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**This document was reviewed following the
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APPROVED FOR PUBLIC RELEASE

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WHC Information Release Administration Specialist:

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7. Abstract This plan identifies the scope and schedule necessary to transition the 309 Building (Plutonium Recycle Test Reactor [PRTR]) from DOE's Nuclear Energy (NE) Office to the Office of Environmental Restoration and Waste Management (EM) pending ultimate facility decommissioning. The 309 Building is currently shutdown, with all wastes stabilized except those in the PRTR and Rupture Loop Ion Exchange Vaults.		
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M. Boston 8/31/94

Information Release Administration

MASTER

309 BUILDING TRANSITION PLAN

Executive Summary

The preparation for decontamination and decommissioning (transition) of the 309 building is projected to be completed by the end of fiscal year (FY) 1998. The major stabilization and decontamination efforts include the Plutonium Recycle Test Reactor (PRTR), fuel storage and transfer pits, Transfer Waste (TW) tanks and the Ion Exchange Vaults. In addition to stabilizing contaminated areas, equipment, components, records, waste products, etc., will be dispositioned. All nonessential systems, i.e., heating, ventilation, and air conditioning (HVAC), electrical, monitoring, fluids, etc., will be shut down and drained/de-energized. This will allow securing of the process, laboratory, and office areas of the facility. After that, the facility will be operated at a level commensurate with its surveillance needs while awaiting D&D. The implementation costs for FY 1995 through FY 1998 for the transition activities are estimated to be \$1,070K, \$2,115K, \$2,939K, and \$4,762K, respectively. Costs include an assumed company overhead of 20% and a 30% out year contingency.

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309 BUILDING TRANSITION PLAN

1.0 Introduction and Purpose

In August of 1993 the 309 Facility was declared excess by the U.S. Department of Energy-Nuclear Energy (DOE-NE). As defined in WHC-CM-1-3, MRP 6.15 (Management Requirements and Procedures) the 309 Facility falls under the standby condition designation of Condition IV-Deactivated. A Field Work Proposal (FWP #9302002B R43) was prepared by Westinghouse Hanford Company (WHC) at the direction of Richland Operations (DOE-RL) which stated the need to transfer the 309 Facility from DOE-NE to the Office of Environmental Restoration and Waste Management (DOE-EM).

As determined earlier this year, the 309 Building is a High Ranking Facility under the Surplus Facility Inventory and Assessment (SFIA) Project guidelines. The 309 Building transition will fall under the new DOE Facility Transfer Policy currently under development. Since this policy has not yet been issued (due effective 09/30/94) DOE Draft 58XX.XX was used as a guide in preparing this transition plan.

As outlined in the FWP and MRP 6.15, a plan would be prepared which would focus on facility shutdown and transition to turnover for utilization, remedial action, or decontamination and decommissioning (D&D). This plan describes the scope and schedule necessary to transition the 309 Building from its current status¹ to a stabilized, shutdown facility ready for turnover to D&D (EM-40). Specifically, this plan describes the major tasks, scope, methodology, and timing for the following activities:

- Cleanup and stabilize surface contamination areas (SCAs) to allow shutdown of active support systems and shutdown of the facility
- Remove and disposition all excess materials, components, etc., and any radiological or hazardous waste from the facility
- Prepare and obtain approval of safety and National Environmental Policy Act (NEPA) documentation consistent with shutdown needs and current regulatory directives
- Establish the baseline scope and schedules for the Management Control System.

¹ The 309 Building is currently shut down, with all wastes except those in the PRTR and Rupture Loop Ion Exchange Vaults stabilized.

2.0 Facility Description

The following provides a description of the facility and major systems of the 309 Building.

2.1 GENERAL

The building is operated by WHC under contract to DOE.

The original 309 Building mission was to provide an operating test reactor in the Hanford Works (HW) Plutonium Fuels Utilization Program whose purpose was to research and develop nuclear fuel technology. This test reactor was known as the Plutonium Recycle Test Reactor (PRTR). In 1962, the Plutonium Recycle Critical Facility (PRCF) was added to support PRTR operations as the location where reactivity values of fuel assemblies were checked.

In 1963, Fuel Element Rupture Test Facility (FERTF, hereafter called the Rupture Loop) operations began in one fringe channel of the PRTR. The Rupture Loop itself was a pressurized, light-water-cooled loop within the main, heavy-water-cooled calandria. The Rupture Loop was used as a pilot irradiation facility to test new fuel element designs and new operating regimes. Many of its tests involved pre-defecting fuel elements with pinhole breaks to study the stability of various pre-defected materials under irradiation.

Such Rupture Loop tests continued under increasingly thermally hot conditions until a serious (Type A) operating accident occurred on September 29, 1965 (fuel rod failure). After the subsequent cleanup, the PRTR resumed critical experiments and began what was known as the Batch Core Experiment. It experimented with augmenting the standard control rods with a "chemical shim" in the form of varied concentrations of boric acid dissolved in the heavy water moderator. This experiment ran for only about half of its planned duration before a flaw was discovered in the P-4 valve (the main valve in the primary coolant inlet system). The PRTR was shut down in order to replace the valve when in mid-1969 the U.S. Atomic Energy Commission (AEC) decided not to refuel the PRTR and to pursue breeder reactor technology instead.

During the years immediately following the PRTR layaway the PRCF continued to operate although its original mission soon gave way to housing experimental lattice testing for the design of various light-water-cooled reactors. Later, a commercial license obtained from the Nuclear Regulatory Commission (NRC) by Battelle Northwest Labs (BNWL) allowed the PRCF to experiment with commercial fuels from a variety of sources (this NRC license has since been closed out). In 1976 the PRCF was closed down due to its outdated technology. During the late 1980's, PRCF hardware and equipment were removed, the area decontaminated, and portions of the area rendered inaccessible.

In 1975 the Interim Examination and Maintenance (IEM) Cell was built in the old maintenance and mockup (M&M) cell area. It is an exact "cold" replica of the operating cell in the Fast Flux Test Facility (FFTF) reactor and is still used to train and requalify operators and to check operating procedures.

In the late 1970's, the ground floor level inside the PRTR containment dome was emptied and converted into a "clean shop" (i.e., one using no radioactive materials and no sodium) to fabricate loops that would be used in the 324 and 337 Buildings to test sodium flow. In conjunction with this shop was a welding qualification room that later became an electronics repair shop (now offices [404a and 404b]).

In 1986-87 a new space technology development program known as SP-100 was assigned to the 309 Building. This program immediately undertook an extensive clean-out of the old PRTR facilities in the building. In 1991, the SP-100 program was placed on a 5-yr "hold", thus ceasing any further clean-out. The SP-100 program was terminated by DOE in November 1993, which has brought about the transition of the facility.

Today the 309 Building houses offices, engineering records, and a cement testing laboratory (rooms 404a and b).

2.2 BUILDING

The 309 Building, originally completed in 1960, has been expanded several times since then. The main building (process and service wings) is 80' X 100' with the adjacent reactor located below grade and covered by a 27" thick concrete slab at ground level and then by a welded, carbon steel cylindrical containment vessel 80' in diameter and 125' high (75' above grade). The remainder of the north-south running building originally housed shops, equipment rooms, offices, etc. In 1960, the M&M wing (61' X 100') was added west of the containment dome. A second addition, built in 1962-1963, east of the containment dome housed the PRCF. Building of the IEM Cell in 1975 added approximately 20' to the top of the M&M wing.

Floor plans of the 309 Building are shown in Figures 2.2.1 and 2.2.2 (in these figures the leftmost number indicates the room number, while the right indicates its square footage). The building has approximately 46,700 sq ft of floor area. Of this area, the first floor offices and personnel corridors comprise 21,600 sq ft; the basement offices and personnel corridors, 4,450 sq ft; the basement service area, 9,900 sq ft; the containment vessel, 5,025 sq ft; the IEM cell, 1,450 sq ft; rooms 20 and 19 (Rupture Loop Annex and access tunnel, respectively), 2,525 sq ft; and the inaccessible below grade portion of the PRCF and Fuel Storage Basin, 1,750 sq ft. Figure 2.2.3 illustrates external facility structures and their locations relative to the 309 Building.

Figure 2.2.1: 309 Building First Floor Plan, Elevation at 0'-0"

Figure 2.2.2: 309 Building Basement Plan, Elevation Below 0'-0"

Figure 2.2.3: 309 Building, Elevation at 0'-0" (Not to Scale)

2.3 HEATING, VENTILATION, AND AIR CONDITIONING

There are two types of HVAC systems in the 309 Building: 1) the system for the containment dome and the Rupture Loop Annex (process wing) incorporating high-efficiency particulate air (HEPA) filtration and 2) the system for the office and service areas (service and M&M wing) incorporating supply fans only.

A bank of four freon compressors (only one is currently serviceable) provide the refrigerative cooling of the ethylene glycol which is piped to chiller coils for cooling the office areas and the containment dome. In May 1994, the system was drained of its ethylene glycol, flushed, and converted to a propylene glycol system (a non-listed coolant).

The heating coils in the building utilize steam provided by the 300 Area Powerhouse. Rooms 213, 214, 101, 102, and 103 are not part of this system as they are serviced by three heat pumps. A swamp cooler located in the south end of the building supplies the service wing except for previously designated rooms.

The containment dome and entrance air locks are maintained at the lowest pressure in the building, -0.50 inch water gauge (W.G.) relative to atmosphere. The office and service areas are maintained at slightly above atmospheric pressure.

2.3.1 HVAC Systems with HEPA Filters

There is one supply fan that furnishes ventilation air to the containment dome. The only exhaust fan expends air through two stages of HEPA filters (one stage located within the containment dome, the second located in the main stack pit) which then vent through the 309 stack to atmosphere. Radial inlet dampers on the inlet of the exhaust fan are automatically controlled to maintain a static negative pressure of approximately -0.50 inch W.G. with respect to atmosphere in order to maintain a controlled air flow pattern from areas of little contamination potential to potentially contaminated areas.

Nine air handlers are located within the containment dome: two at ground level; one in B-Cell; three in A-Cell; and three in C-Cell (one each at the -11', -21', and -32' levels).

The Rupture Loop Annex (room 20) is furnished ventilation air from the office and service areas through its access tunnel (room 19). A ventilation supply fan is located in room 19, but it was abandoned in 1969. The running exhaust fan expends air through one stage of HEPA filters which then vents to atmosphere.

2.3.2 HVAC Systems with Supply Fans

The office and service areas are provided with ten independent heating and ventilation systems, each consisting of heating and cooling coils and a supply fan. The air provided to these areas is a combination of fresh air makeup and recirculated air. The pressure in the office and service areas is maintained at a positive pressure by virtue of the fact that only supply fans are provided with no exhaust fans.

The HVAC systems servicing the office and service areas are:

- Rooms 400 and 404, located in room 404
- Rooms 404a and 404b, located on rooftop
- 300 Series rooms, located in room 304
- IEM Cell, located on rooftop but no longer functional
- Service wing, swamp cooler located in south basement
- Instrument Shop, located on rooftop
- M&M wing (4 systems), located in room 122, the mens rest room and above room 22 (2).

2.4 ELECTRICAL

Electrical power is supplied to the 309 Building through a 300 kVA transformer during normal building operations, and through a 500 kVA transformer for emergency operations. Under normal operating conditions, the main 300 kVA transformer is fed by the Bonneville Power Administration.

Under emergency conditions, loss of normal power, an emergency connection to the 3621D building (300 Area diesel generators) is made. This is done by 125 volt DC battery banks whose sole function is to convert switchgear from normal to backup mode. During emergency conditions, lighting levels are reduced to approximately 1/3 that of normal levels. The 309 Building fire system has a self-contained backup battery power system.

2.5 PIPED UTILITIES

The following piped liquids and gases are available in the building:

- Sanitary water, hot and cold
- Fire-fighting water

- Steam received from the 300 Area Powerhouse and reduced to pressures needed
- Compressed air received from the 300 Area Powerhouse and reduced to pressures needed
- In-house chilled water for building cooling during summer months
- Drains for sanitary water to the sanitary sewer and for steam condensate to the process trenches.

2.6 FIRE PROTECTION

All areas within the 309 Building are covered by wet-pipe sprinkler systems except for the incoming power transformers which are covered by a dry deluge system. The containment dome was built with no fire suppression capabilities due to lack of combustible materials. Manually operated portable fire extinguishers of appropriate types are located throughout the building.

Fire detection systems include product of combustion (i.e., smoke) detectors and manual pull boxes (results of a system upgrade in 1992). All detection systems will alarm locally and at the 300 Area Fire Station. The 300 Area fire trucks arrive within three minutes after an alarm or call.

2.7 ALARMS AND MONITORS

2.7.1 Criticality

The criticality alarm protection system is no longer functional.

2.7.2 Air Monitors and Alarms

There no longer exists an air monitoring system. Any monitoring needed is done by Health Physics Technicians (HPTs) using portable detection devices.

2.7.3 Fire and Emergency Alarms/Communication System

Alarms are sent to the 300 Area Fire Station and the 309 Building annunciator panels if any of the following should occur: 1) activation of any of the building's fire suppression sprinkler heads, 2) activation of smoke or heat detectors, and 3) activation of manual pull box alarms.

A manually operated building evacuation alarm, clearly identified, is located in the hallway adjacent to room 103. Triggering this alarm activates a distinctive siren throughout the 309 Building complex as an emergency signal to evacuate. The evacuation alarm and a "take cover" alarm are also part of

the 300 Area alarm system and can be initiated at the Hanford Patrol Headquarters (3701D building).

The building is also served by an a public address announcing system, a conventional telephone system, and a "crash alarm" telephone.

2.7.4 Radioactive Contamination Monitors

There are no radiation monitoring systems available (i.e., hand, shoe, or alpha types). Any monitoring needed is done by HPTs using portable detection devices.

2.7.5 Sump Alarm

The sump alarm is a local alarm for the process sewer sump for the M&M wing. It is triggered when the sump is on the verge of overflowing.

2.8 WASTE DISPOSAL

2.8.1 Liquid Wastes

The 309 Building is served by the 300 Area sanitary sewer which serves the office and rest room areas only. Sanitary waste flows through a septic tank into trenches where it is absorbed into the ground. The process sewer receives steam condensate from the heating system which goes to process trenches in the north end of the 300 Area.

2.8.2 Dry Solid Wastes

Normal operating waste produced is "clean" (nonradioactive) or low-level waste (LLW). Clean waste is released by HPTs and sent to landfill while LLW is packaged and processed per the appropriate waste certification plan and procedures.

2.8.3 Hazardous Waste, Mixed Waste and Transuranic (TRU) Waste

Some possibilities for mixed-waste exist such as radioactive contamination of lead or asbestos. The Rupture Loop Annex (room 20) contains approximately 24 lead bricks that could be mildly contaminated. The containment vessel contains asbestos that also could be contaminated. Other regulated items continue to exist within the confines of the 309 Building (i.e., rupture loop and reactor ion exchange vaults, reactor calandria, fuel examination cell, fuel transfer pit, and moderator storage tank) and could each contain TRU waste.

2.9 AREAS PREVIOUSLY DECONTAMINATED AND DECOMMISSIONED

The 309 Building contains several areas and structures that have previously been decommissioned and decontaminated or removed for burial. This list includes:

- PRTR related process equipment located in A-, B-, and C-Cells in the containment dome
- The PRCF
- The Fuel Storage Basin
- The Rupture Loop Holding Tank
- The Salt Brine Container and Brine Tanks
- The Emergency Water Well

2.9.1 A-, B-, and C-Cells

Surrounding the reactor are three large cells with their floors at 32' below ground. A-Cell was the largest, occupying almost half of the area under the containment dome. It was the reactor process cell, containing pumps and motors for both the primary and secondary coolant. Also located within A-Cell was the principal heat exchanger for the reactor. The B-Cell occupied about one-fourth of the area under the containment dome and was the experimental cell. It contained the in-vessel rupture loop equipment, the gas loop equipment, and cooling blowers for the Hot Fuel Examination Facility. C-Cell, about the same size as B-Cell, was the instrument cell and consisted of three levels (-11', -21' and -32'). SP-100 efforts removed all equipment from A, B, and C cell and shipped it to the 200 Area solid waste burial grounds.

2.9.2 PRCF

The PRCF was originally designed to support PRTR operations as the place where the reactivity values of the fuel assemblies before and after irradiation were checked. The PRCF control room was located in Room 304. The reactor core is a concrete cell 13' x 10' x 27' deep with its bottom at 32' below grade. The cell was below the east wing of the 309 Building, just south of the fuel storage basin but not inside the containment dome. The PRCF was shut down in 1976 and the reactor fuel and neutron sources were removed and water was drained from the system. During 1989, PRCF hardware and equipment were removed, the area decontaminated, and the below grade portion rendered inaccessible (the report WHC-SD-DD-TI-041 documents the decontamination and decommissioning efforts).

2.9.3 Fuel Storage Basin

Underwater fuel element storage was provided by the Fuel Storage Basin, a 12' x 40' x 26' deep concrete structure located adjacent to the containment vessel. A water passage into the containment vessel was provided for transfer

of irradiated fuel elements from the reactor hall to the storage basin. A sluice gate in the containment vessel wall closed the fuel element underwater port in the discharge pit during reactor operations. The basin was drained and cleaned with the above grade portion decontaminated in the early 1970's. A plywood floor installed at approximately ground level allowed the above grade portion of the basin to be used as a welding qualification shop (now the 400 series offices). An adjacent ion exchange vault and pit was filled with sand during the decontamination activities. It is assumed that the ion exchange column was removed at that time and is therefore not included in the task description and cleanup cost estimate.

2.9.4 Rupture Loop Holding Tank

The Rupture Loop Holding Tank contained liquid wastes from the reactor operations that were awaiting sampling. The tank was located below grade, northeast of the containment dome and just southwest of the 324 building. The black iron tank had a 90,000 gallon capacity, and was 40' in diameter and 10' deep with a sloping top. During reactor operations uncontaminated waste from the tank was released to the Columbia River via manholes 2 & 3. Contaminated waste was pumped to the 340 building via 3" diameter carbon steel Radioactive Liquid Waste System (RLWS) piping (see reference drawings H-3-11194 and H-3-15048 if further clarification is required). The tank was removed in the late 1970's and shipped to the 200 Area solid waste burial ground. The tank's RLWS piping connections were severed and plugged at that time.

2.9.5 Salt Brine Container and Brine Tanks

Buried just west of the 309 building service wing is the Salt Brine Container, a concrete structure 30' x 12' and 9' deep. It held salt that would be slurried and pumped to 3 brine tanks located in the 309 building basement via 2" diameter plastic pipes (the tanks supplied the process water used to cool the smaller heat exchangers in the reactor). All three of the brine tanks were removed during SP-100 activities and shipped to the 200 Area solid waste burial grounds. The salt brine container itself was removed down to ground level and the remainder filled with gravel and/or dirt.

2.9.6 Emergency Water Well

The emergency water well provided "last-ditch" cooling for PRTR activities. It was located in the southwest corner of the service basement and powered by a diesel engine with fuel supplied from the diesel fuel storage tank. In December of 1993, the well pump and motor were removed and excessed. A grout/sand combination was poured down the piping to seal it according to appropriate procedures. The document WHC-SD-ER-TI-004 details these cleanup activities.

3.0 Task Descriptions

Normal day-to-day operations of the 309 building during the transition period will require a core staff for technical and administrative activities. The core staff will ensure the facility is kept safe, habitable and in compliance with applicable codes, regulations and procedures. Specific activities include:

- Rule Compliance.
- Preparation of safe conduct of operations procedures.
- Interface with D&D, DOE, Washington State and other regulators.
- Provide technical and process knowledge for the preparation of decontamination and stabilization procedures.
- Upkeep of the manuals normally assigned to the building.
- Walk through all noncontaminated areas of the building at least daily, checking for broken water lines, air compressors running, water chillers running, etc. Trouble conditions would require more frequent monitoring until repairs are complete.
- Consult with craft schedulers and foreman as required to preclude interference problems and safety problems with the building and its occupants.
- Arrange for and coordinate personnel moves into, out of, and within the building.
- Arrange for air temperature and air flow changes as required in the office.
- Arrange for Health Physics Technician (HPT) services (well in advance of need) for tours of the contaminated portions of the 309 building.
- Conduct scheduled Radiological Routine Surveys.
- Perform semi-annual Industrial Safety and Fire Protection audits.
- Assist in DOE audits and reviews.
- Conduct hazardous materials inventories, waste minimization, Hanford Environmental Management Plan (HEMP), and all other environmental concerns associated with the 309 building.

- Maintain the 309 building lock and tag log; witness and sign off as required.
- Sign off on all permits required for work in and around the building.
- Make the monthly inspection and sign off of the building fire extinguishers.
- Coordinate new phone installations, removal, and repair.
- Arrange for building repairs to keep the building habitable.

3.1 EXCESS EQUIPMENT DISPOSITION

3.1.1 Background

The 309 Building contains equipment and material that remain from approximately two decades of fuels research in the PRTR and the PRCF along with training equipment for the FFTF. This equipment and material includes process equipment and associated components, IEM Cell mock-up equipment, tools, fixtures, shop equipment, and office furniture. Equipment items are located in the IEM cell, shop areas, service basement, and office areas.

The PRTR activities were discontinued in 1969. Since that time some equipment has been excessed, including all equipment located in the A-, B-, and C-Cells (1986-87 SP-100 cleanup activities). Excess equipment and material refers to items which can be released from a radiological perspective and are not designated for future use.

3.1.2 Scope

Fixed equipment, i.e., that which is installed in a permanent manner, will remain in the facility. All other items in the facility that are neither contaminated nor required to support essential or minimum surveillance and maintenance (S&M) activities are candidates for excessing or reassignment.

3.1.3 Approach

Items believed to have potential use by other organizations will be "advertised" to those organizations to allow them to accept the property transfer. All other radiologically clean items that can be readily removed, i.e., those items not requiring significant craft support to remove, will be excessed. Those items that require significant cost for removal and are more economical to remove during D&D, will be left installed.

Initial focus will be on the process equipment left over from PRTR operations and the equipment contained in the IEM Cell. The office areas will be the last portion of the facility to be cleaned.

Maintenance, HPTs, and transportation support services will be utilized, as necessary, for equipment removal, release, and excessing.

3.1.4 Schedule

Equipment excessing is scheduled for completion during FY 1997. Table 3.1 outlines the estimated duration of work. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.1: Excess Equipment Schedule Estimate

TASK	MAN HOURS
Remove and Dispose of Excess Equipment	480
TOTAL MAN HOURS	480

3.2 TRANSURANIC WASTE

3.2.1 Background

TRU contaminated materials are believed to exist in the calandria structure, the PRTR IX vault, the Rupture Loop Annex, and the Rupture Loop IX vault (quantities in grams). Most of this contamination is a result of the fuel rod failure incident of September 1965, during which approximately 700 grams of fuel (UO_2 -4wt% PuO_2) was ejected. After cleanup, approximately 350 grams (14-15 grams PuO_2) is still contained in the systems. TRU waste generation was minimized in 1976 with the shutdown of the PRCF operations.

3.2.2 Scope

All loose TRU waste which can be removed from an area will be transferred into drums and surfaces will be coated to fix residual contamination. Details of this activity are provided in sections 3.4, 3.7, and 3.9.

3.2.3 Approach

It is necessary to update operating procedures and training to package, certify, and ship TRU waste. A 309 Building Contact-Handled TRU Waste Certification Plan, which establishes the basis for the future necessary procedure development and operation, must be written and approved. A Quality Assurance (QA) Plan must also be written and approved. Staff to remove the TRU waste will also need to be obtained.

Vessel and vault cleanup will proceed after procedure development and training are completed. Remaining waste and cleaning material will be bagged out and placed in TRU waste drums. The interior surfaces will be wiped with a damp cloth as necessary for cleanup of smearable contamination. The interior surfaces will then be coated to stabilize and fix any residual contamination. All of these operations will generate some additional waste.

Maintenance, HPTs, transportation/shipping, and waste engineering support services will be utilized as necessary for TRU waste processing and certification activities.

3.2.4 Schedule

The facility TRU waste constitutes the primary radiological hazard in the facility. Thus, its removal justifies a high priority. The Certification and QA Plan development and personnel training are scheduled to be done during FY 1996. TRU waste removal will begin once these items are implemented. Table 3.2 outlines the estimated duration of each task item. Task assumptions and required team members (including number and type of personnel to be trained) are detailed in Appendix A.

Table 3.2: TRU Waste Schedule Estimate

TASK	MAN HOURS
Develop TRU Waste Certification Plan	600
Develop QA Plan	240
Develop Training Plan	720
Train Personnel	2,720
TOTAL MAN HOURS	4,280

3.3 LOW LEVEL WASTE

3.3.1 Background

The containment dome, room 20, IX vaults, stack pit, and the TW tanks and piping are locations all believed to house some form of LLW. Some items in these areas cannot be radiologically released because of inaccessible internal surfaces.

3.3.2 Scope

It is expected that a number of the equipment and material items to be removed from the areas mentioned above are either slightly contaminated or cannot be released because of internal surfaces which prevent a total surface survey from being performed.

3.3.3 Approach

All equipment and material will be surveyed as it is considered for potential release or disposition as LLW. If contamination is observed (non-removeable) or if an item is not releasable due to internal surfaces which preclude a thorough survey, the item will be LLW.

Two categories of LLW are anticipated - compactible and noncompactible. The compactible waste will be collected in cardboard boxes and consolidated as appropriate in LLW drums for final packaging and shipping to long-term storage. The non-compactible waste is loaded directly into the final LLW drum.

Similar to TRU waste, the facility must implement operating procedures and training to establish the capability for LLW packaging and certification. The 309 Building Low-Level Waste Certification Plan and facility-specific operating procedures need to be written and implemented. Formal authorizing documentation from Solid Waste Engineering will be obtained. Staff to remove the LLW will also need to be obtained.

3.3.4 Schedule

Writing of the LLW Certification and QA Plans and personnel training are scheduled to be completed during FY 1996. Table 3.3 outlines the estimated duration of each task item. Task assumptions and required team members (including number and type of personnel to be trained) are detailed in Appendix A.

Table 3.3: Low Level Waste Schedule Estimate

TASK	MAN HOURS
Develop LLW Certification Plan	360
Develop QA Plan	360
Develop Training Plan	360
Train Personnel	2,400
TOTAL MAN HOURS	3,480

3.4 PRTR CORE STRUCTURE, SHIELDING, MODERATOR STORAGE TANK, AND CALANDRIA

3.4.1 Background

The PRTR itself was located in a calandria (tank) 12' in diameter and 9.5' high located in the center of the containment vessel. The reactor core consisted of 85 vertical aluminum tubes, each 4" in diameter. Inside these were Zircaloy-2 process tubes which each held a fuel "cluster" or "bundle" of 19 fuel rods. Primary control for the reactor was achieved by varying the heavy water moderator level. The auxiliary control feature was 18 additional core positions that contained a total of 54 half-rods (safety or shim rods, three in each of the 18 positions). Located below the calandria was the moderator storage tank which stored the heavy water moderator and introduced it into the calandria using helium pressure. The top of the reactor core was shielded by a 27" thick concrete slab at ground level.

Decontamination activities undertaken in the 1970's and 1986-1987 (SP-100 work) resulted in a significant reduction of equipment and hazardous materials within the containment dome. The fuel from the reactor core was removed and processed through the Plutonium-Uranium Extraction (PUREX) facility in 1972-73 (although some fuel, approximately 200 grams UO_2 -4wt% PuO_2 , may be in the PRTR primary system piping as a result of the Rupture Loop fuel rod failure in 1965). Some PRTR fuel elements containing special oxide blends were processed in the hot cell in the 325 (and/or 324) building in 1976 and buried in the 200 Area solid waste burial grounds. The heavy water in the moderator storage tank was drained and shipped to the Savannah River Plant in 1969 (a possible heel remains in the tank). In the late 1970's all ports and plugs in the top reactor shield were sealed with grout and painted with sealant to fix any contamination. During SP-100 efforts the principal heat exchanger was removed from A-Cell (see section 2.9.1).

3.4.2 Scope

Building transition requires only characterization of the radiation levels within the calandria and moderator tank, not a complete cleanup (removal) and decontamination effort.

The scope and final condition of the PRTR reactor and its equipment will include:

- Inspection of the calandria
- Inspection of the moderator storage tank and removal of any heel contained within
- Replacing rotary shields to prevent casual entry.

3.4.3 Approach

A detailed radiological and hazardous materials survey will be done in order to characterize the radioactive contents remaining in the calandria, moderator storage tank and primary cooling system. Surveying of the reactor core will include sampling 10 representative process tubes. Any heel remaining in the moderator storage tank will be removed for burial at the 200 Area solid waste burial grounds.

3.4.4 Schedule

Inspection of the reactor core and its equipment is scheduled to be completed during FY 1998. Table 3.4.1 outlines the estimated duration of each task item for characterization of the PRTR core. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.4.1: PRTR Reactor Inspection Schedule Estimate

TASK	MAN HOURS
Remove Rotary Shields	72
Characterize Calandria	240
Sample Process Tubes, 10 each	1,520
Check Moderator Storage Tank for Heels	104
Pump Heavy Water, Approx. 1 Drum	56
Replace Rotary Shields	72
Dispose of Heavy Water	56
Prepare Report of Findings	360
TOTAL MAN HOURS	2,480

Table 3.4.2 shows labor hours required for the total removal and cleanup of the core and storage tank.

Table 3.4.2: PRTR Reactor Cleanup Schedule Estimate

TASK	MAN HOURS
Install Containment Structure	128
Remove Rotary Shields	48
Remove Outlet Jumpers, 85 each	2,800
Remove Outlet Nozzles, 85 each	2,240
Remove Shim Rods, 18 each	1,120
Remove Miscellaneous Equipment	1,120
Remove Process Tubes, 85 each	6,500
Remove Outlet Header	1,600
Remove Top Shield	1,560
Evaluate Dry Gas Space	400
Remove Calandria	1,700
Remove Bottom Shield	2,400
Remove Inlet Jumpers, 85 each	2,800
Remove Inlet Nozzles, 85 each	2,240
Remove Dump Valves, 4 each	520
Remove Inlet Header	2,040
Remove Moderator Storage Tank	2,040
Remove Wall Plugs	2,040
Trim and Plug Misc. Piping	600
Decontaminate Cavity	640
Apply Affixative Coating	384
Replace Rotary Shields	40
Decontaminate and Package Items	20,000
TOTAL MAN HOURS	54,960

3.5 FUEL STORAGE PITS

3.5.1 Background

Located between A- and C-Cell was the irradiated fuel storage and transfer pit. Constructed of concrete, the 21' x 4' x 26' deep pit was directly above a pipe chase that ran between A- and C-Cell. It could be accessed via a 9-ton plug in the containment dome floor. Process knowledge indicate that high levels of contamination within the pit are possible.

The 309 Building also contained a "green" (fresh) fuel storage pit located below grade between A- and C-Cell and just north of the irradiated fuel storage pit. This small concrete facility is 3.5' x 6.3' x 21' deep.

3.5.2 Scope

The scope and final condition of the fuel transfer pits will include:

- Removal of contaminated equipment
- Removal of any mixed waste, hazardous waste, solid radioactive waste, and loose surface contamination
- Coating internal surfaces with a fixative coating.

3.5.3 Approach

Detailed radiological and hazardous materials surveys will be performed to characterize contamination. After the facility has established waste packaging capabilities, wastes will be packaged and removed. Contaminated equipment will be removed for burial at the 200 Area burial ground in accordance with Storage/Disposal Approval Records (SDARs). Internal surfaces will have smearable contamination removed and will be coated as necessary to stabilize any residual surface contamination.

3.5.4 Schedule

Decontamination of the storage pits are scheduled to be completed during FY 1998. Table 3.5 outlines the estimated duration of each task item. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.5: Fuel Storage Pits Schedule Estimate

TASK		MAN HOURS
Install Temporary Containment		128
Green Fuel Storage Pit	Remove Contaminated Equipment	144
	Remove Mixed & Hazardous Wastes	112
	Remove Solid Radioactive Wastes	128
	Remove Surface Contamination	160
	Apply Affixative Coating	160
Irradiated Fuel Storage Pit	Remove Contaminated Equipment	216
	Remove Mixed & Hazardous Wastes	320
	Remove Surface Contamination	72
	Apply Affixative Coating	64
Remove Temporary Containment		144
Decontaminate, Package & Ship Items		880
TOTAL MAN HOURS		2,528

3.6 HOT FUEL EXAMINATION FACILITY

3.6.1 Background

With its base located at 32' below grade between A- and B-Cell, the Hot Fuel Examination Facility functioned as a hot cell where personnel conducted preliminary gamma scans and other tests on breached, irradiated fuel. The 6' x 4' x 27' deep concrete structure with a 16-gauge stainless steel liner extending to the cell bottom, was equipped with manipulators, periscopes and other remote handling devices. The cell could be physically accessed from B-Cell through a heavy metallic bank vault-type door. The cell was normally air cooled and was equipped with a 4" bottom drain line that flushed liquid wastes to the B-Cell sump. A trap door between the facility and the Fuel Storage Basin allowed fuel transfer between locations.

A control console for the facility was located on the ground floor level of the containment dome (north side), but was removed in the early 1970's. Removal of the periscopes occurred during the containment conversion to a sodium test loop fabrication shop (late 1970's).

3.6.2 Scope

The scope and final condition of the Hot Fuel Examination Facility will include:

- Removal of fuel examination facility equipment
- Sealing the fuel examination facility drain line extending to the B-Cell sump
- Removal of any other mixed waste, hazardous waste, solid radioactive waste, and loose surface contamination (including any remaining fuel pieces)
- Coating internal surfaces with a fixative coating.

3.6.3 Approach

Detailed radiological and hazardous materials surveys will be performed to characterize any contamination. Examination of the trap door integrity will also be performed. If released by HPTs, the remote handling equipment for the fuel examination facility will be excessed as detailed in section 3.1. After the facility has established waste packaging capabilities, wastes will be packaged and removed. Contaminated equipment will be removed for burial at the 200 Area burial grounds. Internal surfaces will have smearable contamination removed and will be coated as necessary to stabilize any residual surface contamination.

3.6.4 Schedule

Characterization and decontamination of the Hot Fuel Examination Facility is scheduled to be performed during FY 1998. Table 3.6 outlines the estimated duration of each task item. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.6: Fuel Examination Cell Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment	408
Remove Access Plug	72
Remove Contaminated Equipment	760
Seal 4" Diameter Drain	192
Remove Surface Contamination	80
Coat Internal Surfaces	120
Remove Temporary Containment	208
Decontaminate, Package & Ship Items	520
TOTAL MAN HOURS	2,360

3.7 PRTR MAIN ION EXCHANGE AND RESIN DISPOSAL VAULTS

3.7.1 Background

The PRTR Main Ion Exchange (IX) and Resin Disposal Vaults housed the IX columns utilized to deionize the heavy water moderator used in the reactor. The vaults are a single below grade concrete structure (in two sections) located northeast of the containment dome with connecting piping. The upper section (Main IX Vault) is 14' x 14' square and 16' deep. The lower section (Resin Disposal Vault) is a 15'-6" diameter cylinder, 22' deep. Access into the upper vault is through three layers of 2' thick shield blocks. Access to the lower vault is via two 2'-11" diameter plugs in the 2' thick concrete separating the sections.

The IX columns contain both an acidic cation exchange resin (Amberlite IRN-77, formerly XE-77) and a basic anion exchange resin (Amberlite IRN-78, formerly XE-78). They also contain a variety of contaminants as a result of reactor operations. These contaminants may include TRUs, lithium hydroxide, cesium, cobalt-60, boron, tritium and fission products. Once IX columns were exhausted, the column and its piping were separated from containment, then lowered into the lower section of the vault for storage. The upper vault contains four partially spent IX columns (still connected to containment piping) and one spent column (disconnected from the piping). The lower vault holds seven spent IX columns and approximately 15,000 gallons of rainwater. Analysis of the rainwater revealed that it is a non-hazardous radioactive

waste. The vault does not contain any airborne contamination or combustible or organic gases.

In 1986 the IX column piping to the containment vessel was drained of heavy water, cut inside containment, and closed off. A detailed inspection and radiological survey was performed during entrance activities (March 1994).² During July 1994 one of the upper vault IX columns was sampled for hazardous wastes and a nondestructive assay (NDA) was performed. Results of these activities have not yet been released.

3.7.2 Scope

The scope and final condition of the vault will include:

- Removal of the IX columns and piping from both vaults
- Removal of any other mixed waste, hazardous waste, solid radioactive waste, or loose surface contamination
- Draining and disposing of the water contained in the lower (Resin Disposal) vault to the 340 Facility
- Coating the internal surfaces with a fixative coating
- Physical inspection of the vaults to assess structural integrity.

3.7.3 Approach

Following removal of the IX columns, piping, water, cleanup materials, and smearable contamination, a fixative will be applied to internal surfaces to stabilize any residual contamination. The final step will be to replace the vault shield blocks and install a metal rain cover to protect against further water leakage.

3.7.4 Schedule

Initial entrance and characterization of the vaults contents was completed March 8, 1994. Sampling of an IX column in the upper vault for hazardous constituents was performed July 19, 1994. Removal of the IX columns and water and decontamination of both vaults is to be concluded by the end of FY 1995.

² The document Stability of the Plutonium Recycle Test Reactor Main Ion Exchange and Resin Disposal Vaults (WHC-SD-SP-ER-002) details the results of the entrance activities.

Table 3.7 outlines the estimated duration of each task item required for cleanup of the vaults. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are detailed in Appendix A.

Table 3.7: PRTR IX Vault Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment*	128
Stage Lifting Equipment, etc.*	32
Lift Shield Block(s) to Upper Vault*	96
Cut Pipes to IX Columns	318
Remove IX Columns in Upper Vault	850
Preliminary Decontamination of Upper Vault	340
Remove Plug to Lower Vault	90
Install Sump Pump in Lower Vault	106
Stage Transport Tank	88
Pump Liquids from Lower Vault (In 3 Separate Stages)	588
Remove Standing IX Columns in Lower Vault	680
Remove Remaining IX Columns in Lower Vault	850
Decontaminate Upper & Lower Vaults	1620
Assess Integrity of both Vaults	490
Replace Upper Vault Shield Blocks	90
Remove Temporary Containment	272
Decontaminate, Package, & Ship Items	1060
TOTAL MAN HOURS	7,698

*Completed

3.8 RUPTURE LOOP TEST FACILITY

3.8.1 Background

Part of the PRTR was the FERTF, commonly referred to as the Rupture Loop. The Rupture Loop Annex (room 20), is located below grade, northwest of the containment dome. It contained the Rupture Loop mechanical equipment including tanks, pipes, and pumps. This cement-floored facility with its own sump was accessed from the basement through a 20' wide tunnel known as room 19.

The pump motors were removed earlier and sent to Idaho National Engineering Lab (INEL) for reuse (mid 1970's). The Rupture Loop Holding Tank and its removal was described in section 2.9.

3.8.2 Scope

The scope and final condition of the Rupture Loop Annex will include:

- Removal of approximately 24 lead bricks located in room 20
- Removal of any other mixed waste, hazardous waste, solid radioactive waste, or loose surface contamination
- Coating of internal surfaces of room 20 with a fixative coating.

3.8.3 Approach

Detailed radiological and hazardous materials surveys will be performed to characterize any contamination. After waste packaging capabilities are established, wastes will be packaged and removed. Internal surfaces will have smearable contamination removed and coated as necessary to stabilize any residual surface contamination.

3.8.4 Schedule

Radiological and hazardous material surveys and decontamination of the Rupture Loop Annex are scheduled for completion during FY 1997. Table 3.8 outlines the estimated duration of each task item. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.8: Rupture Loop Test Facility Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment	48
Remove Access Hatch	25
Remove Lead Bricks (24 each)	58
Remove Lead Shielding	66
Remove Small Ionization Chamber	196
Remove Other Equipment	490
Remove Mixed, Hazardous, & Solid Radioactive Wastes	222
Remove Surface Contamination	450
Coat Internal Surfaces	488
Replace Access Hatch	58
Remove Temporary Containment	112
Decontaminate, Package, & Ship Items	1,060
TOTAL MAN HOURS	3,273

3.9 RUPTURE LOOP ION EXCHANGE VAULT

3.9.1 Background

The Rupture Loop IX Vault contained the IX columns that were used to deionize the heavy water for the Rupture Loop section within the reactor. Located below grade northwest of the containment dome, the Rupture Loop IX Vault is a concrete structure measuring 26.16' x 15.83' and 16' deep. The vault had room for the three IX columns used for the Rupture Loop coolant cleanup and deoxygenation process with storage for up to 12 additional spent columns.

The vault is believed to contain three or four partially spent IX columns. Although the vault has spent column storage capabilities, no spent columns are thought to be stored within. The IX column resins and contamination possibilities are the same as described in section 3.7.1.

3.9.2 Scope

The scope and final condition of the vault will include:

- Removal of the IX columns and piping
- Removal of any other mixed waste, hazardous waste, solid radioactive waste, or loose surface contamination
- Draining and disposing of any contaminated liquids contained in the vault
- Coating the internal surfaces with a fixative coating.

3.9.3 Approach

A detailed radiological and hazardous materials survey will be performed in order to characterize the amounts and locations of radioactive wastes contained within the vault.

Removal of the LLW and TRU waste will proceed after the facility has established waste packaging capability. Once this is in place, cleanup of the residual waste and equipment will begin. Following removal of the IX columns, piping, cleanup materials, and smearable contamination, a coating will be applied to internal surfaces to stabilize any residual contamination. The final step will be to replace the vault shield blocks and the metal rain cover.

3.9.4 Schedule

Inspection and decontamination of the Rupture Loop IX Vault is scheduled to be performed during FY 1996. Table 3.9 outlines the estimated duration of each task item. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.9: Rupture Loop IX Vault Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment	64
Remove IX Columns and Piping	328
Drain and Dispose of Contaminated Liquids	66
Remove Mixed, Hazardous, & Solid Radioactive Wastes	180
Cut Piping to Room 20	132
Remove Surface Contamination	264
Coat Internal Surfaces	225
Remove Temporary Containment	64
Decontaminate, Package, & Ship Items	440
TOTAL MAN HOURS	1,763

3.10 TRANSFER WASTE HOLD-UP TANKS

3.10.1 Background

The TW hold-up tanks served as holdup and sampling containers for a variety of liquid wastes. There are three tanks, all connected to three sumps that could be hooked to either A-, B-, or C-cell in any sump and tank combination. Each tank has a 4000 - 5000 gallon capacity and are buried north and slightly west of the containment dome. During reactor operations uncontaminated waste from the tanks was released to the Columbia River via manholes 2 & 3. Contaminated waste was pumped to the 340 building via RLWS piping. A valve pit is located just east of the tanks along with an IX column.

During the late 1970's the RLWS piping connections to the 340 building were severed and plugged and the power supply line to the sumps disconnected. This power supply line was later cut during the 1980's.

The TW tanks are identified as part of an "Operable Unit" in the Tri-Party Agreement (TPA). However, a cleanup priority has not been set.

3.10.2 Scope

The scope and final condition of the TW hold-up tanks will include:

- Removal of tank heels
- Removal of tanks and sumps
- Disconnect and seal piping to manholes 2 and 3
- Removal of any other mixed waste, hazardous waste, and movable solid radioactive waste, and IX column
- Coating the internal surfaces with a fixative coating
- Removal and replacement of contaminated soils surrounding tanks.

3.10.3 Approach

Detailed radiological and hazardous materials surveys will be performed on the TW tanks so as to quantify the contamination levels. Once waste packaging capability exists, the tank heels will be removed, packaged and disposed of. Any piping not already disconnected will be severed and plugged. The tanks, sumps, and IX column will be removed for burial at the 200 Area Solid Waste Burial Grounds.

3.10.4 Schedule

The TW tanks are scheduled for inspection, decontamination, and removal during FY 1997. Table 3.10 outlines the estimated duration of work. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.) and equipment requirements are located in Appendix A.

Table 3.10: TW Hold-Up Tanks Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment	64
Remove & Dispose of Contaminated Liquids	164
Remove Tank Heels	222
Remove Tanks and Pumps	410
Seal Piping to Manhole #2	66
Seal 3" RLWS Line to 340 Facility	66
Remove Mixed, Hazardous, and Moveable Solid Radioactive Wastes	148
Remove Surface Contamination	66
Coat Internal Surfaces	58
Remove Contaminated Soil	116
Place Clean Soil	128
Remove Temporary Containment	64
Decontaminate, Package, & Ship Items	246
TOTAL MAN HOURS	1,818

3.11 DIESEL FUEL STORAGE TANK

3.11.1 Background

The 5000 gallon capacity diesel fuel storage tank, located below grade at the southwest corner of 309 Building, contained fuel to power the PRTR emergency generator and PRTR emergency water well. It was drained as much as possible years ago, but some sort of heel (solid or liquid) is expected to remain.

3.11.2 Scope

The diesel fuel storage tank will be removed and disposed of in accordance with established procedures.

3.11.3 Approach

The diesel fuel storage tank was placed on the "Orphan Tank" list in 1991 and is under that program's jurisdiction.

3.11.4 Schedule

The diesel fuel storage tank is tentatively scheduled for removal during FY 1995 by the Orphan Tank Program. If funding allows, this tank could be removed during FY 1994.

3.12 INTERIM EXAMINATION AND MAINTENANCE CELL

3.12.1 Background

The IEM Cell was built in 1975 in the old M&M cell area and is an exact "cold" replica of an operating cell in the FFTF. The IEM Cell was used to train and requalify operators and to check operating procedures for the FFTF. Training in the cell may be required to support shutdown of the FFTF.

3.12.2 Scope

All equipment located within the IEM Cell is eligible for excessing. This excessing is required as a result of the planned shutdown of the 309 Building and the termination of the FFTF mission.

3.12.3 Approach

Equipment that is installed in a more or less permanent manner will remain in the facility. All other items in the IEM Cell will be excessed as outlined in section 3.1.

3.12.4 Schedule

The IEM Cell is needed to support FFTF shutdown operations during FY 1997, therefore excessing will not be done until FY 1998. Cleanup of the IEM Cell falls under FFTF funding jurisdiction and thus is not included in the cost estimate.

3.13 309 STACK AND PITS

3.13.1 Background

Located east of the containment dome is the 309 exhaust stack, stack pit, and filter pit. These concrete structures aided in processing containment exhaust air through HEPA filters before releasing it to the environment. Both pits are below grade concrete structures. The stack pit has access to the base of the exhaust stack for air sampling capability. Process knowledge indicates that some contamination (LLW) may be present. The filter pit exhausted air from the Fuel Storage Basin and contained its own fan and HEPA filter.

The filter pit was deactivated in the early 1970's. The stack itself, originally 150' tall, was shortened approximately 50' in 1990 to meet SP-100 seismic criteria.

3.13.2 Scope

The scope and final condition of the 309 stack and its pits will include:

- Removal of any mixed waste, hazardous waste, solid radioactive waste, and loose surface contamination.
- Coating internal surfaces with a fixative coating.

3.13.3 Approach

Detailed radiological and hazardous material surveys will be performed to characterize any contamination. After the facility has established waste packaging capabilities, wastes will be removed, packaged and disposed of. Internal surfaces will have smearable contamination removed and coated as necessary to stabilize any residual surface contamination.

3.13.4 Schedule

Inspection and decontamination of the 309 stack and pits is scheduled for completion during FY 1997. Table 3.13 outlines the estimated duration of each task item. Task assumptions, crew member breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.13: 309 Stack and Pits Schedule Estimate

TASK	MAN HOURS
Install Temporary Containment	64
Remove Access Hatches	50
Remove Mixed, Hazardous, and Solid Radioactive Wastes	132
Remove Surface Contamination, Pits	116
Coat Internal Surfaces, Pits	132
Replace Access Hatches	48
Remove Temporary Containment	64
Remove Surface Contamination, Stack	675
Coat Internal Surfaces, Stack	975
Decontaminate, Package, & Ship Items	410
TOTAL MAN HOURS	2,666

3.14 SAFETY ANALYSIS

3.14.1 Background

The Department of Energy has recently issued new regulations pertaining to nuclear facilities. These regulations cover safety documentation (DOE Order 5480.23), technical safety requirements (DOE Order 5480.22), and unreviewed safety question (USQ) procedures (DOE Order 5480.21). These regulations require up-to-date safety documentation for each DOE operation and subsequent significant modifications, including decommissioning. This plan provides a two phased method to prepare the appropriate safety documentation for the 309 facility. Included are hazard categorization and safety documentation, using a graded approach for the transition period and shutdown condition. The facility is likely to have a "category 3 hazard" (or below) or "radiological facility" categorization.

The regulations require that a plan be developed by each contractor to bring their facilities into compliance. The planning document, described in the order as an "overall management plan", was developed by Westinghouse Hanford from individual plans prepared for each nuclear facility, including the 309 Building. The new safety document required by this order is

identified in WHC-CM-4-46 as an Interim Safety Basis (ISB). The intent of the ISB is to provide assurance that a facility can continue to function safely until a complete revision to the Safety Analysis Report (SAR) has been approved.

The existing 309 Building SP-100 Preliminary SAR (WHC-SP-0379), published in 1990, demonstrated how the existing building (in a shutdown state) would have to be modified for the SP-100 ground test. Since the SP-100 program has been canceled, an ISB will need to be prepared in order to comply with DOE Order 5480.23. A previous safety analysis on the 309 Building is included in the 1979 document "General Safety Assessment Document for WHC-Operated Nonreactor Nuclear Facilities" (TC-1414).

3.14.2 Approach

A two phased approach is used for the safety documentation. A graded approach will be used in accordance with DOE Standard-1027-92 guidance. Phase I of the plan will provide a qualitative initial facility hazards assessment and 309 facility ISB. Phase II will provide a quantitative hazards assessment and safety basis for the facility in the shutdown condition.

3.14.2.1 Phase I Safety Documentation

The objective for Phase I is two fold. First to bring the facility into full compliance with safety regulations and second to provide a frame work for final safety documentation.

A preliminary hazard categorization will be prepared in accordance with DOE Standard-1027-92. The hazard categorization is totally dependent upon the amount of material remaining in the 309 Building and its potential to affect the public, the environment, and onsite workers. Because the exact quantity and form of radiological materials is not known at this time, a qualitative hazards categorization is required. The preliminary hazard categorization will establish the appropriate level and detail for safety documentation.

The ISB will address the 309 Building and the PRTR Legacy. It will provide the information necessary to conclude that hazards are controlled and that current and planned activities can be conducted safely. It will include any needed requirements for interim controls and/or operation restrictions. Upon approval, the ISB will provide the authorization basis for the USQ process.

The format and content of the ISB will follow the guidelines of WHC-CM-4-46, Chapter 8.0, "Interim Safety Basis". Content requirements will be fulfilled by direct incorporation of the information from existing SAFETY BASIS documents or by reference.

During Phase I the procedure contained in WHC-CM-1-3 MRP 5.12 will be used to evaluate USQ's. A waiver for a facility specific USQ procedure is in place. The present waiver is valid until June 1, 1996. When the waiver was

requested it allowed time for a quantitative hazards assessment and appropriate control preparation conducted during phase II.

3.14.2.2 Phase II Safety Documentation

Phase II safety documentation will provide a quantitative hazards categorization and analysis of hazards. The documentation will provide the safety basis for the facility in a shutdown condition. In addition, it will provide a safety basis until such time as the building is ultimately D&D.

During transition plan execution, the conditions of areas containing radiological materials will be assessed and quantified. If the conditions dictate (i.e. waste materials, smearable contamination), the radiological materials may be removed. This quantification will provide the inventory at risk for the final hazard categorization. The removal of radiological materials may place the 309 Building into the Radiological Facility category, which will exempt 309 from DOE Order 5480.23.

The final safety documentation for the 309 Building and the PRTR will address the shutdown configuration of the 309 Building. It will provide the information necessary to conclude that hazards are controlled and that planned activities can be conducted safely. It will include the requirements for controls and/or restrictions on operations and a functioning USQ process.

3.14.3 Scope

3.14.3.1 Preliminary Hazard Categorization

An initial or preliminary hazard categorization will be performed. This activity will require the generation of estimated radiological source terms and will be qualitative in nature. The estimated source term will be compared to hazard category threshold limits per DOE Standard-1027-92. The results of the preliminary hazard categorization will be formally documented and approved.

The following radiologically contaminated areas will be evaluated to ensure hazards are systematically identified and analyzed:

- PRTR calandria and moderator storage tank,
- In containment fuel transfer cells,
- In containment fuel examination facility,
- Rupture Loop annex,
- Exhaust system ducting and stack,
- Exterior ion exchange vaults (Rupture Loop and PRTR) and,
- TW Hold up tanks and associated underground piping.

3.14.3.2 Safety Documentation

The interim safety basis document will provide the information necessary to conclude that hazards are controlled and that current and planned activities can be conducted safely. At a minimum, the following information will be provided in the ISB via direct inclusion or by reference:

- Current facility description and operational mode. This section will extract pertinent information from the facility description section of the existing SARs. Phase II will add a discussion of the shutdown facility configuration.
- Hazard analysis. In addition to the hazard categorization, a hazard analysis will be prepared in accordance with DOE Standard-1027-92 guidance. This analysis will identify significant hazards associated with the facility, summarize the consequences, and identify necessary mitigating structures, systems, and components. During Phase I the ISB will include transition plan related activities, and be qualitative in nature. For Phase II the hazards analysis will be quantitative and address the facility shutdown condition.
- Hazard controls. The hazard controls section will provide the physical and administrative systems for the control and/or mitigation of accident consequences. Included in the hazard controls will be a list of any Safety Class 1 and 2 components, systems, and structures. Hazard controls will identify applicable operational safety requirements (OSRs) and test specifications (TS) from existing safety analysis documents required for nuclear safety.
- Summary. This section will summarize the basis that the configuration of the 309 Building and the PRTR do not present an unacceptable risk to the public, environment, or onsite personnel.
- A configuration management section will provide assurance that maintenance, modification, drawing control, QA and USQ procedures are maintained within the safety basis.

3.14.3.3 Unreviewed Safety Questions

The 309 Building will prepare facility-specific procedures to govern the USQ program at the facility. In addition a training module will be developed to train and qualify the plant review committee members and identified USQ evaluators to the facility specific USQ procedures.

3.14.4 Schedule

Work on development of a 309 Building ISB was begun in May 1994. Phase I safety documentation is scheduled to be finished during FY 1996. Phase II

documentation will be completed in FY 1998. Table 3.14 outlines the estimated duration of the safety analysis preparation.

Table 3.14: Safety Analysis Schedule Estimate

TASK	DURATION
Phase I (FY 1996)	
Preliminary Hazards Assessment	14 weeks*
Prepare Interim Safety Basis Facility Description Hazards Analysis Appropriate Controls Identification	32 weekst
TOTAL	46 weeks
Phase II (FY 1998)	
Revise Safety Basis Shutdown Condition Facility Description Final Hazards Assessment and Analysis Update Hazard Controls	24 weekst
Unresolved Safety Question Procedure Prepare Facility Specific USQ Procedure Develop Training Program	24 weekst
TOTAL	48 weeks

* Includes an 8 week approval period

† Includes a 12 week approval period

3.15 309 BUILDING FACILITY OPERATIONAL CONFIGURATION

3.15.1 Background and Scope

The 309 Building has completed its assigned mission. A description of the facility, the major facility systems, major safety features, etc., was described in Section 2.0. This section defines the overall process to place the facility's support systems in a shutdown state.

The overall scope of this activity is to systematically shut down and secure the facility systems consistent with the programmatic, operational, and safety needs of the facility. This includes:

- Shutdown of utility systems which are no longer required

- Timely shutdown of facility safety and monitoring systems consistent with facility needs and safety documentation
- Characterization and clean-up/stabilization of radiologically controlled areas and hazardous materials areas.

3.15.2 Approach

Shutdown will be divided into three major phases:

1. Secure/modify facility services. The following fluid systems, electrical systems, fire protection system, etc., shutdowns will be undertaken during this phase:

- Convert wet-piping sprinkler system to a dry-pipe fire protection system.
- Drain, dry, and secure nonessential sanitary water system piping.
- Drain, dry, and secure nonessential compressed air systems.
- Drain and dry process water piping, closing off as appropriate.
- Terminate all process and nonessential electrical services.
- Secure facility confined space areas to prevent entry.
- Secure nonessential HVAC (i.e., chillers, etc.) systems.

Systems and equipment required for surveillance and maintenance (S&M) will not be deactivated until final D&D.

2. Secure building and office areas. The operating environment, selected HVAC systems, HVAC support, etc., can be reduced to a minimum level consistent with the safety protection and environmental requirements. The following facility system shutdowns will be undertaken during this phase:

- Shut down and secure containment supply fan.
- Shut down and secure containment and room 20 exhaust fans and blank off (or damper) exhaust ducts as appropriate between the exhaust fan and the HEPA filter.
- Shut down/terminate corresponding electrical services.
- Shut down and secure emergency power and building UPS systems.
- Remove batteries from emergency lights and uninterruptable power supply (UPS).

- Provide portable air sampling instruments when appropriate.
 - Disconnect fire suppression system in office area (or convert to a dry pipe system, where appropriate).
3. Stabilize PRTR systems and areas. The following actions will be undertaken during this phase:
- Remove smearable contamination and then apply fixative to SCAs.
 - Remove and dispose of hazardous waste such as portable lead shielding.
 - Remove and dispose of mixed or radioactive waste such as ion exchange columns.

Following the shut down of the PRTR systems and areas, the 309 Building office area will be shut down along with the securing of the office area supply fans (10) and the three independent heat pumps. This will include the securing of the steam to the 309 Building and locking all exterior doors. All power to the PRTR systems and the office area will be terminated, excluding nominal area lighting and other safety support needs.

3.15.3 Facility Shutdown Log Book

As outlined in MRP 6.15 a controlled notebook shall be maintained as the facility shutdown log book. This log book will be used to record activities and work performed that are related to facility shutdown. These activities include any major deletions, modifications, and additions to the facility, equipment, and systems. The designated property custodian for the facility is to maintain the log book in addition to a facility inventory list.

3.15.4 Manpower Considerations

Plant Operations staff will cover the basic 309 Building work and will develop the procedures and administrative documents to support the shutdown effort. Staff personnel will also provide hazardous material/waste overview, property management support, work control administration, and training coordination. Facility engineering and craft support will be provided by the 300 Area service groups.

3.15.5 Schedule

Securing the non-essential operating systems cannot begin until the majority of decontamination activities have been completed (i.e., cleanup of the reactor, the fuel transfer pits and the fuel examination cell). These completions are projected to be near the end of FY 1998). Table 3.15 outlines the estimated duration of each task item. Task assumptions, crew member

breakdowns (number of engineers, technicians, laborers, etc.), materials, and equipment requirements are located in Appendix A.

Table 3.15: Operation Configuration Schedule Estimate

TASK	MAN HOURS
Design Dry Sprinkler System	700
Convert Sprinklers: Wet to Dry	1,080
Secure Compressed Air System	12
Secure Sanitary Water System	400
Secure Process Water System	16
Secure Nonessential Electric Systems	276
Secure Nonessential HVAC Systems	144
Secure Confined Spaces	600
Shut-Down Building	240
Relocate Building Occupants	960
Relocate Building Occupants*	2,400
Prepare Surv/Ops Procedures	3,120
TOTAL MAN HOURS	9,948

* This is an allowance for the disruption of work for 100 people.

3.15.6 Facility Safety Considerations

The current facility, staffing, procedures, systems, safety documents, etc., reflect the posture of a deactivated nuclear reactor. In the transition to turnover, the level of these will change commensurate with the level of activities in the facility and the protection required and mandated by the governing safety documents. The following summarizes the major systematic activities and approaches which will enhance the safety posture during the transition to turnover and complete shutdown.

3.15.6.1 Prepare the appropriate safety documentation required to allow the planned transition and end state.

This document outlines the approach planned to transition from a deactivated nuclear facility to turnover. No action will be taken during the transition which is outside the safety envelope and documentation. The first step in the transition is to reduce nonessential systems and potential energy sources to a minimum consistent with operational need and within that enveloped by the proposed safety documentation.

Supporting analyses and approvals will be performed and obtained, respectively, to allow implementation of the follow-on activities outlined in this document. It is recognized that additional scope will evolve during the follow-on activities, and refinements of this plan will be required. However, any execution of the actions required will be covered by existing authorizations, or appropriate change action will be undertaken.

3.15.6.2 Reduction of hazardous and radiological material to minimum levels.

Efforts have been in progress for a number of years to reduce the inventory of waste and hazardous materials from the facility. The PRTR core has been removed, upper levels of the containment dome decontaminated, and several contaminated tanks have been removed. Process equipment has been removed from the A-, B-, and C-Cells inside the containment dome. Cleanup of the enclosures and waste disposal will further reduce the radiological inventories to a minimum level within the facility.

3.15.6.3 Stabilization of residual materials to the maximum extent possible.

After the reactor structures, vaults, etc. have been cleaned to the maximum extent possible, the residual materials will be fixed by coating the inside surfaces as necessary with a fixative.

3.15.6.4 Reduction of Potential Energy Sources

Throughout the process, potential energy sources will be steadily reduced to the minimum. As a result of the excess equipment disposition, waste disposal, equipment layup and stabilization, activities, the fire loadings will be reduced to a minimum. During shutdown and cleanup of the process and facility equipment and systems, other potential energy sources (i.e., electrical, compressed gases, etc.), will be taken out of service except for the minimum required for safety considerations (i.e., normal and emergency lighting, etc.).

3.15.6.5 Surveillance, maintenance, and operating procedures will be prepared or revised to reflect ongoing operation.

With the reduction of potential energy sources and hazardous materials, the administrative controls (i.e., surveillance, procedures, etc.) can also be reduced to reflect the corresponding state of operations and risk involved.

But, at the same time, this is a period of change (although gradual) and changing conditions can, at times, have greater safety risks. Accordingly, special attention will be given to the administrative control of the transition process.

4.0 Cost and Schedule

The cost estimate for transitioning the 309 building is detailed in Table 4.0. Costs include an assumed company overhead of 20% and a 30% one year contingency to cover uncertainties. Building occupants will need to be relocated during FY 1997 in order to accommodate the modifications of the building systems. The \$550K figure for utilities and critical maintenance in FY 1998 is to compensate for the lost occupant rents. A 100% inefficiency factor is included in labor and equipment costs for task items where personnel mask use is expected (items 3.4 through 3.10, and 3.13). Task assumptions and a more detailed breakdown of manpower, materials, and equipment costs are located in Appendix A. Item 3.4 (PRTR Reactor) in Table 4.0 reflects radiological characterization costs only. Complete removal and decontamination of the reactor calandria and moderator storage tank would require an additional \$8.2 million plus overhead and contingency (\$4.6 million) during FY 1998. The corresponding overall schedule is shown in Table 4.1.

Table 4.0: 309 Building Transition Plan Cost Estimate

ITEM NO.	ITEM DESCRIPTION	COST CATEGORY (\$K)			COST PER FY (\$K)			
		LABOR	MAT'L	EQUIP	1995	1996	1997	1998
3.0	Bldg Admin/HPT Coverage	1,060			250	260	270	280
	Core Staff	1,328			244	244	410	430
	Regulatory Support	155			23	42	44	46
	Drawing As-Builts	160				80		80
	Utilities & Safety Maint (after occupants leave)	500	20	30				550
3.1	Excess Equipment	27	6	11			44	
3.2	Transuranic Waste Plan	184				184		
3.3	Low Level Waste Plan	149				149		
3.4	PRTR Reactor Vessel & MST Characterization	317		16				333
3.5	Fuel Transfer Cells Decon	329	13	45				387
3.6	Fuel Exam Cell Decon	276	10	29				315
3.7	PRTR IX Vault Clean up	375			375			
3.8	Rupture Loop Annex Decon	413	11	43			467	
3.9	Rupture Loop IX Vault Clean up	223	11	30		264		
3.10	TW Holding Tanks Removal	233	12	24			269	
3.11	Diesel Fuel Storage Tank	FUNDED BY OTHER PROGRAMS						
3.12	IEM Cell	FUNDED BY OTHER PROGRAMS						
3.13	309 Stack and Pits Decon	326	10	44			380	
3.14	Safety Analysis	251				133		118
3.15	Operational Configuration	488	11	14				513
	SUBTOTAL	6,794	104	286	892	1,356	1,884	3,052
	OVERHEAD (20%)	1,359	21	57	178	271	377	611
	SUBTOTAL	8,153	125	343	1,070	1,627	2,261	3,663
	OUT YEAR CONTINGENCY (30%)	2,124	38	103	0	488	678	1,099
	TOTAL	10,277	163	446	1,070	2,115	2,939	4,762

GRAND TOTAL = \$10,886K

Table 4.1: 309 Building Transition Plan Schedule

TASK	FY 95	FY 96	FY 97	FY 98
3.0 - Building Admin, Routine Surveillance, Regulatory Support - As-Built Drawings - Building Utilities, Critical Maintenance				
3.1 Excess Equipment - Office Equipment - Plant Components				
3.2 TRU Waste Transition - Cert Plan - QA Plan - Training Plan - Train Personnel				
3.3 Low Level Waste Transition - Cert Plan - QA Plan - Training Plan - Train Personnel				
3.4 Characterize Reactor - Remove Shields - Characterize Calandria - Sample Process Tubes - Inspect Moderator Storage Tank - Pump/Dispose Heavy Water - Replace Shields - Prepare Report				
3.5 Fuel Transfer Pits - Decon/Seal Green Pit - Decon/Seal Irr. Pit				
3.6 Fuel Exam Cell - Decon/Seal				
3.7 PRTR Ion Exchange Vault - Decon/Seal				

Table 4.1: 309 Building Transition Plan Schedule

TASK	FY 95	FY 96	FY 97	FY 98
3.8 Rupture Loop Annex - Decon/Seal			_____	
3.9 Rupture Loop Ion Exchange Vault - Decon/Seal		_____		
3.10 TW Hold-Up Tanks - Remove/Dispose/Backfill			_____	
3.11 Diesel Fuel Tank - Remove/Dispose/Backfill	_____			
3.12 IEM Cell - Remove/Excess Equipment				_____
3.13 Stacks and Pits - Decon/Stabilize			_____	
3.14 Safety Analysis - Prepare ISB - Revise ISB		_____		_____
3.15 Operational Configuration - Relocate Occupants - Prepare Operating/Surveillance Procedures - Convert Sprinkler System - Secure Water - Secure Air - Modify Electrical - Secure Spaces - Secure H&V			_____	_____ _____ _____ _____ _____ _____

5.0 References

- BNWI-918, Final Investigative Report of Fuel Element Rupture Test Facility Incident: Pt. 1 - Findings and Details, Pt. 2 - Conclusions and Recommendations.
- DOE Order 58XX.XX, "Transition of Facilities to the Office of Environmental Restoration and Waste Management", Draft - August 27, 1992.
- DOE Order 5480.21 "Unreviewed Safety Questions", U.S. Department of Energy, Washington, D.C., December 24, 1991.
- DOE Order 5480.22 "Technical Safety Requirements", U.S. Department of Energy, Washington, D.C., February 25, 1992.
- DOE Order 5480.23 "Nuclear Safety Analysis Reports", U.S. Department of Energy, Washington, D.C., April 30, 1992.
- DOE Standard-1037-92 "Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports", U.S. Department of Energy, Washington, D.C., December 1992.
- PDR-V-787, Preliminary Design Report SP-100 Ground Engineering System Test Site (2.5MW Reactor Test).
- TC-1414, General Safety Assessment for WHC-Operated Nonreactor Nuclear Facilities, Hanford Engineering Development Laboratory, July 1979.
- WHC-CM-1-3, Management Requirements and Procedures.
MRP 5.12, "Identification and Resolution of Unreviewed Safety Questions"
MRP 6.15, "Facility Shutdown, Standby, and Transfer"
- WHC-CM-1-6, Radiological Control Manual.
- WHC-CM-2-2, Materials Management Manual.
- WHC-CM-4-46, Nonreactor Facility Safety Analysis Manual.
Chapter 8, "Interim Safety Basis"
- WHC-CM-7-5, Environmental Compliance Manual.
- WHC-MR-0388, Compilation of Historical Information of 300 Area Facilities and Activities.
- WHC-SD-DD-TI-041, Facility Decommissioning Report for the Plutonium Recycle Critical Facility.

WHC-SD-ER-TI-004, Summaries of Well Construction Data and Field Observations for Existing 300-FF-5 Operable Unit Resource Protection Wells, Revision 2, Pages 104 and 105, Dated March 9, 1994.

WHC-SD-FL-SSP-001, 308 Building Shutdown Plan, Revision 1, August 1993.

WHC-SP-0379, Preliminary Safety Analysis Report for SP-100 Ground Engineering System Test Site.

Appendix A

Cost estimate for the implementation of the 309 Transition Plan prepared by Parsons Environmental Services, Inc. dated July 25, 1994.

PARSONS ENVIRONMENTAL SERVICES, INC.

1955 Jacwin Suite 415 • Richland, Washington 99352 • (509) 943-0909 • Fax: (509) 946-8748

July 25, 1994

GEH-94-049

Ernie Bitten, Facility Manager
309 Facility
Westinghouse Hanford Company
P. O. Box 1970
Richland, WA 99352

Subject: Purchase Order MWY-SWV-385569, Submittal of Final Cost Estimate for
Implementation of 309 Facility Transition Plan

Dear Mr. Bitten:

Please find attached a cost estimate for implementation of the 309 Facility transition plan. This cost estimate includes the incorporation of comments from the preliminary draft review performed by WHC. This estimate was prepared by Matt Hall of Parsons Environmental Services, Inc. with support from Ed Utz of your staff.

If you have any comments, please contact me at (509)946-0573.

Sincerely,

G. E. Hansen
Project Manager

GEH/jae

Attachment

cc: M. Hall Parsons
GEH File/LB

309 FACILITY ASSESSMENT COST ESTIMATE OVERVIEW

Production rates for this estimate were derived from the Means Estimating Manual, Richardson Estimating System and historical data as available. Inasmuch as this type of work is not well documented in estimating manuals, production rates were augmented by information gained through discussions with individuals knowledgeable of the facility, its construction and operation.

Labor rates for personnel performing removal operations are based on Kaiser Engineers Hanford (KEH) labor rates, escalated to the estimated mid-point of the project (1997). Escalation factors are as follows:

1995, 3.5%;
1996, 3.3%;
1997, 3.5%.

Rates for technical personnel (Engineers, Scientists, Technicians) are based on Westinghouse Hanford labor rates.

Equipment rates reflect operating and ownership costs for equipment and are based on local rental rates and the Construction Equipment Ownership and Operating Expense Schedule, prepared by the U.S. Army Corps of Engineers. Equipment rates have been adjusted to reflect local conditions and estimated equipment specifications.

Material prices have been estimated based on the assumed design and usage. Prices for boxes and drums used for transporting/burying waste reflect an average of container prices based on the assumed container size and quantity.

Markups on field labor, materials, and equipment are based on KEH estimating factors. Items included in these markups are as follows.

CONSTRUCTION FORCES

- Technical Services - superintendent, document control, turnover, field engineering, survey, clerical and a portion of the management costs.
- Construction Support - project controls.
- Project Management - self explanatory.
- Quality Assurance Engineering - reviews, procedure preparation, etc.

GENERAL CONDITIONS

- Haul Men and Material - transport of men and material to and from the work site.
- New Hires - cost of processing new personnel
- Cleanup and Labor Support - general support of productive crafts
- Welder Qualifications - testing and certification of welders in accordance with codes and standards
- Small Tools - hand tools, small power tools, etc. which are not charged out by the hour
- Quality Support - inspection, testing, etc.

CRAFT INDIRECT

- includes G&A, safety, radiation protection, hazardous waste assessment, and small tools as well as fringe benefits.

Preparation of the cost estimates for the 309 Facility Transition Plan requires the incorporation of basic assumptions for the performance of the work. The actual time required for performance of each task is compounded by the ancillary tasks which are necessary, but often overlooked. The following table defines the assumptions considered for each task. In most cases the assumptions listed in the table address the "actual performance" of the work. Ancillary considerations which are not itemized in the table, but are required for performance of the task, are listed below.

Ancillary considerations:

Pre-job meetings

Safety Meetings

Safety Equipment (including time to determine, set-up, maintain, etc.)

Safety Personnel (Hole Watch)

Health Physics Personnel

Health Physics Monitoring

Rotation of Personnel

Mobilization and Demobilization (when not itemized)

Staging of Equipment (when not itemized)

Productivity allowance for working in uncertain conditions

Equipment allowance for working in uncertain conditions

**309 Facility Assessment
Cost Estimate
Summary**

NO.	ITEM	LABOR	MATERIAL	EQUIPMENT	TASK TOTAL
3.1	Excess Equipment	\$27,650	\$5,500	\$10,800	\$43,950
3.2	Transuranic Waste	\$183,552	\$0	\$0	\$183,552
3.3	Low Level Waste	\$148,508	\$0	\$0	\$148,508
3.4	PRTR Reactor	\$316,541	\$550	\$15,680	\$332,771
3.5	Fuel Transfer Pit	\$329,053	\$12,925	\$44,860	\$386,838
3.6	Fuel Examination Cell	\$276,476	\$10,340	\$28,520	\$315,336
3.7	PRTR IX Vault	\$499,300	\$20,350	\$29,824	\$549,474
3.8	Rupture Loop Annex	\$413,459	\$11,110	\$42,990	\$467,559
3.9	Rupture Loop IX Vault	\$222,516	\$11,165	\$30,100	\$263,781
3.10	TW Holding Tanks	\$232,995	\$11,990	\$24,360	\$269,345
3.11	Diesel Tank Removal	FUNDED BY OTHERS			\$0
3.12	IEM Cell	FUNDED BY OTHERS			\$0
3.13	Stack and Pits	\$325,976	\$9,900	\$44,100	\$379,976
3.14	Safety Analysis	\$251,126	\$0	\$0	\$251,126
3.15	Operational Configuration	\$487,963	\$10,802	\$14,400	\$513,165
	CATEGORY TOTAL	\$3,715,117	\$104,632	\$285,634	

GRAND TOTAL \$4,105,383

Item 3.1 Excess Equipment	
WORK ITEM	ASSUMPTIONS
Remove excess equipment.	<ul style="list-style-type: none"> - Includes removing, loading, hauling and disposing. - Assumes 50 offices, 5 offices per day.

309 Facility Assessment
 Cost Estimate
 Item # 3.1
 Excess Equipment

DIRECT LABOR			\$13,488	MATERIALS			\$5,000	EQUIPMENT			\$10,800
CONSTRUCTION FORCES			\$3,777	Consumables			6.00%	\$300			
Technical Services	18.00%		\$2,428	Procurement & Warehousing			4.00%	\$200			
Construction Support	4.00%		\$540								
Project Management	5.00%		\$674								
Quality Assurance Engineering	1.00%		\$135								
GENERAL CONDITIONS			\$3,372								
Haul Men and Material	4.00%		\$540								
New Hires	1.00%		\$135								
Clean-up & Labor Support	10.00%		\$1,349								
Welder qualifications	0.00%		\$0								
Small Tools	4.00%		\$540								
Quality Support	6.00%		\$809								
CRAFT INDIRECT			\$7,014								
SUBTOTAL			\$27,650	SUBTOTAL			\$5,500	SUBTOTAL			\$10,800
TOTAL			\$43,950								

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MHC-SD-SP-SSP-001

Revision 0

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WHC-SD-SP-SSP-001

Revision 0

**309 Facility Assessment
Cost Estimate
Item # 3.1
Excess Equipment**

MATERIAL

[illegible]

EQUIPMENT

[illegible]

Item 3.2 Transuranic Waste	
WORK ITEM	ASSUMPTIONS
Develop Certification Plan	<ul style="list-style-type: none"> - Based on experience at other Hanford facilities. - Allows for review time, revisions, rewrites, etc.
Develop QA Plan	<ul style="list-style-type: none"> - Based on experience at other Hanford facilities. - Allows for review time, revisions, rewrites, etc.
Develop Training Plan	<ul style="list-style-type: none"> - Based on experience at other Hanford facilities. - Allows for review time, revisions, rewrites, etc.
Train Personnel	<ul style="list-style-type: none"> - Assumes that personnel have received the required Rad Worker training. - One time, job specific training for 309 Facility Transition Plan functions.

309 Facility Assessment
 Cost Estimate
 Item # 3.2
 TRU Waste

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DIRECT LABOR			\$139,055	MATERIALS			\$0	EQUIPMENT			\$0
CONSTRUCTION FORCES			\$33,373	Consumables			6.00%				\$0
Technical Services	18.00%		\$25,030	Procurement & Warehousing			4.00%				\$0
Construction Support	0.00%		\$0								
Project Management	5.00%		\$6,953								
Quality Assurance Engineering	1.00%		\$1,391								
GENERAL CONDITIONS			\$11,124								
Haul Men and Material	0.00%		\$0								
New Hires	0.00%		\$0								
Clean-up & Labor Support	0.00%		\$0								
Welder qualifications	0.00%		\$0								
Equipment Usage	5.00%		\$6,953								
Quality Support	3.00%		\$4,172								
CRAFT INDIRECT			\$0								
SUBTOTAL			\$183,552	SUBTOTAL			\$0	SUBTOTAL			\$0
TOTAL			\$183,552								

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[illegible]

Item 3.3 Low Level Waste	
WORK ITEM	ASSUMPTIONS
Develop Certification Plan	<ul style="list-style-type: none">- Based on experience at other Hanford facilities.- Allows for review time, revisions, rewrites, etc.
Develop QA Plan	<ul style="list-style-type: none">- Based on experience at other Hanford facilities.- Allows for review time, revisions, rewrites, etc.
Develop Training Plan	<ul style="list-style-type: none">- Based on experience at other Hanford facilities.- Allows for review time, revisions, rewrites, etc.
Train Personnel	<ul style="list-style-type: none">- Assumes that personnel have received the required Rad Worker training.- One time, job specific training for 309 Facility Transition Plan functions.

309 Facility Assessment
 Cost Estimate
 Item # 3.3
 Low Level Waste

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<u>DIRECT LABOR</u>			\$112,506	<u>MATERIALS</u>			\$0	<u>EQUIPMENT</u>			\$0
<u>CONSTRUCTION FORCES</u>			\$27,001	Consumables			6.00%				\$0
Technical Services	18.00%		\$20,251	Procurement & Warehousing			4.00%				\$0
Construction Support	0.00%		\$0								
Project Management	5.00%		\$5,625								
Quality Assurance Engineering	1.00%		\$1,125								
<u>GENERAL CONDITIONS</u>			\$9,000								
Haul Men and Material	0.00%		\$0								
New Hires	0.00%		\$0								
Clean-up & Labor Support	0.00%		\$0								
Welder qualifications	0.00%		\$0								
Equipment Usage	5.00%		\$5,625								
Quality Support	3.00%		\$3,375								
<u>CRAFT INDIRECT</u>			0.00%				\$0				
SUBTOTAL			\$148,508	SUBTOTAL			\$0	SUBTOTAL			\$0
TOTAL			\$148,508								

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Item 3.4 PRTR Reactor	
WORK ITEM	ASSUMPTIONS
Remove Rotary Shields	- Rig, pick and set aside rotary shields.
Characterize Calandria	- Characterize the level of contamination in the calandria.
Sample Process Tubes, 10 ea	- Remove outlet jumpers and nozzles from 10 tubes and evaluate contamination levels. - Replace outlet jumpers and nozzles to prevent spread of contamination.
Check Moderator Storage Tank for Heels	- Remove cover of moderator storage tank and physically determine the presence of heels.
Pump Heavy Water, 1 Drum	- Set up pump and pump heavy water to a drum.
Replace Rotary Shields	- Rig, pick and place rotary shields.
Prepare Report	- Prepare report documenting the findings of the characterization.

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 Cost Estimate
 Item # 3.4
 PRTR Reactor

DIRECT LABOR			\$154,410	MATERIALS			\$500	EQUIPMENT			\$15,680
CONSTRUCTION FORCES			\$43,235	Consumables			6.00%				\$30
Technical Services	18.00%		\$27,794	Procurement & Warehousing			4.00%				\$20
Construction Support	4.00%		\$6,176								
Project Management	5.00%		\$7,721								
Quality Assurance Engineering	1.00%		\$1,544								
GENERAL CONDITIONS			\$38,603								
Haul Men and Material	4.00%		\$6,176								
New Hires	1.00%		\$1,544								
Clean-up & Labor Support	10.00%		\$15,441								
Welder qualifications	0.00%		\$0								
Small Tools	4.00%		\$6,176								
Quality Support	6.00%		\$9,265								
CRAFT INDIRECT			\$80,293								
SUBTOTAL			\$316,541	SUBTOTAL			\$550	SUBTOTAL			\$15,680
TOTAL			\$332,771								

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**309 Facility Assessment
Cost Estimate
Item # 3.4
PTRA Reactor**

LABOR

[illegible]

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309 Facility Assessment
Cost Estimate
Item # 3.4
PRTR Reactor

EQUIPMENT

TASK	Task Hours	Crane \$50.00	Truck \$25.00	Vent. Fan \$12.50	Frlft \$20.00	Cmprsr \$20.00	Cing Eq \$35.00	Pump \$15.00	Schldng \$5.00	Decon Equip \$50.00	Vacuum \$20.00	Equip. subtotal	Labor Ineff	Equip. Total
Install Containment Structure	16	0.25	0.5		0.5	0.5			1			\$800		\$800
Remove Rotary Shields	8	1										\$400	\$400	\$800
Remove Outlet Jumpers, 85 ea	200	0.5		1		1						\$11,500	\$11,500	\$23,000
Remove Outlet Nozzles, 85 ea	160	0.5		1		1						\$9,200	\$9,200	\$18,400
Remove Shim Rods, 18 ea	80	0.5		1		1						\$4,600	\$4,600	\$9,200
Remove Misc Equipment	80	0.5		1		1					1	\$6,200	\$6,200	\$12,400
Remove Process Tubes, 85 ea	500	0.5		1		1						\$28,750	\$28,750	\$57,500
Remove Outlet Header	80	0.5		1		1						\$4,600	\$4,600	\$9,200
Remove Top Shield	120	0.25		1		1					1	\$7,800	\$7,800	\$15,600
Evaluate Dry Gas Space	40			1								\$500	\$500	\$1,000
Remove Calandria	100	0.25		1		1						\$4,500	\$4,500	\$9,000
Remove Bottom Shield	160	0.25		1		1					1	\$10,400	\$10,400	\$20,800
Remove Inlet Jumpers, 85 ea	200	0.5		1		1						\$11,500	\$11,500	\$23,000
Remove Inlet Nozzles, 85 ea	160	0.5		1		1						\$9,200	\$9,200	\$18,400
Remove Dump Valves, 4 ea	40	0.5		1		1						\$2,300	\$2,300	\$4,600
Remove Inlet Header	120	0.5		1		1						\$6,900	\$6,900	\$13,800
Remove Moderator Storage Tank	120	0.25		1		1						\$5,400	\$5,400	\$10,800
Remove Wall Plugs	120	0.25		1		1						\$5,400	\$5,400	\$10,800
Trim and Plug Misc Piping	40	0.25		1		1						\$1,800	\$1,800	\$3,600
Decontaminate Cavity	40			1					4		1	\$2,100	\$2,100	\$4,200
Apply Affixative Coating	24			1		1	1		4			\$2,100	\$2,100	\$4,200
Replace Rotary Shields	8	1										\$400	\$400	\$800
Decon & Package Items	2000	1	2		0.5					1		\$320,000		\$320,000
	4416											\$456,350	\$135,550	\$591,900

Item 3.5 Fuel Storage Pits	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	<ul style="list-style-type: none"> - Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Remove Contaminated Equipment, Green Pit	<ul style="list-style-type: none"> - Work will be done in a highly contaminated area and will require working in suits. - The work area is a confined space.
Remove Mixed and Hazardous Wastes, Green Pit	<ul style="list-style-type: none"> - Work will be done in a highly contaminated area and will require working in suits. - The work area is a confined space.
Remove Solid Radioactive Wastes, Green Pit	<ul style="list-style-type: none"> - Work will be done in a highly contaminated area and will require working in suits. - The work area is a confined space.
Remove Surface Contamination, Green Pit	<ul style="list-style-type: none"> - Wipe down surfaces with rags/towels. - Work will be done in a highly contaminated area and will require working in suits. - Pit is 3.5 ft x 6.3 ft x 21 ft deep. (Approx 560 sf.) - Productivity is adjusted for these conditions.
Apply Affixative Coating, Green Pit	<ul style="list-style-type: none"> - Apply two coats of urethane base paint to all surfaces. - Work must be performed from hanging basket due to narrow configuration of the pit. - The work area is a confined space. - Productivity is adjusted for conditions.

Remove Contaminated Equipment, Irradiated Fuel Pit	<ul style="list-style-type: none">- Removal of fuel carrier assembly, which is anchored to the ceiling, as well as any other equipment.- Work will be done in a highly contaminated area and will require working in suits.- The work area is a confined space.
Remove Mixed and Hazardous Wastes, Irradiated Fuel Pit	<ul style="list-style-type: none">- Includes removal of any other wastes present.- Work will be done in a highly contaminated area and will require working in suits.- The work area is a confined space.
Remove Solid Radioactive Wastes, Irradiated Fuel Pit	<ul style="list-style-type: none">- Includes removal, packaging and hauling to 200 Area.- Work will be done in a highly contaminated area and will require working in suits.- The work area is a confined space.
Remove Temporary Containment	<ul style="list-style-type: none">- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Decon, Package and Ship Items	<ul style="list-style-type: none">- Items which can be properly decontaminated will be packaged and shipped for burial.- Items which will require further decontamination will be sent to the decontamination facility at the 200 area.- Decontamination process is assumed to be steam cleaning or high pressure water blasting.

309 Facility Assessment
 Cost Estimate
 Item # 3.5
 Fuel Transfer Pit

DIRECT LABOR		\$160,513	MATERIALS		\$11,750	EQUIPMENT	\$44,860
CONSTRUCTION FORCES		\$44,944	Consumables		6.00%	\$705	
Technical Services	18.00%	\$28,892	Procurement & Warehousing		4.00%	\$470	
Construction Support	4.00%	\$6,421					
Project Management	5.00%	\$8,026					
Quality Assurance Engineering	1.00%	\$1,605					
GENERAL CONDITIONS		\$40,128					
Haul Men and Material	4.00%	\$6,421					
New Hires	1.00%	\$1,605					
Clean-up & Labor Support	10.00%	\$16,051					
Welder qualifications	0.00%	\$0					
Small Tools	4.00%	\$6,421					
Quality Support	6.00%	\$9,631					
CRAFT INDIRECT	52.00%	\$83,467					
SUBTOTAL		\$329,053	SUBTOTAL		\$12,925	SUBTOTAL	\$44,860
TOTAL		\$386,838					

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Item 3.6 Fuel Exam Cell	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Remove Access Plug	- Rig, pick and set plug aside.
Remove Contaminated Equipment	- Equipment includes manipulators, periscopes and other remote handling devices. - Work will be done in a contaminated area and will require working in suits. - Due to the depth of the cell it will be considered a confined space.
Seal 4" Diameter Drain	- Includes setup, moves, trial and error, etc.
Remove Loose Surface Contamination	- Includes removal by wiping with rags/towels. - Work will be done in a contaminated area and will require working in suits. - Work must be performed from scaffolding, which affects productivity. - Cell is 6 ft x 4 ft x 27 ft deep, and is considered a confined space.
Coat Internal Surfaces With Affixative	- Application of two coats of urethane base paint. - Due to configuration of the cell, scaffolding must be used. - Work will be done in a contaminated area and will require working in suits. - Cell is 6 ft x 4 ft x 27 ft deep, approximately 564 sf. - Area is confined space.

Remove Temporary Containment	<i>- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.</i>
Decon, Package and Ship Items	<ul style="list-style-type: none"> <i>- Items which can be properly decontaminated will be packaged and shipped for burial.</i> <i>- Decontamination process is assumed to be steam cleaning/high pressure water blasting.</i> <i>- Items which will require further decontamination will be sent to the decontamination facility at the 200 area.</i>

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 Cost Estimate
 Item # 3.6
 Fuel Exam Cell

DIRECT LABOR		\$134,866	MATERIALS		\$9,400	EQUIPMENT		\$28,520
CONSTRUCTION FORCES		\$37,763	Consumables		6.00%			
Technical Services	18.00%	\$24,276	Procurement & Warehousing		4.00%			
Construction Support	4.00%	\$5,395						
Project Management	5.00%	\$6,743						
Quality Assurance Engineering	1.00%	\$1,349						
GENERAL CONDITIONS		\$33,717						
Haul Men and Material	4.00%	\$5,395						
New Hires	1.00%	\$1,349						
Clean-up & Labor Support	10.00%	\$13,487						
Welder qualifications	0.00%	\$0						
Small Tools	4.00%	\$5,395						
Quality Support	6.00%	\$8,092						
CRAFT INDIRECT		\$70,131						
SUBTOTAL		\$276,476	SUBTOTAL		\$10,340	SUBTOTAL		\$28,520
TOTAL		\$315,336						

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**309 Facility Assessment
Cost Estimate
Item # 3.6
Fuel Exam Cell**

LABOR

[illegible]

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**309 Facility Assessment
Cost Estimate
Item # 3.6
Fuel Exam Cell**

MATERIAL

[illegible]

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[illegible]

Item 3.7 Ion Exchange Vault	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Stage Lifting Equipment, etc.	- Mobilize equipment and prepare for activities.
Lift Cover Block from Upper Cell	- Remove cover block and set aside.
Cut Pipes to IX Columns	- Columns will be disconnected by unbolting and/or cutting connections. - Work area is a confined space. - Work will have to be performed in PPE due to contamination.
Remove IX Columns in Upper Cell	- Columns will be removed by crane. Personnel will rig the columns in the cell. - Work area is a confined space. - Work will have to be performed in PPE due to contamination. - Due to contamination levels frequent rotation of personnel is possible.
Preliminary Decontamination of Upper Cell	- Cell will be decontaminated by wiping surface areas with rags to remove loose contamination. - Area to be decontaminated is approximately 1300 sf. - Work area is a confined space. - Work will have to be performed in PPE due to contamination. - Due to contamination levels frequent rotation of personnel is possible.
Remove Plug to Lower Cell	- Plugs are 2'11" diameter and 2' thick, concrete construction. - Rigging must be done in the upper cell, which is a confined space and will require wearing of PPE due to contamination.

Install Pump in Lower Cell	<ul style="list-style-type: none"> - Installation of the pump will require personnel to enter the upper cell to place the pump. - Upper cell is a confined space and requires PPE due to contamination.
Stage Transport Tank	<ul style="list-style-type: none"> - Tank will be mobilized and prepared for receipt of contaminated fluids.
Pump Liquids from Lower Cell	<ul style="list-style-type: none"> - Unknown volume of liquid will be pumped into the transport tank. - Pump will likely have to be relocated periodically.
Remove Standing IX Columns	<ul style="list-style-type: none"> - Removal of columns will require personnel to enter the cell to maneuver and rig the columns. - This area is a confined space and is contaminated, requiring work to be performed in PPE. - Staging and set up of ventilation equipment is required. - Care must be taken to avoid spreading contamination which may have leaked from the columns.
Pump Remaining Liquids	<ul style="list-style-type: none"> - Allow one day to reset pump and pump remaining liquids.
Remove Remaining IX Columns	<ul style="list-style-type: none"> - Remaining columns are in a disarray, requiring manipulation of columns prior to rigging. - This area is a confined space. - Personal Protective Equipment must be worn. - Personnel will be required in the cell and on the deck.
Decontaminate Upper & Lower Cells	<ul style="list-style-type: none"> - Decontamination will consist of wiping down all surfaces with rags. - Rags must be collected and disposed of as hazardous waste. - Work must be performed from scaffolding which will have to be placed in the cells and set up. - Work area is a confined space. - Work area is contaminated, requiring the wearing of PPE.

Assess Vault Integrity	<ul style="list-style-type: none"> - <i>Physical inspection of the vault.</i> - <i>Consultation with experts.</i> - <i>Preparation of letter report.</i>
Replace Cover Blocks, Upper Cell	<ul style="list-style-type: none"> - <i>Rig, pick and place cover block.</i>
Remove Temporary Containment	<ul style="list-style-type: none"> - <i>Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.</i>
Decon, Package & Ship Items	<ul style="list-style-type: none"> - <i>Items which can be properly decontaminated will be packaged and shipped for burial.</i> - <i>Decontamination process is assumed to be steam cleaning/high pressure water blasting.</i> - <i>Items which will require further decontamination will be sent to the decontamination facility at the 200 area.</i>

309 Facility Assessment
 Cost Estimate
 Item # 3.7
 PRTR Ion Exchange Vault

DIRECT LABOR			\$243,561	MATERIALS		\$18,500	EQUIPMENT		\$29,824
CONSTRUCTION FORCES			\$68,197	Consumables		6.00%	\$1,110		
Technical Services	18.00%		\$43,841	Procurement & Warehousing		4.00%	\$740		
Construction Support	4.00%		\$9,742						
Project Management	5.00%		\$12,178						
Quality Assurance Engineering	1.00%		\$2,436						
GENERAL CONDITIONS			\$60,890						
Haul Men and Material	4.00%		\$9,742						
New Hires	1.00%		\$2,436						
Clean-up & Labor Support	10.00%		\$24,356						
Welder qualifications	0.00%		\$0						
Small Tools	4.00%		\$9,742						
Quality Support	6.00%		\$14,614						
CRAFT INDIRECT			\$126,652						
				SUBTOTAL		\$20,350	SUBTOTAL		\$29,824
SUBTOTAL			\$499,300						
TOTAL			\$549,474						

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AIM

Association for Information and Image Management

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Silver Spring, Maryland 20910
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Cost Estimate
Item # 3.7
PRTR Ion Exchange Vault**

EQUIPMENT

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Item 3.8 Rupture Loop Test Facility	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Remove Access Hatch	- Rig, pick and set hatch aside.
Remove Lead Bricks	- Approximately 24 lead bricks must be located, packaged, handled, and removed from room 20 through room 19.
Remove Lead Shielding	- Lead sheets must be removed from the Kane Ionization Chamber, packaged, handled and removed through room 19.
Remove Small Ionization Chamber	- Disconnect Kane Ionization Chamber and remove through room 19.
Remove Other Equipment	- Equipment to be removed includes; tanks, pipes, and pumps.
Remove RMW and Haz Waste	- It is possible that this facility contains a portion of the missing 12-15 grams of Plutonium Oxide. - Waste may include residue on the floor, walls, etc.
Remove Surface Contamination	- Decontamination will consist of wiping down all surfaces with rags. - Rags must be collected and disposed of as hazardous waste. - Work must be performed partially from scaffolding which will have to be placed in the room and set up. - Work area may be considered as a confined space. - Work area is contaminated, requiring the wearing of PPE.

Coat Surfaces	<ul style="list-style-type: none"> - Application of two coats of urethane base paint. - Due to configuration of the cell, scaffolding must be used. - Work will be done in a contaminated area and will require working in suits. - Area is approximately 4000 sf and may be considered as a confined space.
Replace Access Hatch	<ul style="list-style-type: none"> - Rig, pick and place access hatch.
Remove Temporary Containment	<ul style="list-style-type: none"> - Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Decon, Package & Ship Items	<ul style="list-style-type: none"> - Items which can be properly decontaminated will be packaged and shipped for burial. - Decontamination process is assumed to be steam cleaning/high pressure water blasting. - Items which will require further decontamination will be sent to the decontamination facility at the 200 area.

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 Cost Estimate
 Item # 3.8
 Rupture Loop Test Facility

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<u>DIRECT LABOR</u>			<u>\$201,687</u>	<u>MATERIALS</u>			<u>\$10,100</u>	<u>EQUIPMENT</u>			<u>\$42,990</u>	
CONSTRUCTION FORCES			<u>\$56,472</u>	Consumables			6.00%	\$606				
Technical Services	18.00%		\$36,304	Procurement & Warehousing			4.00%	\$404				
Construction Support	4.00%		\$8,067									
Project Management	5.00%		\$10,084									
Quality Assurance Engineering	1.00%		\$2,017									
GENERAL CONDITIONS			<u>\$50,422</u>									
Haul Men and Material	4.00%		\$8,067									
New Hires	1.00%		\$2,017									
Clean-up & Labor Support	10.00%		\$20,169									
Welder qualifications	0.00%		\$0									
Small Tools	4.00%		\$8,067									
Quality Support	6.00%		\$12,101									
CRAFT INDIRECT	52.00%		<u>\$104,877</u>									
SUBTOTAL			<u>\$413,459</u>	SUBTOTAL			<u>\$11,110</u>	SUBTOTAL			<u>\$42,990</u>	
TOTAL			<u>\$467,559</u>									

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**309 Facility Assessment
Cost Estimate
Item # 3.8
Rupture Loop Test Facility**

MATERIAL

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Item 3.9 Ion Exchange Vault	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	<ul style="list-style-type: none"> - Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Remove IX Columns	<ul style="list-style-type: none"> - It is assumed that there are four partially spent columns in the vault, - The work area is contaminated and will require personnel to wear PPE. - Work area may be considered to be a confined space. - Columns will be disconnected by unbolting or cutting connections. - Columns must be manipulated, rigged and removed.
Drain & Dispose of Contaminated Liquids	<ul style="list-style-type: none"> - Includes setting pump, collecting contaminated liquids, adjusting pump location, and transporting collected liquids.
Remove RMW and Haz Wastes	<ul style="list-style-type: none"> - Waste is anticipated to include residue from contaminated liquids which must be collected, handled, and packaged. - Work area is contaminated and will require PPE. - Work area may be considered as a confined space.
Cut Piping to Room 20	<ul style="list-style-type: none"> - Piping will be cut either by torch or by mechanical means. - Piping must be sealed.
Remove Surface Contamination	<ul style="list-style-type: none"> - Decontamination will consist of wiping down all surfaces with rags. - Rags must be collected and disposed of as hazardous waste. - Work must be performed partially from scaffolding which will have to be placed in the room and set up. - Work area may be considered as a confined space. - Work area is contaminated, requiring the wearing of PPE.

Coat Internal Surfaces	<ul style="list-style-type: none">- Application of two coats of urethane base paint.- Due to configuration of the cell, scaffolding must be used.- Work will be done in a contaminated area and will require working in suits.- Area is approximately 2200 sf and may be considered as a confined space.- Production rates reflect the above work conditions.
Remove Temporary Containment	<ul style="list-style-type: none">- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Decon, Package & Ship Items	<ul style="list-style-type: none">- Items which can be properly decontaminated will be packaged and shipped for burial.- Decontamination process is assumed to be steam cleaning/high pressure water blasting.- Items which will require further decontamination will be sent to the decontamination facility at the 200 area.

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 Cost Estimate
 Item # 3.9
 Ion Exchange Pit

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DIRECT LABOR			\$108,544	MATERIALS			\$10,150	EQUIPMENT			\$30,100
CONSTRUCTION FORCES			\$30,392	Consumables		6.00%	\$609				
Technical Services	18.00%	\$19,538	Procurement & Warehousing		4.00%	\$406					
Construction Support	4.00%	\$4,342									
Project Management	5.00%	\$5,427									
Quality Assurance Engineering	1.00%	\$1,085									
GENERAL CONDITIONS			\$27,136								
Haul Men and Material	4.00%	\$4,342									
New Hires	1.00%	\$1,085									
Clean-up & Labor Support	10.00%	\$10,854									
Welder qualifications	0.00%	\$0									
Small Tools	4.00%	\$4,342									
Quality Support	6.00%	\$6,513									
CRAFT INDIRECT			52.00%	\$56,443							
SUBTOTAL			\$222,516	SUBTOTAL			\$11,165	SUBTOTAL			\$30,100
TOTAL			\$263,781								

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Item 3.10 TW Hold-Up Tanks	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Pump & Dispose of Contaminated Liquids	- Three tanks must be pumped out with any contaminated liquid contained and shipped. - Includes obtaining pumps, setting up, pumping, tearing down and hauling liquid.
Remove Tank Heels	- These tanks have not been flushed since the fuel break. - Heels are expected but contamination levels are unknown. - Procedures may have to be developed during the task. - Heels will be removed, collected, and packaged for shipment.
Remove Tanks and Pumps	- Three tanks 4,000 - 5,000 gallons per each. - Includes excavation, removal of connections, rigging, hoisting and hauling.
Seal Piping to MH 2	- Piping to manhole 2 will be sealed using a blind flange or will be welded. - Evaluation, set-up, and tear down time is included.
Seal 3-Inch Line to 340 Facility	- Three inch line will be sealed with a blind flange or will be welded. - Evaluation, set-up, and tear down time is included.
Remove RMW and Haz Wastes	- Waste to be removed is in the pit adjacent to the tanks which are being removed. - Quantity and waste type is unknown.

Remove Surface Contamination	<ul style="list-style-type: none"> - Decontamination will consist of wiping down all surfaces with rags. - Rags must be collected and disposed of as hazardous waste. - Work area may be considered as a confined space. - Work area is contaminated, requiring the wearing of PPE.
Coat Internal Surfaces	<ul style="list-style-type: none"> - Application of two coats of urethane base paint. - Work will be done in a contaminated area and will require working in suits. - Area is assumed to be approximately 200 sf and may be considered as a confined space. - Production rates reflect the above work conditions.
Remove Contaminated Soils	<ul style="list-style-type: none"> - Soils in the area of the tanks is assumed to be contaminated and must be properly disposed of. - Assume excavating and loading trucks while using methods to control spread of contamination through migration, dust, runoff, etc.
Place Clean Soil	<ul style="list-style-type: none"> - Haul, place and compact clean backfill to replace the removed contaminated soil.
Remove Temporary Containment	<ul style="list-style-type: none"> - Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Decon, Package & Ship Items	<ul style="list-style-type: none"> - Items which can be properly decontaminated will be packaged and shipped for burial. - Decontamination process is assumed to be steam cleaning/high pressure water blasting. - Items which will require further decontamination will be sent to the decontamination facility at the 200 area.

309 Facility Assessment
 Cost Estimate
 Item # 3.10
 TW Hold-up Tanks

DIRECT LABOR		\$113,656	MATERIALS		\$10,900	EQUIPMENT	\$24,360
CONSTRUCTION FORCES		\$31,824	Consumables	6.00%	\$654		
Technical Services	18.00%	\$20,458	Procurement & Warehousing	4.00%	\$436		
Construction Support	4.00%	\$4,546					
Project Management	5.00%	\$5,683					
Quality Assurance Engineering	1.00%	\$1,137					
GENERAL CONDITIONS		\$28,414					
Haul Men and Material	4.00%	\$4,546					
New Hires	1.00%	\$1,137					
Clean-up & Labor Support	10.00%	\$11,368					
Welder qualifications	0.00%	\$0					
Small Tools	4.00%	\$4,546					
Quality Support	6.00%	\$6,819					
CRAFT INDIRECT	52.00%	\$59,101					
SUBTOTAL		\$232,995	SUBTOTAL		\$11,990	SUBTOTAL	\$24,360
TOTAL		\$269,345					

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TW Hold-up Tanks

EQUIPMENT

TASK	Task Hours	Crane \$50.00	Truck \$25.00	Vent. Fan \$12.50	Frlift \$20.00	Cmprsr \$20.00	Ctng Eq \$35.00	Pump \$15.00	Scaffldg \$5.00	Decon Equip \$50.00	Vacuum \$20.00	Equip. subtotal	Labor Ineff	Equip. Total
Install Temporary Containment	8	0.5	1		0.5	1						\$640		\$640
Pump & Dispose of Cont. Liquid	16	0.25	1	1				1			1	\$1,360	\$1,360	\$2,720
Remove Tank Heels	24	0.5		1		0.5		1			1	\$1,980	\$1,980	\$3,960
Remove Tanks and Pumps	40	0.25	1			0.25						\$1,700	\$1,700	\$3,400
Seal Piping to MH 2	8			1		0.5						\$180	\$180	\$360
Seal 3 Inch Line to 340 Facility	8			1		0.5						\$180	\$180	\$360
Remove RMW and Haz Waste	16	0.25		1		1					1	\$1,040	\$1,040	\$2,080
Remove Surface Contamination	8			1								\$100	\$100	\$200
Coat Internal Surfaces	8					1	1		1			\$480	\$480	\$960
Remove Contaminated Soil	16		1									\$400	\$400	\$800
Place Clean Soil	16		1									\$400	\$400	\$800
Remove Temp. Containment	8	0.25	0.5		0.5	1						\$440	\$440	\$880
Decon, Package & Ship Items	24	1	2							1		\$3,600	\$3,600	\$7,200
	200											\$12,500	\$11,860	\$24,360

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Item 3 13 Stack and Pits	
WORK ITEM	ASSUMPTIONS
Install Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.
Remove Access Hatches	- Rig, pick and set aside access hatches.
Remove RMW and Haz Wastes	- Items to be removed include filters, fans, electrical equipment and other miscellaneous equipment. - Access to the pits is through overhead hatches. - Work area will be considered a contaminated confined space and will require PPE as well as observer, etc.
Remove Surface Contamination, Pits	- Decontamination will consist of wiping down all surfaces with rags. - Rags must be collected and disposed of as hazardous waste. - Work area is considered as a confined space. - Work area is contaminated, requiring the wearing of PPE.
Coat Internal Surfaces, Pits	- Application of two coats of urethane base paint. - Work will be done in a contaminated area and will require working in suits. - Area is assumed to be approximately 500 sf and is considered as a confined space. - Production rates reflect the above work conditions.
Replace Access Hatches	- Rig, pick and place access hatches.
Remove Temporary Containment	- Containment structure of wood or metal frame construction, covered with plastic or tarpaulin.

Remove Surface Contamination, Stack	<ul style="list-style-type: none">- Decontamination will consist of wiping down all surfaces with rags.- Rags must be collected and disposed of as hazardous waste.- Work area is considered as a confined space.- Work area is contaminated, requiring the wearing of PPE.- Due to the height and configuration of the stack, work will be performed from a ladder or from a basket suspended from the crane line.
Coat Internal Surfaces, Stack	<ul style="list-style-type: none">- Application of two coats of urethane base paint.- Work will be done in a contaminated area and will require working in suits.- Due to the height and configuration of the stack, work will be performed from a ladder or from a basket suspended from the crane line.- Production rates reflect the above work conditions.
Decon, Package & Ship Items	<ul style="list-style-type: none">- Items which can be properly decontaminated will be packaged and shipped for burial.- Decontamination process is assumed to be steam cleaning/high pressure water blasting.- Items which will require further decontamination will be sent to the decontamination facility at the 200 area.

309 Facility Assessment
 Cost Estimate
 Item # 3.13
 309 Stack and Pits

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DIRECT LABOR			\$159,012	MATERIALS			\$9,000	EQUIPMENT			\$44,100	
CONSTRUCTION FORCES			\$44,523	Consumables			6.00%	\$540				
Technical Services	18.00%		\$28,622	Procurement & Warehousing			4.00%	\$360				
Construction Support	4.00%		\$6,360									
Project Management	5.00%		\$7,951									
Quality Assurance Engineering	1.00%		\$1,590									
GENERAL CONDITIONS			\$39,753									
Haul Men and Material	4.00%		\$6,360									
New Hires	1.00%		\$1,590									
Clean-up & Labor Support	10.00%		\$15,901									
Welder qualifications	0.00%		\$0									
Small Tools	4.00%		\$6,360									
Quality Support	6.00%		\$9,541									
CRAFT INDIRECT			52.00%	\$82,686	SUBTOTAL			\$9,900	SUBTOTAL			\$44,100
SUBTOTAL			\$325,976									
TOTAL			\$379,976									

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**309 Facility Assessment
Cost Estimate
Item # 3.13
309 Stack and Pits**

MATERIAL

[illegible]

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**309 Facility Assessment
Cost Estimate
Item # 3.13
309 Stack and Pits**

EQUIPMENT

[illegible]

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Item 3.14 Safety Analysis	
WORK ITEM	ASSUMPTIONS
Perform Safety Analysis.	<ul style="list-style-type: none"> - Scope of work for this item includes addressing; Initial Hazard Categorization, Safety Documentation, and Unreviewed Safety Questions. - Analysis will be performed in accordance with the requirements of DOE Orders 5480.21, 5480.22, and 5480.23.

309 Facility Assessment
 Cost Estimate
 Item # 3.14
 Safety Analysis

DIRECT LABOR			\$190,247	MATERIALS			\$0	EQUIPMENT			\$0		
CONSTRUCTION FORCES			\$45,659	Consumables			6.00%	\$0					
Technical Services			18.00%	\$34,244	Procurement & Warehousing			4.00%	\$0				
Construction Support			0.00%	\$0									
Project Management			5.00%	\$9,512									
Quality Assurance Engineering			1.00%	\$1,902									
GENERAL CONDITIONS			\$15,220										
Haul Men and Material			0.00%	\$0									
New Hires			0.00%	\$0									
Clean-up & Labor Support			0.00%	\$0									
Welder qualifications			0.00%	\$0									
Equipment Usage			5.00%	\$9,512									
Quality Support			3.00%	\$5,707									
CRAFT INDIRECT			0.00%	\$0									
SUBTOTAL				\$251,126	SUBTOTAL			\$0	SUBTOTAL			\$0	
TOTAL				\$251,126									

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Item 3.15 Operation Configuration	
WORK ITEM	ASSUMPTIONS
Design Dry Pipe Sprinkler System	- <i>Engineers, Technicians, Draftsmen and Clerical personnel as necessary to survey the existing facility, determine necessary modifications, design the modifications and prepare design documentation.</i>
Convert Wet Pipe Sprinkler System to Dry Pipe System	- <i>Water will be drained from the existing system and disposed of.</i> - <i>Sensors will be wired to the main valve, which will pressurize the system when fire is detected in the facility.</i>
Secure Sanitary Water System	- <i>Close main valve.</i> - <i>Drain and flush the system as necessary.</i> - <i>Blank lines as necessary.</i>
Secure Compressed Air System	- <i>Close the main valve.</i> - <i>Blank the line.</i>
Secure Process Water System	- <i>Will be done concurrently with securing of the sanitary water system.</i>
Secure Nonessential Electric Systems	- <i>Design modifications to existing system.</i> - <i>Disconnect electrical power to the building circuits.</i> - <i>Power to the containment vessel will be left activated.</i> - <i>Power to approximately 25% of the lighting circuits will be left activated to permit inspection and maintenance as necessary.</i>
Secure Confined Spaces	- <i>Confined spaces will be secured using locks, grates, gates, etc.</i>
Secure Nonessential HVAC Systems	- <i>Locate and disconnect electrical power to the HVAC system.</i>
Shut-Down Building	- <i>Physical shut down of the facility to include securing of windows, doors, roof hatches, etc.</i>

Relocate Building Occupants	<i>- Assume 50 offices, 5 offices moved per day.</i>
Relocate Building Occupants	<i>- Assume that 100 office occupants are disrupted from normal activities for a total of three days to pack, move, and unpack.</i>
Prepare Surveillance/Operations Procedures	<i>- Assume 13 weeks for preparation, review, submittal and approval of procedures.</i>

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 Cost Estimate
 Item # 3.15
 Operational Configuration

DIRECT LABOR		\$255,000	\$113,641	MATERIALS		\$9,820	EQUIPMENT	\$14,400
CONSTRUCTION FORCES			\$31,819	Consumables		6.00%	\$589	
Technical Services	18.00%		\$20,455	Procurement & Warehousing		4.00%	\$393	
Construction Support	4.00%		\$4,546					
Project Management	5.00%		\$5,682					
Quality Assurance Engineering	1.00%		\$1,136					
GENERAL CONDITIONS			\$28,410					
Haul Men and Material	4.00%		\$4,546					
New Hires	1.00%		\$1,136					
Clean-up & Labor Support	10.00%		\$11,364					
Welder qualifications	0.00%		\$0					
Small Tools	4.00%		\$4,546					
Quality Support	6.00%		\$6,818					
CRAFT INDIRECT	52.00%		\$59,093					
SUBTOTAL			\$487,963	SUBTOTAL		\$10,802	SUBTOTAL	\$14,400
TOTAL			\$513,165					

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309 Facility Assessment
 Cost Estimate
 Item # 3.15
 Operational Configuration

DIRECT LABOR		\$255,000	\$113,483	MATERIALS		\$9,820	EQUIPMENT	\$14,400
CONSTRUCTION FORCES			\$31,775	Consumables		6.00%		
Technical Services	18.00%		\$20,427	Procurement & Warehousing		4.00%		
Construction Support	4.00%		\$4,539					
Project Management	5.00%		\$5,674					
Quality Assurance Engineering	1.00%		\$1,135					
GENERAL CONDITIONS			\$28,371					
Haul Men and Material	4.00%		\$4,539					
New Hires	1.00%		\$1,135					
Clean-up & Labor Support	10.00%		\$11,348					
Welder qualifications	0.00%		\$0					
Small Tools	4.00%		\$4,539					
Quality Support	6.00%		\$6,809					
CRAFT INDIRECT		52.00%	\$59,011					
		SUBTOTAL	\$487,639			SUBTOTAL		\$14,400
						\$10,802		
TOTAL			\$512,841					

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**309 Facility Assessment
Cost Estimate
Item # 3.15
Operational Configuration**

MATERIAL

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Optical
Reactor Clean-up
309 Facility Assessment
Cost Estimate
Summary

NO.	ITEM	LABOR	MATERIAL	EQUIPMENT	TASK TOTAL
				\$10,800	\$43,950
3.1	Excess Equipment	\$27,650	\$5,500		\$183,552
3.2	Transuranic Waste	\$183,552	\$0	\$0	\$148,508
3.3	Low Level Waste	\$148,508	\$0	\$0	\$8,511,658
3.4	PRTR Reactor	\$5,866,003	\$2,053,755	\$591,900	\$386,838
3.5	Fuel Transfer Pit	\$329,053	\$12,925	\$44,860	\$315,336
3.6	Fuel Examination Cell	\$276,476	\$10,340	\$28,520	\$549,474
3.7	PRTR IX Vault	\$499,300	\$20,350	\$29,824	\$467,559
3.8	Rupture Loop Annex	\$413,459	\$11,110	\$42,990	\$263,781
3.9	Rupture Loop IX Vault	\$222,516	\$11,165	\$30,100	\$269,345
3.10	TW Holding Tanks	\$232,995	\$11,990	\$24,360	\$0
3.11	Diesel Tank Removal		FUNDED BY OTHERS		\$0
3.12	IEM Cell		FUNDED BY OTHERS		\$379,976
3.13	Stack and Pits	\$325,976	\$9,900	\$44,100	\$251,126
3.14	Safety Analysis	\$251,126	\$0	\$0	\$512,841
3.15	Operational Configuration	\$487,639	\$10,802	\$14,400	
	CATEGORY TOTAL	\$9,264,254	\$2,157,837	\$861,854	

GRAND TOTAL \$12,283,945

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 Cost Estimate
 Item # 3.4
 PRTR Reactor

<u>DIRECT LABOR</u>			<u>\$2,861,465</u>	<u>MATERIALS</u>			<u>\$1,867,050</u>	<u>EQUIPMENT</u>			<u>\$591,900</u>	
CONSTRUCTION FORCES			\$801,210	Consumables			6.00%	\$112,023				
Technical Services	18.00%	\$515,064		Procurement & Warehousing			4.00%	\$74,682				
Construction Support	4.00%	\$114,459										
Project Management	5.00%	\$143,073										
Quality Assurance Engineering	1.00%	\$28,615										
GENERAL CONDITIONS			\$715,366									
Haul Men and Material	4.00%	\$114,459										
New Hires	1.00%	\$28,615										
Clean-up & Labor Support	10.00%	\$286,146										
Welder qualifications	0.00%	\$0										
Small Tools	4.00%	\$114,459										
Quality Support	6.00%	\$171,688										
CRAFT INDIRECT			52.00%	\$1,487,962								
SUBTOTAL				\$5,866,003	SUBTOTAL				\$2,053,755	SUBTOTAL \$591,900		
TOTAL				\$8,511,658								

309 Facility Assessment
Cost Estimate
Item # 3.4
PRTR Reactor

LABOR

TASK	Task Hours	Lbr \$25.70	Carp \$29.90	Elect \$35.74	Pipeftr \$36.28	Pntr \$26.03	Tmstr \$28.82	Oprtr \$29.78	HPT \$37.03	QC/ Safety \$34.51	NDA \$37.03	Insitr \$35.52	Blrmkr \$35.40	Cmnt Msn \$29.45	lnwrkr \$32.33	Mwrt \$29.52	Shtmtl Wrkr \$31.74	Sub Total	Mask Ineff. @ 100%	Task Total
Install Containment Structure	16	2	2				1	1	1	1								\$3,861		\$3,861
Remove Rotary Shields	8	2						1	2		1							\$1,538	\$1,538	\$3,076
Remove Outlet Jumpers, 85 ea	200	4			4			1	2	1	1				1			\$91,126	\$91,126	\$182,252
Remove Outlet Nozzles, 85 ea	160	4			4			1	2	1	1				1			\$72,901	\$72,901	\$145,802
Remove Shim Rods, 18 ea	80	4			4			1	2	1	1				1			\$36,450	\$36,450	\$72,901
Remove Misc Equipment	80	4			4			1	2	1	1				1			\$36,450	\$36,450	\$72,901
Remove Process Tubes, 85 ea	500	4			4			1	2	1	1							\$211,650	\$211,650	\$423,300
Remove Outlet Header	80	6			4			1	2	1	1		4		1			\$51,890	\$51,890	\$103,781
Remove Top Shield	120	6			2			1	2	1	1							\$48,257	\$48,257	\$96,514
Evaluate Dry Gas Space	40	4							4	1	1							\$12,898	\$12,898	\$25,797
Remove Calandria	100	6			4			1	2	1	1				2			\$53,936	\$53,936	\$107,872
Remove Bottom Shield	160	6			2			1	2	1	1				2			\$74,688	\$74,688	\$149,376
Remove Inlet Jumpers, 85 ea	200	4			4			1	2	1	1				1			\$91,126	\$91,126	\$182,252
Remove Inlet Nozzles, 85 ea	160	4			4			1	2	1	1				1			\$72,901	\$72,901	\$145,802
Remove Dump Valves, 4 ea	40	4			4			1	2	1	1							\$16,932	\$16,932	\$33,864
Remove Inlet Header	120	6			4			1	2	1	1				2			\$64,723	\$64,723	\$129,446
Remove Moderator Storage Tank	120	6			4			1	2	1	1				2			\$64,723	\$64,723	\$129,446
Remove Wall Plugs	120	6			4			1	2	2	1				1			\$64,985	\$64,985	\$129,970
Trim and Plug Misc Piping	40	4			4			1	2	2	1				1			\$19,606	\$19,606	\$39,211
Decontaminate Cavity	40	6			4			1	2	2	1							\$20,368	\$20,368	\$40,737
Apply Affixative Coating	24	6				6		1	2	1								\$10,770	\$10,770	\$21,539
Replace Rotary Shields	8							1	2	2								\$1,383	\$1,383	\$2,766
Decon & Package Items	2000	2					2	2	2	1					1			\$619,000		\$619,000
	4416																	\$1,742,163	\$1,119,302	\$2,861,465

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Cost Estimate
Item # 3.4
PRTR Reactor

MATERIAL

	Material	Quantity	Unit Price	Mat'l Cost
Install Containment Structure	Structure Material	1	\$10,000	\$10,000
Remove Rotary Shields				
Remove Outlet Jumpers, 85 ea				
Remove Outlet Nozzles, 85 ea				
Remove Shim Rods, 18 ea	Shielding Devices	18	\$2,000	\$36,000
Remove Misc Equipment	Shielding	10	\$2,000	\$20,000
Remove Process Tubes, 85 ea	Shielding Devices	85	\$20,000	\$1,700,000
Remove Outlet Header				
Remove Top Shield				
Evaluate Dry Gas Space				
Remove Calandria				
Remove Bottom Shield				
Remove Inlet Jumpers, 85 ea				
Remove Inlet Nozzles, 85 ea				
Remove Dump Valves, 4 ea				
Remove Inlet Header				
Remove Moderator Storage Tank				
Remove Wall Plugs				
Trim and Plug Misc Piping				
Decontaminate Cavity	Rags, etc.	1	500	\$500
Apply Affixative Coating	Coating Material (per SF)	1100	\$0.50	\$550
Replace Rotary Shields				
Decon & Package Items	Shipping Containers	100	\$1,000	\$100,000
				\$1,867,050

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Cost Estimate
Item # 3.4
PRTR Reactor

EQUIPMENT

TASK	Task Hours	Crane \$50.00	Truck \$25.00	Vent. Fan \$12.50	Frklft \$20.00	Cmprsr \$20.00	Ctng Eq \$35.00	Pump \$15.00	Scfldng \$5.00	Decon Equip \$50.00	Vacuum \$20.00	Equip. subtotal	Labor Ineff	Equip. Total
Install Containment Structure	16	0.25	0.5		0.5	0.5			1			\$800		\$800
Remove Rotary Shields	8	1										\$400	\$400	\$800
Remove Outlet Jumpers, 85 ea	200	0.5		1		1						\$11,500	\$11,500	\$23,000
Remove Outlet Nozzles, 85 ea	160	0.5		1		1						\$9,200	\$9,200	\$18,400
Remove Shim Rods, 18 ea	80	0.5		1		1						\$4,600	\$4,600	\$9,200
Remove Misc Equipment	80	0.5		1		1					1	\$6,200	\$6,200	\$12,400
Remove Process Tubes, 85 ea	500	0.5		1		1						\$28,750	\$28,750	\$57,500
Remove Outlet Header	80	0.5		1		1						\$4,600	\$4,600	\$9,200
Remove Top Shield	120	0.25		1		1					1	\$7,800	\$7,800	\$15,600
Evaluate Dry Gas Space	40			1								\$500	\$500	\$1,000
Remove Calandria	100	0.25		1		1						\$4,500	\$4,500	\$9,000
Remove Bottom Shield	160	0.25		1		1					1	\$10,400	\$10,400	\$20,800
Remove Inlet Jumpers, 85 ea	200	0.5		1		1						\$11,500	\$11,500	\$23,000
Remove Inlet Nozzles, 85 ea	160	0.5		1		1						\$9,200	\$9,200	\$18,400
Remove Dump Valves, 4 ea	40	0.5		1		1						\$2,300	\$2,300	\$4,600
Remove Inlet Header	120	0.5		1		1						\$6,900	\$6,900	\$13,800
Remove Moderator Storage Tank	120	0.25		1		1						\$5,400	\$5,400	\$10,800
Remove Wall Plugs	120	0.25		1		1						\$5,400	\$5,400	\$10,800
Trim and Plug Misc Piping	40	0.25		1		1						\$1,800	\$1,800	\$3,600
Decontaminate Cavity	40			1					4		1	\$2,100	\$2,100	\$4,200
Apply Affixative Coating	24			1		1	1		4			\$2,100	\$2,100	\$4,200
Replace Rotary Shields	8	1										\$400	\$400	\$800
Decon & Package Items	2000	1	2		0.5					1		\$320,000		\$320,000
	4416											\$456,350	\$135,550	\$591,900

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**DATE
FILMED**

10/18/94

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