactive materials and substances is governed by DOT, NRC, and DOE regulations. All waste would be shipped either in commerce under DOT and NRC regulations or out of commerce under DOE Order 460.1B requirements. Out-of-commerce shipments under DOE Order 460.1B would be described in a transport plan that demonstrates equivalent safety to the applicable DOT and NRC regulations.

A variety of laws, regulations, and statutes seek to manage or protect historic resources. Such resources include buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. The requirements include the Antiquities Act of 1906; Reservoir Salvage Act of 1960; National Historic Preservation Act of 1966; National Environmental Policy Act of 1969; Executive Order 11593 (Protection and Enhancement of the Cultural Environment, 1971); the Archaeological and Historical Preservation Act of 1974, the Archeological Resource Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990. Section 106 of the National Historic Preservation Act and its implementing procedures require federal agencies to take into account the potential effects of proposed projects on historic properties listed on or potentially eligible for the National Register of Historic Places.

In 2004, DOE-ID entered into a Programmatic Agreement with the Idaho State Historic Preservation Office, and the Advisory Council on Historic Preservation. The agreement implements the

“INL Cultural Resource Management Plan” (DOE-ID 2007), which tailors INL compliance with Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR Part 800) as well as various other cultural resource laws to meet the unique needs of the INL Site. DOE-ID’s “Agreement in Principle” with the Shoshone-Bannock Tribes ensures an active tribal role in cultural resource impact assessment and protection. If the T-25 Powerline Road route is implemented, Section 106 compliance would continue to develop a strategy to protect cultural resources from adverse impact. A Cultural Resource Protection Plan would be developed for the road improvements in consultation with the Idaho State Historic Preservation Office and Shoshone-Bannock Tribes. If historic properties at MFC are extensively modified, requirements outlined in the Cultural Resource Management Plan would be implemented.

Soil disturbing activities, including those associated with the use of unimproved roads, have the potential to increase noxious weeds and invasive plant species that would be managed according to the "Management of Undesirable Plants on Federal Lands" (7 USC Section 2814) and the Invasive Species Executive Order 13112. The INL would follow the applicable requirements to manage undesirable plants.

In analyzing the potential biological impacts of the use of T-25 Powerline Road for this project, DOE-ID has followed the requirements of the Endangered Species Act (16 USC Sections 1531 et seq.) and has reviewed the most current lists for threatened and endangered plant and animal species. Other Federal laws that could be applicable include: the Fish and Wildlife Coordination Act (16 USC § 661 et seq.), Bald Eagle Protection Act (16 USC § 668), and the Migratory Bird Treaty Act (16 USC Sections 715 to 715s).

The State of Idaho is authorized by the EPA (40 CFR 52) to manage criteria and toxic air pollutants through its State Implementation Plan. The plan includes IDAPA 58.01.01 and requires a permit-to-construct for any facility with the potential to release state-regulated pollutants that exceed a certain threshold. Radionuclide emissions are regulated under the federal National Emission Standards for Hazardous Air Pollutants Program (40 CFR 61, Subpart H). Criteria and state toxic air pollutants have the potential to be released during both the modification and operational phases, but are not expected to exceed ambient air quality standards or contribute to an unacceptable increase in pollutant levels for any of the alternatives.

7. LIST OF AGENCIES AND PERSONS CONSULTED

No other federal or state agencies were consulted during preparation of this EA.

Communications have been initiated with the Shoshone-Bannock Tribes and Idaho State Historic Preservation Office regarding cultural resource impacts, particularly those associated with the potential use of the T-25 Powerline Road. If the T-25 Powerline Road improvements are implemented, consultation will continue toward development of a Cultural Resource Protection Plan.

If consultation with the U.S. Fish and Wildlife Service is deemed necessary, that agency will be consulted.

If the HFEF Decon Cell at MFC is used, methodologies developed in consultation with the Idaho State Preservation Office and Advisory Council on Historic Preservation, as outlined in the “INL Cultural Resource Management Plan,” (DOE-ID 2007) will be completed.

8. REFERENCES

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