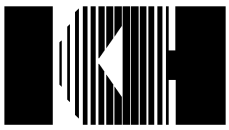

Kaiser-Hill

PROJECT MANAGEMENT PLAN

771 Closure Project

Rocky Flats Environmental Technology Site
Closure Project

June 30, 2000

Approved:

Project Manager	**date**

Contents

Appendices

Appendix A—Contract Statement of Work
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Appendix G – D&D Summit Assumption and 771 Closure Project Incorporation Description

1. MANAGEMENT APPROACH

The new contract between the Department of Energy (DOE) and Kaiser-Hill (K-H) provides incentives to K-H to complete the Rocky Flats Closure Project (RFCP) in the most cost-effective manner possible with ***significant*** penalties for unsatisfactory safety, environmental, safeguards and security, and cost variance (CV)/schedule variance (SV) performance. While SV is evaluated, the contract places a greater value in delivering the project for lower cost than for completing the project earlier. Under the new contract, the transaction level with DOE is greatly reduced because K-H is responsible for virtually all differing site conditions. DOE is only responsible for government-furnished items and services as specified in Section C, Statement of Work (SOW), Technical Exhibit A. All references in this plan to the SOW refer to the K-H SOW for RFCP. To successfully complete the scope of work, K-H must conduct all work safely and cost-effectively through the Integrated Safety Management (ISM) process.

The ISM process is used by Kaiser-Hill as the framework for the planning and execution of the RFCP. At a macroscopic level, the five principle elements of ISM have been applied to develop the overall closure strategy and the 2006 Closure Project Baseline (CPB). For example, instead of considering hazards and controls for protection of workers in the traditional sense, hazards are also the risks and uncertainties in the baseline, and the controls are project management systems designed to mitigate those risks.

In addition to using ISM as an overall planning and managing strategy, ISM is used as the primary tool for assuring safe accomplishment of work at the floor-level. All work conducted at the Site is performed in accordance with the Integrated Work Control Program (IWCP) or an approved substitute. It is the floor level planning and execution tool used at Rocky Flats. The ISM process has been fully integrated into the IWCP process. The IWCP has been tailored over the past two years to incorporate planning for environmental stewardship, safeguards and security, and quality assurance.

By broadening these principles to cover work planning at the Site level, safety and stewardship issues become the central linkage for execution of the entire project, and are embodied in all work activities. This Project Management Plan (PMP) continues this philosophy and is organized around each of the following five ISM elements:

- Section 2—Project Scope
- Section 3—Identification of Project Risks
- Section 4—Controls
- Section 5—Work Activities
- Section 6—Feedback

Section 7 includes a list of references and appendices, which are included to provide detailed information about the project.

2. PROJECT SCOPE

In accordance with ISM, this section will define the scope of work for the 771 Closure Project. The scope information will provide input for detailed planning. The scope of the 771 Closure Project includes the following:

- Special Nuclear Material (SNM) removal, liquids removal, and building stabilization/deactivation of the Building 771 and other associated structures
- Decommissioning of Building 771 and other associated structures, which includes the following key work activities:
  - Establish and maintain a safe and compliant work environment
  - Perform liquid system decommissioning
  - Perform glovebox decommissioning
  - Package resultant waste
  - Decontaminate structures
  - Demolish structures
  - Perform under building remediation, if required
- Decommissioning Program Office, which involves preparing and maintaining the key planning documentation for all decommissioning projects.

The Rocky Flats Environmental Technology Site (RFETS or Site) projects supporting closure by 2006 is depicted in Figure 1: 2006 Closure Projects. The SOW tables from the contract are included as Appendix A. The tables have been modified to also identify the lead and supporting projects for each scope item.

2.1 Scope

The work breakdown structure (WBS) structure that supports the above stated scope of work for the Building 771 Closure Project is as follows:

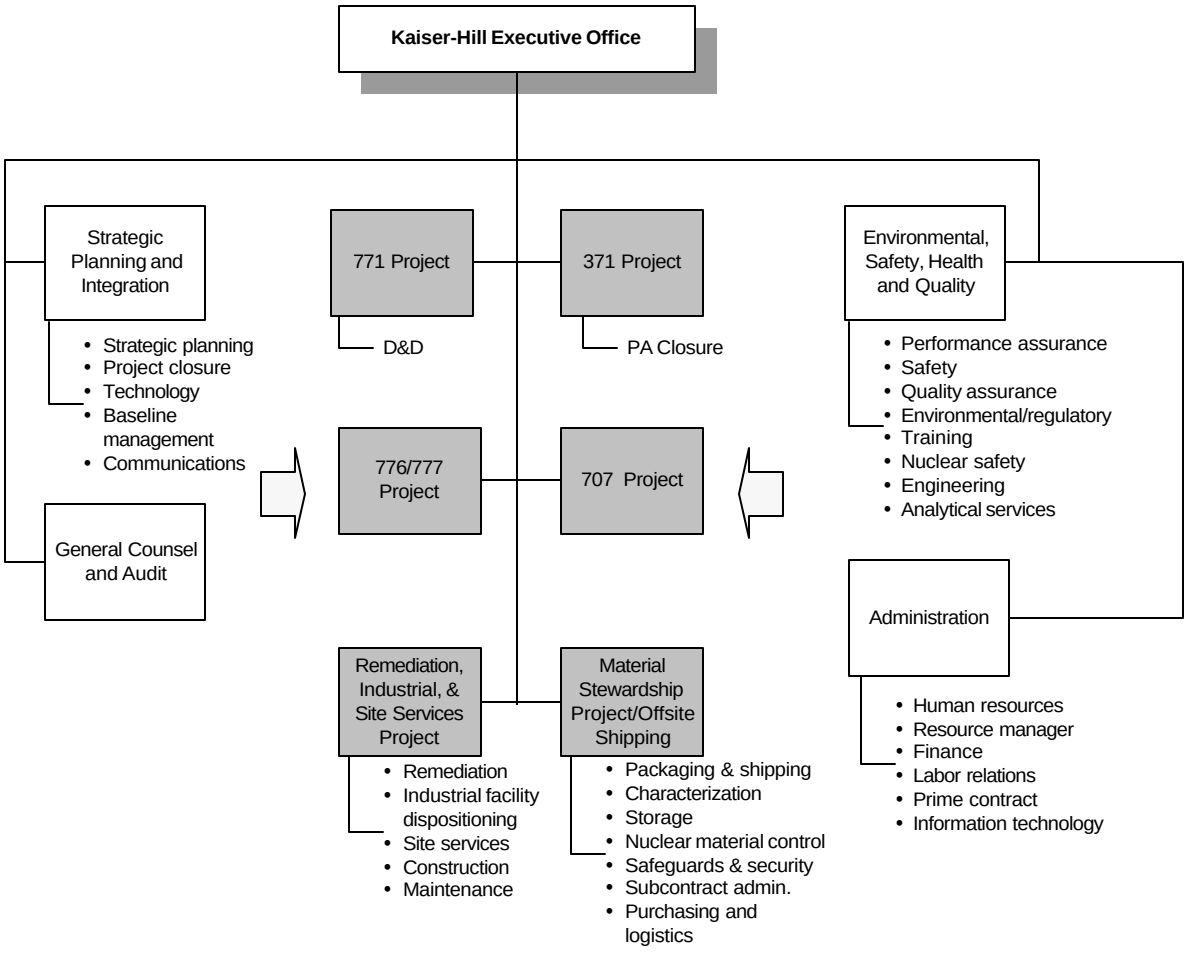
C	Building 771/774 Project
CA	Building 771/774 Project Closure
CAA*	Building 771/774 Project Management
CAB*	Building 771/774 Facility Maintenance
CAC*	Building 771/774 SNM/Deactivation
CAD*	Building 771/774 Decommissioning
CAE*	Building 771/774 Support Services
CAF*	Decommissioning Program

*Indicates a Cost Account per Section H of the Closure Contract. A description of the cost accounts is detailed in the following sections.

2.1.1 CAA, Project Management

This element includes project management and administrative support. Contract costs associated with the continuation at the Rocky Mountain Remediation Services (RMRS) contract are included in this element.

Figure 2-1. 2006 Closure Project



2.1.2 CAB, Facility Maintenance

This cost account is broken down into five elements, and the following outlines the elements and their scope:

- CAB1 - Conduct routine compliance surveillances/inspections on Resource Conservation and Recovery Act (RCRA) units, security systems, radiological control requirements, and industrial safety. Conduct Limiting Conditions for Operations (LCO) surveillance's on Vital Safety Systems (VSS) as required by the building specific authorization basis document (i.e. fire systems, criticality alarm systems, heating, ventilation and air conditioning (HVAC) systems).
- CAB2 - Conduct baseline maintenance activities on VSS, facility support systems/structures, environmental compliance/ waste management support systems, security systems, etc.
- CAB3 - Provide operations management for building baseline activities.
- CAB4 – Provide operations technical support for building baseline activities.
- CAB5 - Conduct Authorization Basis (AB) activities to ensure there are adequate controls for hazards associated with storage of material and operations to be performed in the building. These activities include developing and maintaining the applicable Safety Analysis Reports, Basis for Operations, or Basis for Interim Operations documents.

2.1.3 CAC, Building Stabilization/Deactivation

As defined below, deactivation activities only occur in Type 3 facilities as defined in RFCA. Building stabilization are similar activities that occur on Type 1 or 2 facilities.

2.1.3.1 Building Stabilization

Building stabilization consist of the activities necessary to remove a building from operation and place the building in a safe and stable condition that eliminates or mitigates hazards and ensures adequate protection to workers, the public, and the environment. Stabilization occurs in buildings that do not have a deactivation phase. Stabilization potentially results in additional baseline cost reductions by eliminating or reducing the need for surveillance and maintenance activities.

Stabilization includes characterization; planning and project management; administrative and physical stabilization; and AB modifications. Stabilization activities remove the cluster of buildings from operation, and prepare them for turnover for decommissioning and meet applicable safeguards, hazard category or other completion criteria.

Specific stabilization activities include preparing IWCP packages, performing removal of hazardous and nonhazardous materials, holdup removal, and reduction of building fire loading. Activities may include inventory and removal of unattached hazardous materials from the buildings and project areas, such as regulated hazardous chemicals, beryllium and gas cylinders, draining fluids from equipment, asbestos abatement and/or encapsulation, and repack of existing waste packages. RCRA units may be placed into a RCRA stable condition or the RCRA unit closed. Disposition of excess property, in accordance with government property disposition requirements may be performed.

2.1.3.2 Deactivation

Deactivation are the activities necessary to remove a building from operation and place the building in a safe and stable condition that eliminates or mitigates hazards and ensures adequate protection to workers, the public, and the environment. Deactivation potentially results in additional baseline cost reductions by eliminating or reducing the need for surveillance and maintenance activities.

Deactivation includes characterization; planning and project management; administrative and physical deactivation; and AB modifications. Deactivation activities remove the buildings from operation, and prepare them for decommissioning and maintain compliance with applicable safeguards, hazard category or other completion criteria.

Specific deactivation activities include preparing IWCP packages, performing removal of hazardous and nonhazardous material, holdup removal, and reduction of building fire loading. Activities may include inventory and removal of unattached hazardous materials from the building and project areas, such as regulated hazardous chemicals, beryllium, gas cylinders, draining fluids from equipment, asbestos abatement and/or encapsulation, and repack of existing waste packages. RCRA units may be placed into RCRA stable condition or RCRA unit closure may occur. Disposition of excess property, in accordance with government property disposition requirements may be performed.

Deactivation includes removal of contaminated systems, system components, or equipment for the purpose of accountability of SNM and nuclear safety. It also includes removal of contamination incidental to other deactivation or for the purposes of accountability of SNM and nuclear safety. Deactivation does not include decontamination necessary for the dismantlement phase of decommissioning.

Specifically, for Building 771, the scope of the deactivation phase includes the planning and physical work activities associated with tap and drain, process piping removal, and sludge removal from the tanks in Building 774.

2.1.4 CAD, Decommissioning

Decommissioning is the activity necessary to remove a building from the site, in a safe manner that minimizes hazards and ensures adequate protection to workers, the public, and the environment. Decommissioning activities include characterization; site preparation; decontamination; dismantlement; demolition; and project management and support services. Regulatory approval for decommissioning precedes the physical execution of decommissioning tasks. The decommissioning process, as implemented at RFETS, results in each building and contents being dispositioned properly in accordance with the applicable regulations and requirements, whether as waste, as recycle, or as reuse. Specific physical decommissioning activities include the following:

- Characterization, stripout, removal and size reduction of process equipment (gloveboxes, tanks, process piping, ducting, etc.) and distribution systems (building lighting/power, heating, water, sewer, etc.);
- Isolation of the building from the rest of the site infrastructure;
- Packaging of contaminated wastes generated during the overall decommissioning effort, holdup removal; property and waste disposition;
- Decontamination;
- Building disassembly and dismantlement; and
- Demolition.

Waste chemical removal, disposition of excess property, chemical hazard reduction and stabilization or closure of RCRA units may occur either during deactivation or decommissioning.

Physical site preparation includes the establishment of laydown, shipping, and material processing areas; set-up of size reduction, monitoring, and waste staging areas and step-off pads; and the removal of stored wastes. Decontamination areas include building interior/exterior surfaces or other fixed structures,

equipment, drains, gloveboxes, tanks, process piping, ducting. Removal of hazardous and toxic substances may be performed as a decontamination activity.

Demolition of the walls, roof, non-structural and structural components, foundations and connecting structures (tunnels, breezeways, overhead walkways) of the building is performed. Unless specified differently in the building RFCA decision document, subsurface concrete will be removed three feet below the existing grade. Demolition rubble will be properly dispositioned.

Characterization activities supply the data necessary to minimizes hazards and ensure adequate protection to workers, the public, and the environment and has four phases: scoping; reconnaissance; in-process; and pre-demolition (including independent verification, if required). Decommissioning characterization does not cover the characterization associated with Individual Hazardous Substance Site (IHSS) remediation, which is part of Environmental Restoration (ER) or any process characterization of SNM.

In order to perform these physical activities, planning and engineering resources prepare the following major documents (as needed):

- Reconnaissance Level Characterization Report (RLCR);
- Pre-Demolition Survey Report (PDSR);
- Decision Document (Decommissioning Operations Plan (DOP); Proposed Action Memorandum (PAM); Interim Measures/Interim Remedial Actions Document (IM/IRA), or use an approved RFCA Standard Operating Protocol);
- RCRA Unit Closure Plan/Closure Description Documents (CDDs);
- Health and Safety Plan (HASP);
- IWCP packages;
- Waste Management Plan;
- Training Plan;
- Utility relocation design documents;
- Building demolition design documents; and
- Equipment removal design documents.

The development of these work packages and plans requires the use of multiple support services such as: training; procurement and contract administration; security and fire protection; quality assurance/quality control (QA/QC); waste management and inspection; transportation and construction departments; radiological operations and engineering; Radiation Control Technician (RCT); medical and health; safety and industrial hygiene; shipping, receiving, and warehousing; legal; regulatory interface; laundry; analytical laboratory; toxic and hazardous material handling; utilities; excess property; telecommunications and information resources; finance and administration; and planning and integration.

Completion of decommissioning results in the building "footprint" being assigned to the ER organization for any required remediation. Unless specified differently in a RFCA decision document, all buildings will be demolished, all wastes are removed, and building foundations, utilities or other remaining structures will be removed to a depth of three feet below the final proposed grade. For each project, a Project Completion Report will be completed, approved by the regulators, and placed in the Administrative Record in accordance with RFCA and other applicable requirements.

2.1.5 CAE, Support Services

This cost account includes five major areas. Project support includes project controls. Security includes access controls and special operations. Waste operations include material movement in the facility, inspection and certification of waste packages and coordination of materials storage in the Project. Technical support includes training and non-productive time. Property management includes equipment leases and purchases over $10,000 and consumables.

2.1.6 CAF, Decommissioning Program

The Decommissioning Program provides overall coordination of decommissioning activities at the Site. This includes coordination of all Site decommissioning work, technology development projects, the preparation and maintenance of program level work plans and strategy documents, and long term contingency planning, and characterization for decommissioning.

The Decommissioning Program ensures K-H consistency and integration of the decommissioning program relative to the implementation aspects of the RFCA, DOE Headquarters (DOE/HQ) guidance related to decommissioning, the facility disposition process, and the DOE/HQ document *Accelerating Cleanup - Path to Closure*.

The Decommissioning Program provides a single external point of contact and ensures K-H consistency in communication with DOE/RFFO, DOE/HQ, Colorado Department of Public Health and Environment (CDPHE), Defense Nuclear Facilities Safety Board (DNFSB), Environmental Protection Agency (EPA), General Services Administration (GSA), Department of Housing and Urban Development (HUD) and others with respect to decommissioning matters. The following includes the scope the Decommissioning Program:

- Coordination of decommissioning project interfaces with the decommissioning AB work;
- Preparation of program-level priority reviews, analyses, and strategy documents for decommissioning, to ensure the appropriate allocation of resources;
- Providing programmatic preparation of regulatory Project and facility plans;
- Fostering the necessary consistency in decommissioning project scope and interface definition;
- Sponsoring development of generic decommissioning plan required standards, standard operating protocols, and procedures, as required, to avoid duplication of effort among projects;
- Maintenance of *Decommissioning Program Plan* (DPP), the *RFCP D&D Characterization Protocol* (DDCP), *the Facility Disposition Program Manual* (FDPM), and RFCA Standard Operating Protocols (RSOP);
- Oversight of the Project Management and the Reconnaissance Level Characterization Plans and Reports prepared;
- Coordination of the decommissioning efforts to provide outsourcing guidance and oversight, streamlining, and benchmarking, with the appropriate lead organization;
- Development and maintenance of databases, as necessary, to support decommissioning activities;
- Providing timely compliance with RFCA requirements to support decommissioning activities based on analysis that considers future decommissioning projects;
- Providing programmatic input to and review of DOPs; and
- Providing input and quarterly updates to DOE/RFFO for use in the DOE Annual Performance Plan or equivalent.

This cost account also includes the procurement and deployment of decommissioning process equipment to aid the acceleration of decommissioning of buildings and equipment. The equipment being procured is portable and will be used in a number of plutonium buildings on the Site.

This cost account also provides for activities supporting the accelerated deployment of technologies needed for Site closure. In particular, this element includes Site (EW05) matching funds to complete EW40 (DOE - HQ EM-50) funded scope. In FY99, EM-50 funded the design and procurement of equipment for a mobile non-destructive assay (NDA) system for transuranic (TRU) standard waste boxes. This element, in FY99 and FY00, provides for the fabrication, certification and deployment of this NDA system.

Also included in this cost account for FY00 is funding to evaluate and select the most appropriate technologies to deploy in support of decommissioning activities at the Site. This funding will allow a consistent basis for technology selection and deployment.

This scope of work implements the RFCA/DPP requirements regarding the preparation of plans and decision documents leading to facility/cluster closure. The preparation of regulatory cluster and facility plans includes compliance submittals for HUD/GSA, establishing the Administrative Record, the preparation of the Environmental Checklist, the completion of the Historical Site Assessments and facility walk-downs, the completion of facility characterization and the preparation of RLCRs, Project Management Plans and RFCA Decision Documents.

This work scope also includes the technical studies to support facility disposition and closure. For details regarding planning and characterization during FY00 - FY01 refer to Fiscal Year 2000 and 2001 Statement of Work. For the outyears, FY02 - FY04, planning and characterization include the following facilities/clusters:

- FY02 – Building 881, Building 883 and Building 991
- FY03 – Building 125, Building 441, 690T Cluster, 800A Cluster, T-891 Cluster, 903/905 Pad, 300/500 Cluster, Building 440, Building 331, Building 532, Building 512, Building 632, Building 442, Building 452, INFFCM Cluster, INFSTM Cluster, PWTS Cluster, SECIZ Cluster and 904/906 Pad
- FY04 – Building 130, Building 460, Building 850 and Building 111

2.2 Boundaries

The 771 Closure Project includes the following:

- 714, hydrofloric storage (182 ft^2)
- 714A, hydrofloric storage (192 ft^2)
- 714B, emergency breathing air (192 ft^2)
- 715, emergency generator #1 (824 ft^2)
- 716, emergency generator #2 (286 ft^2)
- 717, magnehelic gauge building/sampling shed (48 ft^2)
- 770, 774 maintenance/771 war room (2,860 ft^2)
- 771B, carpenter shop (564 ft^2)
- S770, storage facility
- 771, plutonium recovery facility (151,430 ft^2)
- T771A, trailer offices (1,620 ft^2)
- T771B, trailer offices (1,440 ft^2)
- 771C, nuclear waste packaging – drum counting (4,648 ft^2)

- T771C, showers/lockers (520 ft^2)
- T771E, trailer offices (1,440 ft^2)
- T771F, trailer offices (1,960 ft^2)
- T771G, showers/lockers (1,200 ft^2)
- T771H, trailer offices (1,848 ft^2)
- T771J, trailer offices (1,960 ft^2)
- T771K, trailer offices (1,960 ft^2)
- T771L, trailer restrooms (320 ft^2)
- T771MB, trailer mobile breakroom (480 ft^2)
- 771-DT, decon trailer
- 771-S, 771 stack
- 771-TUN, 771-776 tunnel
- 772, HF acid storage (1,129 ft^2)
- 772A, acid storage (400 ft^2)
- 773, incident command center (190 ft^2)
- 774, liquid waste treatment plant (25,060 ft^2)
- 774A, waste treatment plant RCA tank (363 ft^2)
- 774B, waste treatment plant Non RCA (363 ft^2)
- 775, sewage lift station (152 ft^2)
- T21A, aboveground storage tank #2 diesel
- Tank 173, propane storage tank
- Tank 174, liquid argon tank
- Tank 175, liquid nitrogen tank
- Tank 176, sodium hydroxide tank
- Tank 179, propane storage tank
- Tank 180, cooling water storage tank
- Tank 182, neutralized waste second staging holding tank #66
- Tank 183, neutralized waste second staging holding tank #67
- Tank 184, neutralized waste second staging holding tank #68
- Tank 185, potassium hydroxide holding tank
- Tank 192, diesel storage tank
- Tank 193, diesel storage tank
- Tank 194, hydrofluoric acid storage tank D-44
- Tank 195, hydrofluoric acid storage tank D-45
- Tank 197, LP gas storage tank 450-781
- Tank 292, firewater collection tank
- Tank 293, firewater collection tank

2.3 Budget

The baseline budget is presented in Appendix B. The working budget is presented in Appendix C. The following table was developed to quantify the most significant risks associated with the 771 Closure Project baseline budget and schedule. Two dollar figures have been developed for each planning basis. The total cost represents the cost of not realizing any of the planning basis. The most probable added cost represents the cost of not realizing a portion of the planning basis. The planning basis column represents the most significant risks or assumptions associated with the 771 Closure Project. These risk and

assumptions are documented in the individual strategies in Section 3.0. Based on this table, approximately $121,253,000 could be added to the current 771 Closure Project Budget if the assumption and risks currently built into the baseline are inaccurate.

Re-Baseline Planning Basis	Risk of Failure	Total Cost	Most Probable Added Cost	Notes
Use of crafts will parallel use of Steelworkers; that is, laborers can perform essentially all activities.	70%	$7,217,000	$5,052,000	Effects both labor cost per hour and efficiency since a craft doesn't wait for work to open up. Also parallels Steelworkers efficiency under 'productivity'. Estimate added cost is about half of Trades labor costs.
Efficiency rates will improve.	35%	$56,397,000	$19,739,000	This cost was cut out in the many factors applied. Estimate from BDL experience with Building 771 Variance Analysis Reports.
Twelve months can be cut from the project schedule by compressing the work.	50% to 85%	$13,788,000	$9,238,000	All issues on this table and in the PMP uncertainties can cause schedule slip. Costs for the specific failures are noted. The costs of the schedule extension itself are Project Management (1CAA), landlord (1CAB), and support services (1CAE)
The project authorization basis will be revised to provide relief from operational burdens	70%	$9,926,000	$6,948,000	Total of sets and deactivation (6/6/00 estimate) $49,630 K; 20% of this total is at-risk
The contamination levels found will allow the planned method, which uses the building shell as containment, to proceed.	50%	$9,076,000	$4,538,000	Hard to estimate risk since no characterization yet. Estimated the Areas and Project Management could be extended by 4 months
No productivity will be lost due to extended overtime.	30%	$13,673,000	$4,102,000	6-12 hour shifts accomplish the same amount of work as 5-10s. Conceptually supported by industry standards. (5*10)/(6*12) = 69% ~ 70%
Ramp-down will occur at earliest potential point in project	at least 50%	$3,516,000	$1,758,000	All cost savings factors at risk for 1CAB (pre and post, or estimated vs. target cost)
16% of the TRU gloveboxes and tanks can be decontaminated to low level and SCO.	80% to 90%	$1,507,000	$1,281,000	D&D Summit Assumption has no identified success path. Building 774 tanks savings already included.
Trained personnel are readily available so mobilization cost is minimal	50%	$2,000,000	$1,000,000	Mobilization costs were not estimated.
Sludge can be easily mobilized and pumped to Building 374 for treatment; the amount can be handled by Building 374.	70%	$1,074,000	$752,000	Due to lack of characterization, sludge removal could be low by 100%: entire cost sludge removal
Hold-up will not require any special activities to manage and secure material.	75%	$948,000	$711,000	If hold-up is encountered, combustible drums will be used.

Re-Baseline Planning Basis	Risk of Failure	Total Cost	Most Probable Added Cost	Notes
Increased productivity, and improved packaging (note that no schedule improvement has been assumed)	50%	$1,292,000	$646,000	D&D Summit Assumption, step 2 only, Building 771 sets plus Building 774 gloveboxes only.
The tanks will be removed from the building and shipped to disposal whole (that is, with no size reduction)	30% to 50%	$743,000	$297,000	No funds were added to the baseline for cranes or flatbeds or other alternatives to size reduction; 25% of the original size reduction was retained. D&D Summit steps 2 + 3 for Building 774 tanks only at 30% to 50%
Implosion method will be chosen.	50%	$96,000	$48,000	Alternate assumed to be to pull the stack over in sections. Estimated at 2 months of the Area AG burn rate of $48K per month.

During the baseline development, several reduction were taken to meet the overall Site budget goals. The following bullets document how those reduction were taken from the original 771 Closure Project budget:

- Reduced Project management by a total of $1,019,715 from FY02, FY03 and FY04
- Reduced Facility Maintenance by a total of $1,218,751 from FY03 and FY04
- Reduced Decommissioning Sets budget by $5,954,421 from FY01, FY02 and FY03
- Reduced Decommissioning Areas budget by $ 7,382,717 from FY03 and FY04
- Reduced Support Services by a total of $1,476,892
- Reduced the Decommissioning Program by a total of $1,004,840
- Reduced the EM-50 Site funds by a total of $1,088,202

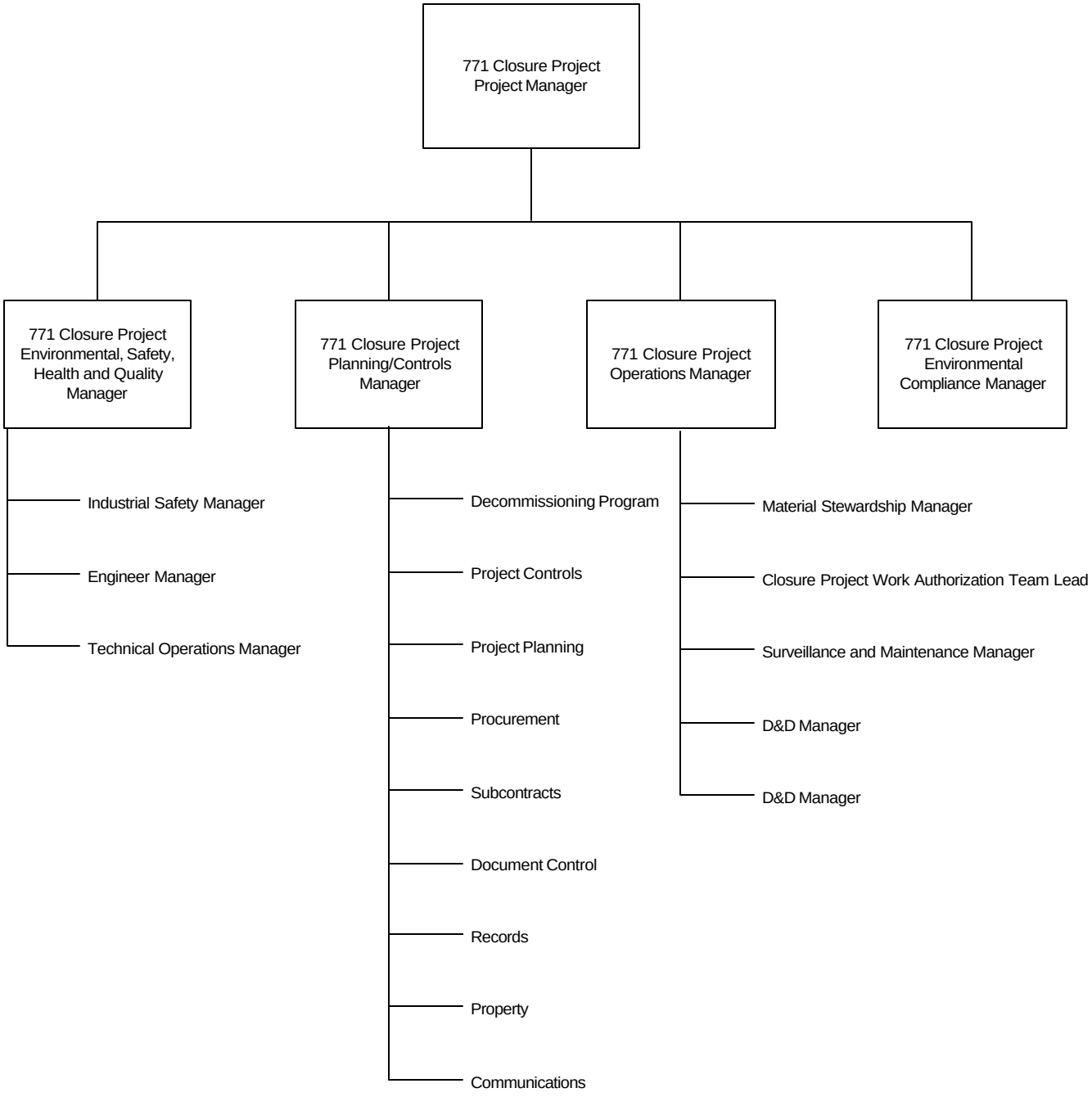
2.4 Schedule

The baseline schedule is presented in Appendix D. The working schedule is presented in Appendix E.

2.5 Organization And Responsibilities

This section describes the project organization structure, functions, and interfaces. Figure 2-2 presents the organization chart for the 771 Closure Project. The roles and responsibilities of this project along with its interfaces with other projects and within this project are presented below.

Figure 2-2 771 Closure Project



Building 771 VP/Project Manager	
Roles and Responsibilities	**External Interfaces**
• Safely and compliantly complete the scope of work for this project • Ensure compliance with applicable Material Stewardship requirements • Release/authorize daily work in accordance with the Plan-of-the-Day • Maintain safety systems • Maintain and operate vaults • Store legacy waste • Manage and close RCRA units • Conduct landlord functions • Maintain physical facility security and ensure compliance with security requirements • Store classified materials • Manage property accounting • Coordinate training, including project specific training • Implement IWCPs • Implement and track corrective actions • Develop project emergency plan • Provide support for Site-wide emergency response • • Transfer compliant waste containers to the Material Stewardship Project	• MSP Project – Provides Commodity contracts and MTAs, Accept packaged waste • 371 Project • 776 Project • 707 Project • RISS-Site Services—Provides utilities, maintenance, logistics • Strategic Planning & Integration • Environmental, Safety, Health and Quality – Provide analytical services • General Counsel & Audit • Administration • DOE customers • Regulators and stakeholders related to this project

Environmental, Safety, Health and Quality (ESH&Q)	
Roles and Responsibilities	**External Interfaces**
• Maintain project AB and coordinate AB issues • Represent the project to regulatory agencies • Implement Management Assessment Program (MAP) • Implement environmental stewardship, health, safety, and quality program and requirements • Collect, track, trend, and report on project ESH&Q metrics including occurrence reporting and safety statistics • Represent project on Site-wide committees	• Regulatory agencies • Environment, Safety, and Health Council • Site Plant Review Committee • PAAA Steering Committee • Criticality Safety and Nuclear Safety Councils • ALARA Oversite committee • Joint Resolution Committee • Analytical services

Environmental Compliance	
Roles and Responsibilities	**External Interfaces**
• Represent the project to regulatory agencies • Implement environmental stewardship requirements • Represent project on Site-wide committees	• Regulatory agencies • Environment, Safety, and Health Council • Plant Review Committee • Joint Resolution Committee • Analytical services

Project Planning and Controls	
Roles and Responsibilities	**External Interfaces**
• Maintain the project plan • Coordinate change control • Develop and maintain the project baseline including scope, schedule, and cost • Report project performance against the project plan • Prepare monthly project reviews • Provide resource allocation analysis • Conduct contingency planning • Prepare risk management plans • Manage installation of special projects which provide system upgrades, decommissioning equipment, and support facilities • Serve as CTR/requisitioner for project subcontracting and approve invoices	• Strategic Planning and Integration • Human resources • Subcontract administration • Finance • Records/Document Control

Engineering/Technical Support	
Roles and Responsibilities	**External Interfaces**
• Develop IWCP Packages • Provide discipline engineering services as necessary to support project operations • Implement site standards for engineering on the project • Provide technical support for execution of the IWCPs	• Site Engineering • Purchasing and logistics

Radiological Operations	
Roles and Responsibilities	**External Interfaces**
• Provide daily direction to project RCTs • Provide RCTs to project operations • Support planning for radiological work	• ESH&Q

Decommissioning Program	
Roles and Responsibilities	**External Interfaces**
• Establish the Decommissioning Program to enable efficient and consistent decommissioning at RFCP • Develop and maintain decommissioning program documents • Conduct strategic planning for decommissioning • Test and implement proven technologies for decommissioning work • Design, construct, and implement use of robotics for decommissioning for the Site • Conduct advanced planning and facility characterization for contingent projects • Develop programmatic characterization documents • Develop, implement and coordinate a Site-wide size reduction strategy • Develop and maintain the Facility Disposition Cost Model • Support projects in decommissioning planning • Develop standards for decommissioning cost collection and estimating	• MSP Project • 371 Project • 776 Project • 707 Project • ER and Industrial Building decommissioning Project • 771 Closure Project • SP&I • ESH&Q

Procurement and Subcontract Administration	
Roles and Responsibilities	**External Interfaces**
• Procure materials necessary for the project • Award and administer project specific support Subcontracts. • Award and administer Task Orders against Master Task Agreements. • Support the development of accruals for the project controls organization • Support approval of subcontractor invoices • Contracting • Accountable to the Building 771 Closure Project Manager for project contract activities • FOCI Coordination • Purchase major-engineered equipment.	• Subcontract Administration • Finance • Purchasing/logistics

Administration	
Roles and Responsibilities	**External Interfaces**
• Manage project communication activities. • Provide miscellaneous project administrative support. • Provide guidance and counseling to project management in employee relations issues • Administer and provide guidance to project employees with regard to HR policies • Provide general HR expertise to the project in such areas as performance appraisal training, assistance with position descriptions, counseling employees, etc. • Administer the compensation program within the project (i.e. merit planning, promotion planning, and ensuring compliance with K-H policies and guidelines) • In concert with the resource allocation Program, assist the project in resource allocation planning, both hourly and salaried, and coordinate surpluses and shortages with other projects and with the HR functional center • Supported by the central employment function, provide project management with qualified salaried candidates for openings within the project and assist management in the selection process • Assist and act as a resource in the discipline process for both salaried and hourly employees • Provide guidance in issues with hourly employees • Represent labor relations and assist the first-line supervisor in step 1 of the grievance procedure • Assist management in interpreting the labor agreements, with appropriate guidance from labor relations • Manage document control for the project • Provide training coordination and administration for the project • Coordinate hourly personnel actions • Monitor project compliance with CBA.	• Human resources • Labor relations • Document control • Records management • Communications

Material Stewardship	
Roles and Responsibilities	**External Interfaces**
• Manage storage of facility materials • Conduct facility material movement with authorization of CCA • Coordinate inter-building material movements • Provide waste volumes and type projections • Coordinate the immediate pick up and storage of compliant waste packages • Develop, update and maintain building specific MC&A plans • Develop and implement project specific MAA/PA closure plans • Conduct project specific safeguard functions including: SNM inventory, Intra-building moves, control MAR, MBA custodian, and assay and accounting (ROCKMAS) • Project and communicate security force requirements to MSP to support building operations • Fund security force overtime that supports building operations • Project and communicate inter-building shipment needs to MSP • Manage and dispose of facility property. • Establish MOU with MSP on the operation of specific NDA equipment dependant on process needs and equipment location.	• Waste Management • Purchasing/logistics • Safeguards and security

2.6 Subcontracting Strategy

The project is currently organized with K-H managing a single subcontractor (RMRS). RMRS conducts building operations, SNM removal, deactivation, and hot decommissioning. The cold decommissioning and demolition activities will be subcontracted. Under the new organization, the following subcontracting strategy will be implemented:

- K-H has re-organized into the project management team for Building 771 as outlined in Figures 2-1 and 2-2. Personnel from the Technical Support Master Task Agreement will supplement the K-H project management team. Some support may be obtained from separate procurements.
- At the beginning of the second quarter of FY00, RMRS was given the opportunity to retain the subcontract for conducting the building operations and hot decommissioning. If their proposal for this scope is not adequate, it will be competitively bid to the companies on the Master Task Agreements. This will be a Cost Plus Performance Fee (CPPF) contract.
- During the last quarter of FY00, a small contract will be initiated to commence building trade activities.
- During the second quarter of FY01, an open procurement will be initiated for the remaining scope of decommissioning activities to include building trades, dismantlement, decontamination, demolition and ER.

Scope	Subcontractor	Contract Type	Incentives	Schedule
Technical Support/Program Support	Technical Support Master Task Agreement	Fixed unit labor rate	Safety performance, cost reduction	Bid third QTR FY00
Building Operations	RMRS	CPPF	Safety performance, cost reduction	Renegotiate contract Second QTR FY00
Hot Decommissioning	RMRS	CPPF	Safety performance, cost reduction	Renegotiate contract Second QTR FY00
Decommissioning	Competitive Bid	CPPF	Safety performance, cost reduction	Bid third QTR FY02
Demolition/ER	Competitive Bid	Firm fixed price	Safety performance, cost reduction	Bid first QTR FY04

2.7 Building History

Building 771 was used for processing plutonium and actinides between 1953 and 1989. In 1989, all plutonium operations ceased. Since the end of the operational period, a significant quantity of SNM has been removed from the building. Building 771 housed the following five major operations:

- Plutonium recovery, processed plutonium-bearing residues
- Plutonium special recovery, processed scrap metal and oxide residues
- Plutonium chemistry, plutonium chemistry and processing
- Plutonium metallurgy research, developed production processes
- Analytical laboratory, analyzed samples for plutonium, americium, uranium, neptunium and other radioactive isotopes

Building 771 is constructed of mainly reinforced concrete; with some non-production portions of the building constructed of concrete block and fabricated metal. The original building is a two-story structure built into the side of a hill with most of three sides covered by earth. The fourth side, opening to the north, provides the main entrance to the building.

Throughout the history of Building 771, there have been incidents that have contaminated the building. In 1957, a plutonium metal chip fire contaminated the entire building. In 1969, a fire contributed to building contamination levels and resulted in the floor drains being sealed. Glovebox criticality drains had also overflowed due to ventilation pressure surges, resulting in contamination of floor and room surfaces.

There are two areas in Building 771 that are of special concern. Room 141, a pump room, experienced repeated leaks of nitric acid contaminated with plutonium (Pu). As a result of these leaks, the door to the room was welded shut and all piping in and out of the room was sealed off. No one has entered room 141 for approximately 20 years. Another area of concern is the 7A fluorinator line that has historically been a high radiation area.

A number of chemicals have been used in Building 771 for processing and in analytical labs and most of these chemicals are well documents and in relatively small quantities. There is a system that used hydrofluoric acid (HF) that is operationally empty, but has not been flushed. Beryllium is known to exist in

some of the gloveboxes. Machine, hydraulic and lubricating oil and grease exist in various machines, gearboxes, and equipment. Polychlorinated biphenyl's (PCBs) are also likely to be encountered in transformers and electrical components, paint, roofing materials, and adhesives. Due to the age of the facilities, it is assumed that the building contains asbestos-containing material (ACM), both radioactively contaminated and non-contaminated. Lead is also present in the glovebox shielding and some of the building material.

Building 774 has the same operational history as Building 771. Radiological hazards will predominate with some chemical hazards. Although radiological contamination is present in the processing sections of Building 774, the levels are lower then the levels in Building 771. Building 774 used chemicals for waste processing, and these chemicals are well defined from procedures and process knowledge.

The other facilities in the 771 Closure Project have normal industrial hazards with three exceptions. The first exception is those buildings that were used for the storage of HF. The second exception is the acid storage facility. After the acids are removed, this facility will present no special hazard. The third exception is the Building 728 process pit. The pit may have been used as a process waste storage pit, with the resulting chemical and radiological hazards.

2.8 Work Breakdown

The decommissioning work is broken down into dismantlement sets and decommissioning areas. In general, dismantlement sets are completed by Steelworkers, and decommissioning areas are completed by Building Trades. Steelworkers conduct work on highly contaminated systems with removal contamination greater than 2,000 dpm. Building Trades generally work in areas with removable contamination less than 2,000 dpm, unless some ventilation is left in place by the Steelworkers to maintain differential pressure. The following sections detail how the work has been broken down and the proposed strategy for IWCP packages.

2.8.1 Dismantlement Work Set Descriptions

The following table indicates the set number and a brief description of those sets. The sets encompass dismantlement activities. Dismantlement sets include scope to remove process equipment and associated items, but leave in place elements needed for safety and convenience of the workers performing the scope under Areas. For example, fire suppression and alarm systems, ambient lighting, domestic water, sanitary drains, Health Physics vacuum, and various tools and storage cabinets are among the items left in place by dismantlement. Dismantlement consists of planning, disassembly, and removal of equipment components and satisfactory packaging for disposal of the resulting waste. Although the set descriptions indicate piping, conduit, and ventilation will be removed, there may be some instances where miscellaneous equipment remains in the area because it meets the free release criteria, there are no advantages to removing the equipment, due to logistics in the set the equipment can be more readily removed during the area decommissioning, and/or the equipment is necessary for safety or coordination reasons. If equipment is not removed for any or a combination of these reasons, the set will still be considered complete.

Set	Description
07	Set 07 dismantlement will remove and package glovebox 2 and its associated equipment inside the glovebox, and barrel storage area. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the glovebox.
12	Set 12 dismantlement will remove and package gloveboxes 8, 8e, and 9; the equipment inside the gloveboxes; and minor external items. Piping, conduit, pneumatic transfer lines, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes.

Set	Description
22	Set 22 dismantlement will remove and package gloveboxes 33, 37, 38, and 39 and tanks 5, 176, 177, 630, and 631. In addition, equipment internal to these gloveboxes and tanks, and external equipment including a barrel-dump platform, work platform, Benelex framework, and minor items will be removed. Piping, conduit, and ventilation will be removed as necessary to facilitate access to the gloveboxes and tanks.
27	Set 27 dismantlement will remove and package glovebox 30 and tanks D-203, 204, 205, 206, 208, 218, and 219. Items internal to these gloveboxes and tanks, and minor external equipment will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
36	Set 36 dismantlement will remove and package gloveboxes MT-1, MT-2, MT-3, MT-4, MT-5, MT-6, MT-7, and Tanks 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1019, 1020, 1013, 1014, 1022, 1023, 1024, 1032, 1033, 1050, 1053, 1062, 1063, 1064, 1065, 1066, 1067, 1069, and 1073. Items internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
38	Set 38 dismantlement will remove and package gloveboxes 201, 205, 206, 207, 208, 209, 213, 214, 215, 221, 223, 224, 225, 227, 228, 241, and 242; Bottle-Box 201; and tanks 430 and 431. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
43	Set 43 dismantlement will remove and package gloveboxes A-10, 20, 30, 31, 32, 51, 52, 53, and D-2; and tanks D-2, 1803, 1804, 1805, 1807, 1809, 1810, 1811, 1813, 1816, 1817, 1818, 1819, T-5, 6, 7, 8, 21, 22, 25, and 26. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
60	Set 60 dismantlement will remove and package gloveboxes 1 North and 1 South and associated equipment inside the gloveboxes. Tanks 705, 706, 713, 714, 715, 716, 764, and 765 will be removed. Piping, conduit, and ventilation will be removed as necessary to facilitate access to the gloveboxes.
61	Set 61 dismantlement will remove and package gloveboxes 3, 4, 5A, 9A, 22, 5, 11, 14 (new), 12, 13, 14 (old), 15, 16, 16A, 17, and 18. Tanks 7 (mist tank); 6, 967, 548, 549, 550, 551, 552, 609, 610, 509 (new), 510 (new), 529, 530, 547, 548, 553, 554, 949, 950, 951, 952, 953, 954, 955, 500, 501, 502, 503, 504, 505, 506, 509, 510, 544, 545; 70, 71, 72, and 73 will also be removed. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
62	Set 62 dismantlement will remove and package gloveboxes 6, 7, and 7A. The equipment inside the gloveboxes including Nash pump, Hydrofluorinator, and Scrubber will be removed. Piping, conduit, pneumatic transfer lines, and ventilation will be removed, as necessary, to facilitate access to the gloveboxes.
63	Set 63 dismantlement will remove and package glovebox SR-11 and SR-12, and equipment internal to these gloveboxes. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
64	Set 64 dismantlement will remove and package the Contamination Control Cell; and its associated equipment inside the cell. Piping, conduit, and ventilation will be removed as necessary to facilitate access to the cell.
65	Set 65 dismantlement will remove and package gloveboxes 43A, 43B, 43C, and 43D; and its associated equipment inside the glovebox. Piping, conduit, and ventilation will be removed as necessary to facilitate access to the gloveboxes.
66	Set 66 dismantlement will remove and package gloveboxes 23, 24, 25, 26, 29, 31, 50, 40, 44, and 42. Tanks 928, 979, 980, 981, 982, D360, 361, 362, 363, 364, 920, 921, 922, 923, 927, 78, 79, 451, 452, 453, 454, 456, 457, 466, 467, 468, 469, 470, 472, 971, 972, 973, 974, 975, 976, D-931, 932, 933, and 934 will also be removed. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.

Set	Description
67	Set 67 dismantlement will remove and package gloveboxes 153A, 153B, 153C, 153D, and 153E; hot cells HC1, HC2, HC3, HC4, HC5, and HC6; and tanks T-3, T-4, 86, 87, 88, and T-153E. Equipment internal to these gloveboxes, hot cells, and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
68	Set 68 dismantlement will remove and package gloveboxes A-1, A-2, A-3, A-4, and 1097 and a hood; and tanks 1081, 1082, 1083, 1084, 1085, 1086, 1087, 1088, 1090, and 1095; and two acid metering tanks. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
69	Set 69 dismantlement will remove and package gloveboxes E-10, 11, 20, 30, 31, 32, 50, 51, K-10, 20, 30, 50, F-60, 70, 70A, and B-boxes F-20 and F-30; and tanks 80, 81, 82, 83, 84, 85, a demineralized water tank, and scrubber K-30. Equipment internal to the contaminated gloveboxes and tanks will also be removed. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
70	Set 70 dismantlement will remove and package tanks 309 East and 309 West. Piping, conduit, and ventilation will be removed as far as necessary to facilitate access to the gloveboxes and tanks.
72	Set 72 dismantlement will remove and package glovebox exhaust ductwork from the west side of Building 771, first floor
71	Set 71 dismantlement will remove and package items from the hallways in the limited area, primarily piping, conduit, and any items stored in the halls during dismantlement work. To support the release of areas for work, the hallways may be dismantled in two campaigns, east and west.
74	Set 74 dismantlement will remove and package Plenum FU-1E and its internal HEPA filters and pre-filters.
75	Set 75 dismantlement will remove and package Plenum FU-1 and Plenum FU-4 and their internal HEPA filters and pre-filters.
76	Set 76 dismantlement will remove and package the Plenum FU-2A, FU-2B, and FU-2C and their internal HEPA filters, pre-filters, and furnace filters.
77	Set 77 dismantlement will remove and package the Incinerator Filter Plenum and its internal HEPA filters.
78	Set 76 dismantlement will remove and package the Main Exhaust Plenum and its internal first and second stage HEPA filters and demister.
82	Set 82 dismantlement will remove a size reduction workstation that was installed in Room 149 to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The tent, Inner Tent Chamber, tools and fixtures, and ventilation equipment will be removed and packaged for disposal. Piping, conduit, and ventilation ducting from the workstation will also be removed.
83	Set 83 dismantlement will remove a size reduction workstation that was installed in Room 181A to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The tent, Inner Tent Chamber, tools and fixtures, and ventilation equipment will be removed and packaged for disposal. Piping, conduit, and ventilation ducting from the workstation will also be removed.
84	Set 84 dismantlement will remove a size reduction workstation that was installed in Room 183 to facilitate dismantlement of some of the gloveboxes, tanks, and other large items in Building 771. The tent, Inner Tent Chamber, tools and fixtures, and ventilation equipment will be removed and packaged for disposal. Piping, conduit, and ventilation ducting from the workstation will also be removed.
91	Set 91 dismantlement will remove and package equipment in Building 774 Rooms 202 and 203 including gloveboxes 6, 7, 8, and 17; tanks T42, T1A, TIRF, T4L and T4R, T 70, T71, T73, and F-5. Sludge that remains in the tanks will also be removed and packaged. The associated items inside and outside the gloveboxes will also be removed and packaged for disposal. Piping, conduit, and ventilation ducting will be removed.
92	Set 92 dismantlement will remove and package equipment from Room 210, including the Bottle Box treatment glovebox and tanks, OASIS treatment glovebox and tanks, microwave treatment glovebox and system, plenum for the room, and other items located in the room. Sludge that remains in the tanks will also be removed and packaged. Piping, conduit, and ventilation ducting will be removed.

Set	Description
93	Set 93 dismantlement will remove and package equipment in Rooms 102 and 103, including gloveboxes 9, 10, 11, and 13; tanks SP2, 210A, T10 and T12, T9, C1, 11L and 11R, D351, a caustic storage tank, and (new) T40; and other items located in the room. Sludge that remains in the tanks will also be removed and packaged. Piping, conduit, and ventilation ducting will be removed.
94	Set 94 dismantlement will remove and package contaminated ventilation ducting.
95	Set 95 dismantlement will remove and package plenums FP-201 and FP-202 and several large tanks: T-201, T-202, T203, T-204, and (old) T-40; along with their associated equipment and other items located in the building. Sludge that remains in the tanks will also be removed and packaged. The equipment that pumps waste and ground water from building sumps to Building 374 is included in this set. Remaining piping, conduit, and ventilation ducting throughout Building 774 will be removed.

2.8.2 Decommissioning Areas

The following table indicates the area number and a brief description of those areas. The areas involve decontamination activities. Some miscellaneous equipment may remain in the areas after decontamination, component removal and size reduction because it meets the free release criteria, and there is no reason to remove it.

Area Designation	Area Description
AA	Decommissioning area AA (front offices) includes corridor B office area, corridor F office area and removal of utilities piping, remaining ventilation systems, interior partitions and drop ceilings, minor decontamination activities as discovered during PDS, and the demolition of the office building structure. Corridor B office area decommissioning includes all of corridor B and offices 116, 117, 117A, 118, 118A, 119, 119A, 119B, 119C, 119D, 124, 125, 125A, 125B, 125C, 125D, 125E, 126, 126A, and 126B. Corridor F office area decommissioning includes rooms 103, 104, 105, 105A, 105B, 107, 109, 110, 110A and 110B; corridor F; and a criticality alarm panel.
AB	Decommissioning area AB (annex) includes dismantlement of the annex area and removal of utilities piping, remaining ventilation systems, interior partitions and drop ceilings, minor decontamination activities as discovered during PDS, and the demolition of the annex building structure. The annex area includes rooms 301, 302, 303, 304, 305, 306 and 308; drum counters, scales, exhaust fans, and motors.
AC	Decommissioning area AC (locker rooms) includes dismantlement of the locker room area and removal of utilities piping, remaining ventilation systems, and minor decontamination activities as discovered during PDS. Demolition of the locker room structure will occur in conjunction with demolition of the Building 771 structure. Locker room area decommissioning includes rooms 120, 122, 123, 123B, 123C, 133 and 135; the men's and women's locker rooms; the janitor's closet and the laundry cage in the men's locker room. This equipment consists of lockers, benches and plumbing fixtures.
AD	Decommissioning area AD (MTCE shop) includes dismantlement of the 129 maintenance area and removal of utilities piping, remaining ventilation systems, interior partitions and drop ceilings, minor decontamination activities as discovered during PDS, and the demolition of the Annex building structure. 129 maintenance area decommissioning includes rooms 129, 129A, 129B, 129C, 129D, 129F, 130, 131, 132, and 132A; Dock 2; and unwanted machine tools.
AE	Decommissioning area AE (West side of LA) includes dismantlement of the 157 stock room area and removal of utilities piping, remaining ventilation systems, and removal of interior non-load bearing CMU and drywall partition. Interior surfaces will have all paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. An estimated 25% of floor slabs will be removed during decontamination activities. Demolition of the area will occur in conjunction with demolition of the Building 771 structure. The 157 stock room area decommissioning includes room 157. This area was an R&D support area until it was converted to a stock room/storage area in 1992.

Area Designation	Area Description
AF	Decommissioning area AF (East side of AL) includes room 141, the elevator area, the 151 radiation control area, and removal of utilities piping, remaining ventilation systems, and removal of interior non-load bearing CMU and drywall partition. Interior surfaces will have all paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. Floors will be removed from rooms 114 and 149. Walls, floors, and ceiling will be removed from room 141. Demolition of the area will occur in conjunction with demolition of the Building 771 structure. Room 141 decommissioning includes room 141 and presents an extremely high plutonium contamination problem. Room 141 was an SNM storage vault and then a pump room. The elevator area decommissioning includes rooms 142, 145, and 242; electrical control panel; elevator cage; and hydraulic unit. The radiation control area decommissioning consists of rooms 135A, 135B, 151, 151A, 151B, 151C, 151E, 151F, and 152. This includes the RCT areas, SAAM panel and decontamination showers.
AG	Decommissioning area AG (Stack and Tunnels) includes Building 771 stack and removal of stainless steel liner in the tunnel, Building 776 and Building 774 tunnels, and removal of utilities piping, remaining ventilation systems, and removal of stainless steel liner in Building 771 stack tunnel. Interior surfaces will have all paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. Demolition of the Building 771 stack tunnel, Building 776 tunnel, and Building 774 tunnel will occur in conjunction with demolition of the Building 771 structure. Demolition of the Building 771 stack will occur separately as scheduled.
AH	Decommissioning area AH (Second Floor) includes the east, center, and west 283 HVAC exhaust and utilities areas, and removal of utilities piping, and remaining ventilation systems. Interior surfaces will have all paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. Demolition of the area will occur in conjunction with Building 771 structure. The east 283 HVAC exhaust and utilities area decommissioning includes room 283 east, exhaust unit S-8, air handling unit AHU-2, exhaust fans #5 and #6. The center 283 HVAC exhaust and utilities area decommissioning includes rooms 283A, 283B, 283H, 283I, 283J, and 283 center; exhaust fans #2, #3, and #4. The west 283 HVAC exhaust and utilities area decommissioning includes rooms 283C, 283D, 283E, 283F, 283G, and 283 west; air handling unit AHU-3, exhaust fan #1, and the uninterruptible power supply (UPS) battery system. In addition, the area includes the removal and packaging of equipment on the Building 771 second floor except the plenums (see sets 74 through 78 for plenums scope). The second floor equipment includes the Main Supply Plenum, the Test plenum, fans from the filter plenums, bag-filters, air-washers, deep-bed filters, knock-out and condensate tanks. Also control panels, transformers, electrical switch gear, motors, pumps, various instruments, racks, and various tools such as portable lights, welders, ladders, air movers, tool boxes, dollies, cabinets, desks, lockers, and other items. Piping, conduit, and ventilation ducting will be removed.
AJ	Decommissioning area AJ (Building 771 Outbuildings) includes 771/774 outbuildings; Building 770 interior and exterior walls and utilities; decontamination and removal of all cluster outbuildings, UST's, tanks and pads, and appurtenant structure. Demolition of the outbuildings will occur as scheduled. The 771/774 outbuilding decommissioning includes buildings 714, 714A, 715, 716, 717, 728, T771A, 771B, T771B, T771C, 771C, T771D, T771E, T771F, T771G, T771H, T771J, T771K, T771L, 772, 772A, 773, and tank 38. Included in these buildings and tanks are areas that contain chemical contamination and one building that contains diesel fuel. In the trailer complex, there are two trailers that are shower facilities; one trailer is used for restrooms; and one trailer is used for storage. The rest of the trailers are used for offices. A number of the buildings contain asbestos. Tanks T-107 and T108 are situated in a wetland area, and one building is the environmental sampling station for Building 771's exhaust airflow. Tank 38 is by the old HF shed.
AK	Decommissioning area AK (B790) includes Building 790 interior equipment, walls and utilities, Building 790 PDS, release, and demolition of Building 790.

Area Designation	Area Description
AL	Decommissioning area AL (Building 771 Structure) includes Building 771 PDS, release, and demolition of Building 771, and connecting tunnels (771/774 pipe chase and 771 to stack).
AM	Decommissioning area AM (Building 774 Area and Structure) includes removal of utilities piping, remaining ventilation systems, and removal of interior non-load bearing CMU and drywall partition in Building 774. This includes glovebox 5 with its associated microwave chiller and tank T2F in Room 202; glovebox 355 in Room 103; reagent tanks and pumps in room 241; oil storage tanks 102 and 103; the caustic storage tank outside Building 774 hatch entry; and miscellaneous items in rooms 250 and 212. The plenum in Room 203, and other items located in Rooms 301, 302, 303, 303A, 304, 305, 306, 320, 321, the 322 storage shed, 200, 204, 205, 206, 207, 208, 209, and 220 will also be removed. Interior surfaces will have all paint removed to facilitate PDS. In-process characterization will identify areas of surficial contamination, and surface decontamination (scabbling) will remove contamination. Demolition of Building 774 will occur at the close of structural decontamination activities and completion of PDS.
AN	Decommissioning area AN (IDECs) includes indirect/direct evaporative cooling area and removal of all equipment and appurtenant structure associated with the indirect/direct evaporative cooling systems. Removal of the metal structure will occur as scheduled following equipment removal. The indirect/direct evaporative cooling area decommissioning includes the 8 new intake air systems, piping, valves, electrical distribution and control panels, and the metal building.

3. WORK ACTIVITIES

After the scope has been defined, hazards identified and analyzed, and controls established, the work may commence. In addition to the documentation and controls documented in previous sections, there are additional procedures in place to control work activities once work commences. These procedures include the plan-of-the-day, pre-evolution requirements, and training requirements. In addition to the assumptions detailed in the individual sections, Appendix G contains the Site-wide assumptions from the D&D Summit, and an explanation of how those assumptions were incorporated into the 771 Closure Project baseline.

3.1 Administrative Strategy

There are several administrative activities that have to be conducted before and during decommissioning in order to facilitate the decommissioning schedule and regulatory requirements. These activities include PA closure, authorization basis modification and maintenance, regulatory strategy, relocation of personnel, and resource and shift management.

3.1.1 Protected Area (PA) Closure Strategy

The PA reconfiguration project involves significantly reducing the size of the current PA. For the 771 Closure Project, the removal of the PA would significantly ease access to the complex from the parking areas. Some escort requirements will continue to be required in the back area of Building 771 until the plenum removal is complete. The security isolation zone in its current form will not be necessary and access for waste shipping trucks would be greatly improved. However, the fence around the 771 Closure Project will remain in place for project control reasons.

On October 1, 1999, 771 Closure Project management demonstrated that remediation of SNM hold-up from various locations in the building had progressed to a stage which, per DOE order, precluded the need for a MAA. The area known as the MAA became a Limited Access Area (LAA) for security purposes.

The Vulnerability Assessment (VA) to assess the overall risk of a reduced PA will confirm that a credible roll-up scenario to a category II quantity of SNM does not exist. Therefore, no additional SNM hold-up remediation from B-771 will be pursued.

All SNM hold-up encountered during decommissioning activities will be containerized and shipped from the Site as waste, and therefore the decommissioning of higher hold-up areas in Building 771 need not precede either the scheduled operation of Site packaging activities or PA reconfiguration.

Some internal security enhancements to facilitate a reduced PA will be necessary. An enhanced LAA entry system has been planned although alternatives to it are being evaluated, a safe containing classified documents will be relocated, and modifications to security alarms are being considered.

3.1.2 AB Strategy

Building 771 and 774 are currently operating under the 771 Basis for Operations (BFO). In the current revision, the AB addresses the defined scope of closure work qualitatively judged to pose the bounding hazards associated with closure. This establishes a safety envelope with a suite of controls adequate to address known hazards of anticipated closure activities. The BFO is updated on an annual basis. Although sufficient to perform a large number of decommissioning activities, the current BFO does not provide authorization to complete all required project activities for closure.

A new AB, in the form of a Basis for Interim Operation (BIO), is being developed to address the decommissioning activities to be performed in the 771/774 Complex. Buildings 771 and 774 are both currently classified as Hazard Category 2 nonreactor nuclear facilities. The BIO is expected to be drafted the last quarter of FY00 and completed the first quarter of FY01. The BIO will be prepared and used as the AB document to include the following functions:

- Authorize structural decontamination and demolition of Building 771 or Building 774
- Authorize decontamination and demolition of structures outside the facilities (e.g., Building 728, the pipe chase between Buildings 771 and 774, Building 774 Underground Storage Tanks (USTs), etc.)
- Address scenarios involving ducts and plenum
- Address temporary conditions and systems (e.g., temporary power or ventilation)
- Credit functions rather than specific pieces of equipment to allow for changes in equipment as the facility is dismantled.
- Address waste packaging/storage scenarios outside of the facility, but within the 771 Closure Project.

The AB controls will contain the tailored set of safety management system elements necessary to protect personnel and the environment. Each major infrastructure program (configuration control, quality assurance, conduct of operations, radiological control, etc) will be addressed. An authorization agreement will define the set of applicable orders and requirements using a graded approach. The AB will enable this graded approach though the following three methods:

- Technical safety requirements (TSR) in the BIO will be written, if possible, to relax/remove controls as hazards are removed from the facility. For example, when Benelex is removed from the facility, the TSR controls will not longer be required.
- In many cases, the safety basis will point to programs on Site which utilize a graded approach similar to the LCOs, where when the hazard is eliminated, the control is eliminated. For example, as radiological contamination areas are decontaminated, the surveys and controls required by the Radiation Control Program will be eliminated as well.
- Finally, in some cases, as a hazard is eliminated, a written justification will be necessary to document why controls are no longer appropriate and with DOE approval, the controls will be eliminated.

At some point in facility closure, it is expected that the BIO will contain only the program controls necessary to protect the worker against normal industrial hazards in a radiological facility. It is unlikely the status of the facility will be modified until late in the closure process because it takes an extremely low amount of Pu to recategorize a Category 2 to a Category 3. However, since the controls will continue to be eliminated, the change in Category will have minimal cost savings.

- The following are the assumptions associated with the AB strategy: DOE will agree to minimum set of controls and the controls will be removed as the facility risk is removed.
- Defense-in-depth systems are minimized.
- AB changes are approved in a timely manner
- Approval is not withheld unreasonably
- DOE will agree to the BIO strategy and methodology including functional based TSRs, use of temporary systems, and removal of controls corresponding to removal of risk.

3.1.3 Deactivation Endpoints

The 771 Closure Project utilizes an integrated approach to closure where deactivation, decontamination and decommissioning activities are conducted simultaneously instead of sequentially. This approach is expected to be more cost-effective and less time consuming overall than the serial approach of complete deactivation of a facility followed by decommissioning. The parallel approach also significantly reduces exposure of the workers to hazards. For example, in the typical series model, workers would perform radiological surveys and other necessary characterization activities, enter each glovebox, and prepare the glovebox for deactivation. Then, much later, the workers would return to that same box, redo the necessary radiological surveys, and begin the decommissioning process. By performing closure activities in parallel, the work team can perform characterization and other preparation activities one time, reducing worker exposure, cost, and schedule.

Using this approach, deactivation endpoints are no longer applicable. As originally envisioned, deactivation endpoints were to define a stopping (end) point for deactivation. Once all of the endpoints were achieved, the facility could be placed in a deactivation mode pending further decision to proceed with decommissioning. In a situation where deactivation and decommissioning are occurring simultaneously and where the decision to proceed with decommissioning has already been made, the need for discrete deactivation stopping (end) points is unnecessary.

This integrated approach is still compliant with DOE Order 430.1A because the planning process established in this PMP will ensure that deactivation, surveillances, and decommissioning activities are appropriately planned, and the IWCP will ensure that these activities are appropriately conducted, and documented. The DNFSB 94-1 milestones satisfy the requirement for negotiation, and a final report will be prepared once the 771 Closure Project is complete.

Although the 771 Closure Project no longer uses deactivation endpoints, the project WBS does contain deactivation activities. The scope of deactivation under the project's WBS is similar to the original scope of deactivation in that the primary objective is the removal and stabilization of hazardous materials. For the 771 Closure Project milestones have been applied to the removal and stabilization of liquid holdup from 38 liquid systems in Building 771. These milestones were established in response to DNFSB recommendation 94-1. The DNFSB 94-1 milestones are roughly analogous to deactivation endpoints in that they pertain to the removal and stabilization of hazardous materials in Building 771. Under the projectization of Rocky Flats closure, the common term "milestone" is used rather than "endpoint". The following are the current DNFSB 94-1 milestones

- Drain 8 additional actinide systems in Building 771 - Completed March, 2000
- Complete removal all 38 liquid systems in Building 771 - December, 2001
- Complete processing of liquids removed the 38 systems in Building 771 - March, 2002

This change in approach has been a significant shift in the Rocky Flats methodology. The cost estimate to clean up and close down Rocky Flats has decreased dramatically since 1995. Original cost estimates called for the completion of the project in 2065 at a cost in excess of $90 billion (adjusted for inflation). Today, the site is working toward completion in 2006 at a cost of less than $7 billion. The well integrated, parallel approach to closure eliminates the division between deactivation and decommissioning to the benefit of Site closure. The following is the assumption associated with the deactivation endpoint strategy:

- DOE will agree with the endpoint decision

3.1.4 IWCP Strategy

All Site work in controlled per the Site IWCP or an approved substitute. Various documents are used, such as procedures, standard work packages, and individual work packages. The following are the assumptions with respect to the IWCP package strategy:

- All work control will be performed in accord with the latest version of the Site IWCP or an approved simplified substitute.
- The specific division of scope into packages is influenced by many factors from building conditions to personnel availability.
- The work crew, in accord with the Integrated Safety Management System (ISMS), will determine the final number and content of packages.

IWCP packages provide a means for implementing ISMS principles and each package is developed based on specific work-scope and hazards. To provide a meaningful and manageable package, each package typically contains scope that presents similar hazards. Since each package is the tool of the crew performing the work, the number and scope of work packages cannot be specified in advance of ISMS implementation. However, a baseline plan can be established. The dismantlement in Building 771 is well underway and a standard group of packages for each work set has been developed. As part of dismantlement rebaselining, additional packages were added to the consolidated sets based on the professional judgement of decommissioning planners and engineers to ensure a meaningful hazard analyses can be conducted. Final decisions on IWCP packages will continue to be made by the work crew that executes the dismantlement.

The following table documents the packages that are currently planned for the sets. The packages have been segregated into hot, cold and balance packages. A hot package is for work that involves process lines and associated equipment that are contaminated. A cold package is for work that involves process lines and associated equipment that are believed to be uncontaminated. Balance packages are for the remaining activities within the set.

Set number and title	**IWCP Packages**		
	Cold	**Hot**	**Balance**
07 – room 114, glovebox 2	0	1	0
12 – room 114, gloveboxes 8, 8E, and 9	0	1	0
22 – room 149, gloveboxes 33, 37, 38 and 39	0	1	0
27 – room 149, glovebox 30 (old)	0	1	0
36 – room 146/146C, gloveboxes MT-1 through MT-8	1	2	1
38 – room 182, process area	1	1	1
43 – rooms 180A, 180C and 180D	1	1	1
60 – room 114, line 1	1	2	0
61 – rooms 141 and 141A, gloveboxes 3-5, 5A, 9A, 11-18, and 24	0	11	1
62 – room 114, lines 6 and 7 (hydroflorination)	0	1	0
63 – room 146A, gloveboxes SR-11 and SR-12	0	1	1
64 – room 149, process room and c-cell	0	1	0
65 – room 149, lines 43A, 43B, 43C, and 43D	0	1	0
66 – room 149, gloveboxes 23-26, 29, 31, 40, 42, 44, 50, tank farm, and utility support areas	0	8	1
67 – 153 process area	0	1	1
68 – room 174 process area	0	1	1
69 – rooms 180B, 180E, 180F, and 180K	0	2	1
70 – 309 Tank area	0	1	1

Set number and title	IWCP Packages		
	Cold	Hot	Balance
71 – Building 771 corridors	0	2	0
74 – filter plenum FU-1E	0	1	0
75 – filter plenum FU-1	0	2	0
76 – filter plenum FU-2	0	3	0
77 – incinerator filter plenum	0	1	0
78 – main filter plenum	0	1	0
82 – room 149 size reduction (ITC 2-1)	0	1	1
83 – room 181A size reduction (ITC 1-2)	0	1	1
84 – room 183 size reduction (ITC 1-1)	0	1	1
90 – room 212 and 250-51, Gloveboxes 5, 355, T205-208	3	1	0
91 – rooms 201-203	0	2	1
92 – room 210	0	3	1
93 – rooms 101-105	0	3	1
94 – rooms 200, 204-09, 220, 301-06, 320-22, airlock	0	1	1
95 – rooms 241, 341, and 441	0	2	1
TOTAL	7	63	18

The following table documents the packages currently planned for the Decommissioning Areas. The packages are segregated into hot, cold, and balance packages. A hot package is for decontamination work that involves contaminated areas; e.g., the hydrolasing of surfaces, and scarification (scabbling) of surfaces. A cold package includes removal of materials within free released sections of the structures, and demolition of the structure. Balance packages include the removal of special systems associated with decommissioning areas; e.g., ventilation systems.

Decommissioning Area and Description		IWCP Packages		
		Cold	Hot	Balance
AA	Building 771 front offices and room 101	1	0	0
AB	Annex facility	2	0	0
AC	Building 771 locker room facility	1	0	0
AD	Building 771 maintenance shop	1	0	0
AE	Building 771 west side of limited area	0	2	2
AF	Building 771 east side of limited area	0	2	1
AF	Building 771 infinity room 141	0	1	0
AG	Building 771 stack and tunnel (flue)	0	2	0
AH	Building 771 second floor	0	1	0
AJ	Building 771 outbuildings, trailers, UST's, and tanks	6	7	1
AK	Building 790 calibration lab	1	0	0
AL	Building 771 exterior structure	0	2	0
AM	Building 774 interior/exterior	1	1	1
AN	Building 771 indirect/direct evaporative cooling area	1	0	0
TOTAL		14	18	5

Standard work packages (SWPs) document removal and decontamination activities, which are recurrent, and may be utilized in conjunction with prepared decommissioning area IWCP work packages.

Standard Work Packages (SWPs)			
Zone II Ventilation Removal	0	1	0
Safety Systems Removal (Fire, LSDW, etc.)	0	1	0
Interior Wall Removal	0	1	0

Standard Work Packages (SWPs)			
Hydrolasing	0	1	0
Scabbling	0	1	0
Inaccessible areas	0	1	0
Final survey	0	1	0
TOTAL	0	7	0

The following table documents the risk and uncertainties and risk associated IWCP strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Scope and number of work control packages will change as planning proceeds.	Minimal; work to date indicates does not impact project	High	None needed
Changes to requirements and forms in IWCP will be made without considering input from the planners.	Moderate; reduces efficiency and creates re-work which can impact execution if planning schedule operating on late-starts	Low	Staff performing Site-wide changes should be encouraged to solicit and incorporate project comments from working level

*High, Medium, or Low

3.1.5 Regulatory Strategy

The 771/774 DOP is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulatory decision document under which decommissioning will be completed. Building 771/774 will be closed using the DOP, and it is assumed that the other structures in this project will be closed using RSOPs.

The DOP will be modified in the first quarter of FY01. This modification will include the addition of the demolition, the environmental restoration interface, RCRA units closure strategy, and establish the remediation waste requirements. The remediation waste requirements will be covered in an Operations Order that will be referenced in the DOP.

The DOP will address all environmental requirements through applicable or relevant and appropriate requirements (ARARs). No other environmental permits will be required. This modification will also align the DOP with the modified BIO.

The Pre-Demolition Survey (PDS) will be conducted using the new Site-wide Pre-Demolition Survey Plan (PDSP). The following are the assumptions associated with the regulatory strategy:

- The RSOPs will be available when needed for the other cluster facilities.
- All but a few RCRA units will be closed using the modified DOP.
- The PDSP will be approved and available.
- The release criteria for the 771 Closure Project will be similar to the 779 Project.
- Soil characterization and release criteria will not delay closure.
- The Operations Order for the remediation waste requirements will not increase regulator burden on managing waste on the project.

3.1.6 Relocation of Personnel Strategy

The relocation of personnel will be conducted in phases. Phase 1 will involve setting up a temporary offices, bathrooms, shower facilities, and storage areas. The parking area east of Building 790 has been designated as the location for this temporary office space, and it is envisioned that this area will house the 771 Closure Project staff through the decommissioning process.

Once this area has been established, personnel will be relocated from the building into the trailers. The maintenance and Configuration Control Authority (CCA) personnel will be the last to be relocated. A decision will have to be made prior to relocating personnel on the essential Project staff. Only essential project staff will be relocated to the temporary offices. Non-essential Project staff will be relocated to the T130 office trailers. The distinction between essential and non-essential Project staff is that essential office staff needs to have constant and immediate access to the Project. Nonessential Project staff can still conducted their job assignments without immediate access to the Project. The following are the assumptions associated with the relocation of personnel strategy:

- Telecommunications will be routed through the telecommunication shed not Building 771.
- The 790 parking area will not be needed throughout the 771 Closure Project.
- One person can be relocated in one day.
- 80-100 people can be relocated in a week.
- The preliminary office trailers will be delivered and installed by July 2000.

No risks or uncertainties have been identified for the relocation of personnel strategy. A timeframe for the relocation of personnel and a layout of the trailer area will be added to a subsequent revision of the PMP.

3.1.7 Shift/Resource Strategy

This section provides details on the strategy for providing resources for the 771 Closure Project during decommissioning. The resources are allocated as salaried, steelworkers, or building trades. The number of K-H salaried personnel will not change drastically from what it is today. The remaining salaried positions will be filled through RMRS and third tier subcontractors. It is anticipated that salaried overtime will be greatly reduced or eliminated altogether.

The project will utilize approximately 210 - 220 steelworkers through the end of calendar year 2002. Resources will be reallocated in cooperation with the South Side and other projects relative to need and availability of trades. Steelworkers will be working 12-hour shifts with rotating alternate work schedule (AWS) of four 12-hour shifts one week and five 12-hour shifts the following week.

Optional courses of action are managing leased trades with third tier foremen; larger scope subcontracting work to include subcontracting the trades; and utilization of K-H Construction with a shift schedule the same as Steelworkers. The following are the assumptions associated with the resources strategy:

- There will be no significant changes in the steelworker contract.
- The building trades will not be restricted in the work activities that they can perform. For example, electricians will not only remove electrical items, and electrical items can be removed by trades other than electrical.
- Primary decommissioning activities will be accomplished by laborers.

3.2 Technical Strategy

The technical approach for the Building 771 cluster is based on meeting the following goals: early risk reduction, early PA closure, and closure of the site by the end of FY2006. The approach in Building 771 is to conduct deactivation and decommissioning in parallel. This approach is more cost-effective as it allows more work to be accomplished with fewer resources. It also significantly reduces exposure of the workers to hazards. This also enables the project team to better utilize the resources and reduces the overall schedule for the project. Below is a brief description of the generic sequence of activities that will be conducted. The actual activities and their sequence will be described in detailed in IWCP packages.

- Additional characterization to supplement the hazard analysis.
- Develop IWCP package(s).
- Determine if ACM will be disturbed as part of the scope of the set. If so, the set will be abated by a qualified contractor prior to start of work that could disturb the ACM.
- Remove any remaining material from the room.
- De-energize, lock out, tag out, and disconnect electrical power to components/systems to be removed. Electrical system conduit that cannot be de-energized or is required for continued closure activities will be clearly identified. Temporary power may be utilized and will be clearly identified and controlled.
- Temporary ventilation may be used as necessary.
- Remove equipment (gloveboxes, B-boxes, hoods, tanks, etc.) within the work set. Gloveboxes, B-Boxes and Hoods will be decommissioned using the following approach:
    - Equipment and components will be removed from the internal portions of the contamination containment device (i.e., glovebox) as needed to facilitate waste packaging.
    - Internal surfaces will be wiped down using tack rags, non-ionic clean solution. Loose materials will be swept up as required. More aggressive techniques may be used such as abrasive grit, blast, or other methods.
    - Based on radiological survey measurements, a strippable coating may be applied to fix surface contamination during size reduction operations. When appropriate, the strippable coating may be applied and removed several times to reduce surface contamination levels. Other decontamination methods may be used.
    - Lead shielding on the external surfaces of the gloveboxes may be removed to minimize the generation of mixed waste. If mixed item description codes (IDCs) (lead, stainless steel, etc.) are approved, this may not be required.
    - Prior to the size reduction of a glovebox, B-Box or hood, the component will be enclosed in a contamination control containment. Depending on the layout of the room, the size of the component to be size reduced, and radiological contamination levels, a containment may be erected around the equipment in place or the equipment may be moved to a central size reduction facility located within Building 771, but in another room/area. In any case the contamination control containment will be equipped with high efficiency particulate air (HEPA) ventilation to control the spread of contamination and minimize worker exposure during size reduction and waste packaging operations.
- Workers may size reduce the component using a variety of methods including nibblers, saws, thermal cutting and other metal cutting techniques. Size reduction may be performed to minimize waste volume and allow packaging in approved containers. All waste material will be characterized and packaged in accordance with Site Waste Management procedures.
- After all equipment and systems have been removed from the room/area the exposed room surface will be decontaminated and abated for lead, ACM, and/or PCBs in painted surfaces, as necessary. The surfaces will be sampled/surveyed to determine the need for further

decontamination and to verify the effectiveness of the decontamination process. Room surfaces will typically be decontaminated by wipe down and/or surface scarification methods such as scabbling or other similar technique.

- As the equipment and systems are cleared from each section of the building, workers will complete the removal of all remaining utilities to the area. This will include the ventilation systems and all electrical power within the area. The section will be sealed off until demolition of the building commences.
- When these activities are completed and the building has been released, the building will be demolished. Under building contamination will be remediated during demolition after the slab has been removed and the building is still intact. The resulting waste will be segregated into three waste streams: free released structural debris, free released non-structural debris and non-free released materials. The free-released structural material (mainly concrete) will be stockpiled in accordance with the Concrete Recycling RSOP and eventually recycled. The free released non-structural debris will be packaged and shipped to the Erie landfill. The non-free released material will be dispositioned in accordance with the applicable waste acceptance criteria (WAC).

3.2.1 771 Building Operations

The building operations portion of the 771 Closure Project contains those activities necessary to maintain a safe and compliant facility. There are five activities in the facility maintenance cost account: compliance surveillance, maintenance, operations technical support, operations management and AB. These activities are required in order to maintain the facility regardless of whether or not there are mission activities such as deactivation or decommissioning. By keeping the resources needed to maintain a safe and compliant facility in a separate building operations account, there will be sufficient resources to perform these vital activities in the event that all resources were removed from the other 771 Closure Project cost accounts.

It is expected that over time as deactivation and decommissioning proceed the resources that need to be allocated to the building operations account will decrease. For example, the number of glovebox surveillances will decrease as decommissioning removes the gloveboxes. To account for this expected trend, factors were applied by fiscal year to certain tasks below the activity level in order to reduce the number of resources allocated. The factors are determined based on the overall strategy for decommissioning, and an estimation of the number of tanks and gloveboxes that will have been removed prior to the start of the fiscal year. The table below lists the factors, by task under each activity, that were applied to account for the expected decrease. Not all building operations tasks are expected to decrease. Certain tasks are required regardless of the amount of process equipment that has been removed. A good example of this is the Shift Management task that contains resources for the CCA office. The CCA office is expected to be staffed as long as an AB is required for the facility.

After removal of the Zone II ventilation the need for an AB is assumed to terminate and the activities necessary to maintain a safe and compliant facility are terminated. Any remaining requirements for the building operations activities are expected to be minimal and are captured in other project elements.

In the table below the FY 00 factors (EAC/BCWS) are adjustments made to the original landlord estimate to account for historical cost trends. The FY 01, FY 02 and FY 03 factors are additional adjustments applied to the revised FY 00 factor to account for the progression of decommissioning activities. The FY 01 factor is multiplied by the FY00 factor to obtain the factor applied in FY 01.

Landlord Activity Description	FY 00 FY99 ACWP/ Original estimate (Factor)	FY 01 Factor	FY 02 Factor	FY 03 Factor
Eyewashes and Safety Showers	0.57	1.00	1.00	1.00
Pressure Differential-Magnehelic/Photohelic	0.60	0.70	0.50	0.00
Zone I/II Exhaust System-HEPA Filter Efficiency	0.62	1.00	1.00	0.50
Emergency Power Systems	1.35	1.00	1.00	1.00
Criticality Accident Alarm System	2.32	1.00	1.00	0.50
Fire Detection/fire Suppression	0.14	1.00	1.00	1.00
Criticality Safety Operations	0.81	1.00	1.00	0.50
LCO Coordinator	0.97	1.00	1.00	1.00
RCRA Inspections	1.00	1.00	1.00	0.50
Non-LCO Fire Systems	1.56	1.00	1.00	1.00
Fire Inspections	1.00	1.00	1.00	1.00
Safety Housekeeping	2.30	1.00	1.00	1.00
Glove Overheat	0.26	0.70	0.50	0.00
SNM Measurements	0.33	0.70	0.50	0.00
Hydrogen Mitigation	1.02	1.00	1.00	0.43
Routine Radiological Surveys	1.04	1.00	1.00	1.00
Effluent Monitoring	0.18	1.00	1.00	1.00
SAAM/CAM	0.32	1.00	1.00	1.00
Hood/B Box Face Velocity	0.54	0.70	0.50	0.0
Air-head Surveys	0.99	1.00	1.00	1.00
Annual Smoked Test	0.12	1.00	1.00	1.00
Quality Assurance	0.98	1.00	1.00	1.00
Safeguard and Security	3.74	1.00	1.00	0.50
OSR Compensatory Measures	1.2	1.00	1.00	1.00
External Support to 771 Maintenance	0.61	0.70	0.50	0.0
Management Support and Procurement	0.86	0.70	0.50	0.0
Contract for Planning Engineering & Industrial Hygiene	0.56	0.70	0.50	0.0
Major IWCP Work Packages	0.76	0.70	0.50	0.0
BFO Compliance Projects	-	N/A	N/A	N/A
PMO's	0.16	0.70	0.50	0.0
Calibrations	-	N/A	N/A	N/A
Routine Packages	2.59	0.70	0.50	0.0
Nuclear Safety Support-USQD/SES, OSR	0.65	1.00	1.00	1.00
Criticality Engineering	2.18	1.00	1.00	0.50
Criticality Safety Officer	2.00	1.00	1.00	0.50
Step Off Pad	1.97	1.00	1.00	1.00
Contamination Control	0.49	1.00	1.00	1.00
Radiation Work Permit	0.91	1.00	1.00	1.00
Health Physics Instrumentation	0.14	1.00	1.00	1.00
Radiological Management	1.04	1.00	1.00	1.00
Radiological Engineering	0.39	1.00	1.00	1.00
Lead Engineer	0.89	1.00	1.00	1.00
Electrical Engineering	1.09	1.00	1.00	1.00
Mechanical Engineering	0.91	1.00	1.00	1.00
Procedures	0.84	1.00	1.00	1.00

Landlord Activity Description	FY 00 FY99 ACWP/ Original estimate (Factor)	FY 01 Factor	FY 02 Factor	FY 03 Factor
Industrial Hygiene	2.69	1.00	1.00	1.00
Technical Management/Emergency Preparedness	0.84	1.00	1.00	1.00
Plan of the Day/Week	0.96	1.00	1.00	1.00
Work Control	0.80	1.00	1.00	1.00
Analytical Samples and Analysis	-	N/A	N/A	N/A
Chemical Control Officer	-	N/A	N/A	N/A
Occurrence Reporting	0.65	1.00	1.00	1.00
Commitment Tracking	0.66	1.00	1.00	1.00
Document Control	0.37	1.00	1.00	1.00
Custodial	0.97	1.00	1.00	1.00
Utility Management	0.84	1.00	1.00	1.00
Decontamination	1.18	0.70	0.50	0.0
Housekeeping	0.84	0.70	0.50	0.0
Stationary Operating Engineers	1.15	1.00	1.00	1.00
Laundry	1.00	0.70	0.50	0.0
Facility Manager	-	N/A	N/A	N/A
Operations Manager	2.03	1.00	1.00	1.00
Shift Manager	0.98	1.00	1.00	1.00
Lockout/Tagout	5.03	1.00	1.00	1.00
KH Project Management	-	N/A	N/A	N/A
Shift and Operations Order	0.95	1.00	1.00	1.00
Environmental Program Manager	-	N/A	N/A	N/A
Environmental Technical Support	0.54	1.00	1.00	1.00
General Waste Management	2.04	1.00	1.00	1.00
Management Assessment	0.34	1.00	1.00	1.00
Training	1.00	1.00	1.00	1.00
Property Management	1.30	1.00	1.00	1.00
Project Management	0.62	1.00	1.00	1.00
Integration and Financial Support	0.68	1.00	1.00	1.00

The following are the assumptions used for the development of the building operations strategy:

- Historical costs are an accurate prediction of future cost. If there is a significant change in operations requirements, historical costs are invalidated.
- At the start of FY 01, it is assumed that 70% of the gloveboxes and tanks remain, at the start of FY 02 50% remain, and at the start of FY 03 none remain.
- At the start of FY 04 landlord functions for the 771Closure Project will cease because only the facility structure will be left.

3.2.1.1 Building 771 RCRA Closure Strategy

All RCRA related equipment, primarily gloveboxes and tanks, will be closed in accordance with the requirements identified in approved CDDs. The completion of work will be documented in a summary report submitted to CDPHE. Closure of floor container storage areas and floor secondary containment areas will be deferred until the entire process area, or a significant section, is empty and can be decontaminated. Approval for this closure effort will be obtained through a modification to the DOP.

The majority of the CDDs for equipment are already complete and approved. An umbrella CDD that addresses the last 5 piping systems and a CDD for a permitted treatment glovebox will be completed and approved prior to conducting closure activities associated with those units. One additional CDD will be developed to address the incinerator. Although the CDDs have been prepared or are in preparation, there are additional actions to be taken, including:

- Submittal of additional information not yet available, but which must be submitted before removal work can proceed on that piece of equipment.
- Tracking units to ensure that the closure process is completed.

Building 771 contained 35 RCRA piping systems and 147 mixed residue tanks (each of these tanks is a RCRA unit). The piping system closures are conducted in two phases: first, drain and remove all pipe thereby isolating each tank (Phase 1) and second, remove each tank with an associated decommissioning set (Phase 2). Phase 1 is completed on 20 systems and in progress on 5. Of the 147 tanks, 7 have been removed and are closed. The removal of 15 additional tanks should be completed by June 30. Only 32 tanks are not currently covered by an approved CDD.

Building 771 had 25 permitted gloveboxes. The following summarizes the status of the Building 771 gloveboxes: 16 have been removed and closed; 8 require additional information from the IWCP; and 1 requires a CDD. Of the 6 interim status gloveboxes, 2 have been removed and closed and 3 require the submittal of additional information from the IWCP. The incinerator glovebox is not included in any of these listings. Most of the remaining gloveboxes are larger and have higher levels of radiological contamination.

For the floor areas, more than one method of closure may be included in the DOP modification. It is anticipated however, that most of the floor areas will require scabbling of the top surface of the concrete to remove chemical or radiological decontamination. This should be sufficient for RCRA closure purposes. The following are the assumptions associated with the 771 RCRA closure strategy:

- All of the RCRA floor units have been identified.
- The DOP modification will be timely and incorporate the removal of the floor areas and include any other RCRA Unit closure requirements.
- The DOP modification and CDDs will be developed by the 771 Closure Project and approved by the DOE and the Lead Regulatory Agency (LRA).

3.2.2 Building 774 Operations

Although Building 774 is scheduled for demolition with Building 771, there are still operations underway in Building 774. Building 774 performed waste treatment for Building 771 and several other facilities. In order to meet the demolition schedule, Building 774 operations must be concluded and Site dependency on Building 774 relieved. One of these operations is the cementation of low-level oil. Two tanks and the Organic and Sludge Immobilization System (OASIS) glovebox were previously used to treat this oil, but the operation will not be re-started, see Section 3.2.2.3. The treatment-process interfaces are summarized below. The usual interfaces, such as utilities, are not listed.

Building 910. The Building 910 tanker loading station receives liquids from tankers within the PA, transfers that liquid to Building 774, and Building 774 pumps the liquid to Building 374. This process was established so the tankers did not need to go out of the PA; therefore, the process is only needed until the PA is reduced. After the PA is reduced, tankers that use Building 910 will have other loading

stations available. PA reduction is expected to be complete before the Building 774 transfer line is scheduled for disconnection; no compensatory action is planned. The transfer line is not scheduled to be re-routed in the current baseline; however, the 771 Closure Project may re-route the system depending on building and Site needs.

Temporary Modular Storage Tanks (MSTs). The MSTs collect Solar Ponds Interceptor Trench water for transfer through Building 774 to Building 374. A new treatment process has been successfully installed. The current inventory of water in the tanks is to be pumped through Building 774, and the MSTs are scheduled for demolition. This water transfer is expected to be complete before the Building 774 transfer line is scheduled for disconnection; no compensatory action is planned. The transfer line is not scheduled to be re-routed in the current baseline; however, the 771 Closure Project may re-route the system depending on building and Site needs.

Toxic Substances Control Act (TSCA) Waste Oil Management. The TSCA waste oil storage tanks in Building 774 previously received contaminated oils from various buildings. The tanks provided a batching and tanker-loading station. Currently, the only shipment method available is through drum shipments because the transfer lines have been disconnected. Treatment and disposal is performed at Oak Ridge. During the re-baseline, a plan was developed to transfer all applicable backlogged oils to the Building 774 tanks and ship the oils to Oak Ridge before the tanks are scheduled for deactivation in July 2000. Currently, it is planned that other Projects on-site will ship drums of waste oil to Building 774, and the oils will be placed in the tanks for a second shipment to Oak Ridge. No compensatory action is planned.

Bottle Box. The Bottle Box treats an aqueous, mixed waste stream using cementation. In addition to liquids generated inside the 771 Closure Project, liquids from Building 559 analytical labs are also treated. The date for terminating Bottle Box operations for internally generated liquids is being calculated during the re-baselining. However, the 771 Closure Project plans to stop receiving Building 559 liquids immediately. A procedure is being developed to stabilize aqueous mixed waste in Building 559.

The termination of Building 774 operations must be planned to allow decommissioning and demolition to proceed. Several issues remain unresolved and are presented as assumptions. To allow project flexibility, operations will be terminated at the earliest possible time. Operational termination points must be confirmed to finalize the Building 774 schedule. The Building 774 strategy is based on the following assumptions; these assumptions need to be validated in order to proceed with planning efforts.

- The low-level, PCB contaminated oil stored in Building 774 will be shipped to Oak Ridge for treatment in the current quarter (3rd Q FY00). The oily sludge from those tanks will be accepted by Building 374 in drums. The volume of sludge has not been accurately measured, but operational estimates are up to 2,000 gallons of sludge, see Section 3.2.2.1.
- Building 774 oil tanks will be operated for one more shipping campaign in late FY 2000. Oils that can be shipped to Oak Ridge for treatment will be transferred in drums to Building 774 and placed in the tanks for loading into tankers. Upon completion of this campaign, no further oil shipments will be accepted in Building 774, see Section 3.2.2.3.
- Building 774 will not re-start the OASIS oil solidification process, see Section 3.2.2.3.
- Building 774 will accept a dozen drums of laboratory waste liquids from Building 559 for treatment in the Bottle Box. No other aqueous liquids will be accepted from anywhere outside of the

Building 771 cluster. Building 559 will arrange treatment of the rest of their liquid without reliance on Bottle Box.

- The Bottle Box will operate only until Building 771/774 tap and drain liquids have been dispositioned. The Bottle Box will then undergo RCRA closure and decommissioning. Closure documentation will be contained within the DOP modification.
- The transfer line that pumps Solar Ponds-related water to Building 374 will be closed as Building 774 work allows.
- Approximately 1,700 gallons of oily sludge and 37,000 gallons of water-based sludges are estimated to be in the Building 774 tanks. The oily sludge is currently an orphan waste. About a third of the water-based sludges are expected to be TRU level; the remainder may be low-level mixed, which is an orphan waste. This assumption is based on limited process knowledge, and its accuracy is unknown.
- The termination and stripout of the transfer line to Building 374 will be scheduled to support Building 771/774 closure. The closure project may need the capability to empty deluge tanks or pump decontamination liquids, for example, prior to strip out of the line.
- Internally generated liquids will need to be pumped to Building 374 after the Building 774 pumping equipment is disabled. These liquids will include groundwater from floor sumps and could also include decontamination liquids. The Project will install a substitute pumping capability to accomplish this transfer.
- Interfaces between Building 774 and the rest of the plant, as described above, assume Site schedule sequences that should be confirmed after the re-baseline is completed.

3.2.2.1 Sludge and Tank Removal Strategy

During the production era at Rocky Flats, Building 774 provided waste treatment for Building 771 and other facilities. Many of the processes were aqueous based, but there was also some oil treatment. The tanks in Building 774 are generally larger than in Building 771 and do not contain Raschig Rings. During normal operations, significant amounts of sludge accumulated in many of the tanks.

There has been no chemical and physical characterization of the sludges. Various personnel who have worked in the building were interviewed to develop a preliminary estimate based on process knowledge. The results are shown in Table 3-1. Only a qualitative estimate of the amount of sludge is available but project controls personnel added a first-cut quantification. The physical characteristics, which must be known to select a sludge-removal technology, are poorly understood. Project controls personnel have also added a first-cut quantification of the physical characteristics. These estimates, which are crucial to the cost and schedule estimates, are only conceptual and provide, at best, a +50% to –35% accuracy in the estimate.

The lack of chemical characterization also creates uncertainties. Both radiological and chemical data are needed to determine the waste disposal path for the sludges and the tanks. Most of the sludge is thought to be mixed low level waste and will require storage on-site outside the 771 Closure Project until a disposal site can be identified. The Material Stewardship Project will store and handle the sludges until dispositioning.

These substantial uncertainties due to a lack of characterization lead to a large uncertainty in the project's the proposed methods, costs, schedule, and handling of the sludge and the tanks that hold sludge.

The Building 774 sludge and tank removal strategy is based on the following assumptions;

- Sludges must be broken up for removal from the tanks. Conceptually, it is proposed that an abrasive waterjet will be used to mobilize the sludge enough to pump it into drums.
- The empty tanks will be steam cleaned to SCO or LLW.
- In general, the standard manual, mechanical size reduction techniques used in Building 771 dismantlement will also be used for the tanks. It is assumed the tank pieces can be cleaned sufficiently to be disposed of as low level waste.
- Approximately 6 to 10 of the tanks are projected to be TRU and will be sized reduced using plasma arc inside containments.
- For oily sludge, the sludge will be solidified in drums. For aqueous sludge, no treatment will be performed other than absorbant to dry the material or neutralization.

The current baseline assumes the tanks will be decontaminated to low level waste and the tanks removed from the building in their entirety. A tank would be sealed and shipped as its own container or size reduced with heavy machinery, such as an excavator.

Table 3-1 Estimated Sludge in Building 774

Qualification of sludge					**Conceptual quantification**		
Tank	volume in gallons	Sludge Assessment	other characteristics		sludge in gallons	sludge in cubic ft	sludge in pounds
			type	rad level			
2F	150	Minor	aqueous	TRU	15	2.0	221
71	150	Some	aqueous	LL	37.5	5.0	551
T3	250	Minor	aqueous	TRU	25	3.3	368
1A	2,000	Some	aqueous	TRU	500	66.8	7,352
1RF	2,000	Some	aqueous	TRU	500	66.8	7,352
4L	1,400	Some	aqueous	TRU	350	46.8	5,147
4R	1,400	Some	aqueous	TRU	350	46.8	5,147
70	75	Minor	aqueous	TRU	7.5	1.0	110
72	18	Minor	aqueous	LL	1.8	0.2	26
73	20	Minor	aqueous	TRU	2	0.3	29
T7	50	Some	aqueous	LL	12.5	1.7	184
T8	25	Minor	aqueous	LL	2.5	0.3	37
T13	450	Minor	oily	LL	45	6.0	541
T14	450	Minor	oily	LL	45	6.0	541
C1	800	Lots	aqueous	TRU	360	48.1	5,294
SP2	200	Some	aqueous	TRU	50	6.7	735
FLOC 5	1,200	Lots	aqueous	TRU	540	72.2	7,941
9	300	lots	aqueous	TRU	135	18.0	1,985
10	500	lots	aqueous	TRU	225	30.1	3,309
12	1,000	some	aqueous	TRU	250	33.4	3,676
74	20	minor	aqueous	LL	2	0.3	29
210A	275	lots	aqueous	TRU	123.75	16.5	1,820
11R	500	sand/rock	aqueous	TRU	125	16.7	1,086
11L	500	sand/rock	aqueous	TRU	125	16.7	1,086
T40 (new)	7,300	lots	aqueous	TRU	3285	439.1	most pumpable
		minor	aqueous	LL	3285	97.6	8,783
102	10,000	minor	oily	LL	1000	133.7	12,031

Qualification of sludge					Conceptual quantification		
			other characteristics				
103	10,000	minor	oily	LL	1000	133.7	12,031
201	15,000	lots	aqueous	LL	6750	902.3	99,257
202	15,000	lots	aqueous	LL	6750	902.3	99,257
203	15,000	lots	aqueous	LL	6750	902.3	99,257
204	15,000	minor/some	aqueous	LL	2625	350.9	38,600
351	50	minor	aqueous	LL	5	0.7	74
T40 (old)	7,300	full	aqueous	TRU	6570	878.3	101,002
Other tanks		none	aqueous	LL	0	0.0	-

3.2.2.2 Building 774 RCRA Closure Strategy

There are multiple unknowns with respect to the Building 774 RCRA Closure Strategy. The baseline assumes that all RCRA related equipment would be closed in accordance with the requirements in a modification to the DOP through unit removal. Work completion will be documented in a summary report submitted to CDPHE. The closure of floor areas will be similar to Building 771.

The number of pieces of equipment (12 idle equipment tanks, 30 regulated tanks, and 4 gloveboxes) is much smaller than that in Building 771, but the unknowns are much greater. Sludge is expected in many of the tanks, but the amount and consistency is unknown. The hazardous waste characterization of the liquids, sludges, and tanks has not been completed, but is assumed to include both characteristic and listed EPA waste codes. In addition, the radioactive contamination levels in the tanks is unknown, but is assumed to be low level in most cases.

A measurement and sampling event is being scheduled for the fourth quarter of FY 2000. This will involve several different types of measurement groups and will support both engineering planning and environmental compliance. Ultrasonic testing, radiation scanning, sampling of liquids/sludges, and possibly opening some tanks for pictures will be conducted. The results will be used to determine disposal paths and removal options.

Any sludge will need to be removed before disposal of a tank. The tank and sludge strategy, Section 3.2.2.1, contains additional information on sludge removal. After gross sludge removal, the tank walls may need additional cleaning, which is proposed to be conducted with a hot pressurized water jet. As documented in Section 3.2.2.1, the tanks may be size reduced and disposed of as low level waste (LLW) or may be shipped whole as surface contaminated objects (SCO). Section 3.2.5.4 contains additional information on the SCO strategy

Liquefaction of sludge and any type of spray cleaning will require transportation of aqueous waste to Building 374 probably by use of a truck. Disposal of waste liquids and sludges may present some difficulties. Aqueous based waste either acidic or caustic should be able to be managed by Building 374. However, oil based waste has no current disposal path. Section 3.2.2.3 contains additional information on the management of these oils. Intermediate cementation is the only available method at this time. After the 10,000+ gallons of PCB contaminated oil is shipped from tanks 102 and 103, the tanks will need to be decontaminated.

There are 7 RCRA tanks and 4 idle equipment tanks that are in excess of 2,000 gallons. If these tanks are not size reduced, partial demolition of the building will be required to remove the tanks. One tank will require some special considerations. T-40 (old) is a vault or cistern type of tank with the floor of Room 203 providing the top of the tank. Access is through a manhole. A partial demolition of the building will be required before this tank can be accessed for cleaning and removal. This may require a containment structure during removal activities.

For decommissioning and closure purposes, there are some convenient groupings that could be used to facilitate disposition. In Room 210, there are 5 tanks and 1 glovebox from OASIS that handled waste oil. Also in Room 210, there are 3 tanks and 1 glovebox for the bottle box, which could have higher radiation levels. Room 241 contains 4 large tanks currently permitted for aqueous waste treatment. Room 202 contains 8 interim status tanks with aqueous waste that are assumed to be listed. Basement Room 102 contains 6 interim status tanks of the same type and 3 idle equipment tanks. Basement Room 103 contains a permitted glovebox, 2 idle equipment tanks, and 1 permitted tank. Room 320 has the 2 PCB oil tanks.

3.2.2.3 Oils Strategy

Two types of waste oil are present in Building 774 and must be shipped to treatment or alternate storage.

- In Building 774, the OASIS process was previously used to treat low-level oil, but the OASIS waste form has no disposal path. The operation will not be re-started. A few drums of this oil are stored in Building 774 and over 500 drums are stored in other buildings at RFETS.
- Building 774 also stores about 10,000 gallons of PCB-contaminated low-level oil. This oil is planned for shipment to Oak Ridge for treatment. The oily sludge in the storage tanks does not currently have a planned treatment.

The following are the assumptions associated with the oil strategy:

- Building 774 will not re-start the OASIS oil solidification process. The OASIS process does not have current waste profiles for Nevada Test Site (NTS) or Waste Isolation Pilot Plant (WIPP), and the waste form has no disposal path.
- If any oil exists elsewhere on site, it will be managed without OASIS. (In September 1998 about 500 drums of oil were estimated to require treatment.)
- PCB-contaminated low-level oil will be shipped to Oak Ridge in FY00.
- Oak Ridge will also accept radiologically contaminated oil that does not contain PCB contamination.

Building 774 operations must be terminated to support the decommissioning mission. Since OASIS has not operated in some time, the project will not re-start this operation. Any current inventory of this oil must be managed in an alternate manner. The recommended alternative is to ship all the oil to Oak Ridge for treatment. The backlog of oil (over 500 drums) will be accepted in Building 774 and transferred to the oil storage tanks currently storing PCB-contaminated oil. These tanks can then be used to transfer the oil to a tanker truck for shipment to Oak Ridge. This operation will be completed in FY 2000 or very early in FY 2001. The 771 Closure Project will realize the costs associated with placing the backlog of oil into the tanks and transferring the oils for shipment. Other projects may generate oil and any such oil can be handled by those projects in the same manner without further reliance on Building 774.

PCB contaminated oil must be shipped to Oak Ridge for treatment. The shipment will occur early in the 4^{th} quarter FY 2000.

The following table provides the uncertainties and risk associated with oil strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Shipment of backlogged oil to Oak Ridge has not been confirmed.	Building 774 would have to return the oil to drums and ship them back to the generator. Chance for efficient shipping in a tanker could be lost.	Medium	Building 771 is relying on support from outside the project to resolve the shipment.
Non-PCB contaminated oil will become PCB-contaminated if it is introduced into Building 774 storage tanks.	If Oak Ridge cannot take the oil, alternate disposal routes may be precluded by the PCB contamination. The problem could become worse in this scenario.	Medium.	Building 771 is relying on support from outside the project to resolve the uncertainty. Obtain commitment for Oak Ridge prior to introducing the drummed-oil into the Building 774 tanks.
Treatment for the sludge from Building 774 oil storage tanks has not been identified.	None to Building 771. But the Site must store the oily sludge until treatment is identified.	High	Building 771 is relying on support from outside the project to resolve the treatment or storage.
Contaminated oil generated in the future does not have a disposal route.	None to Building 771. But the Site must continue to store the oil.	High	This is outside the scope of the 771 Closure Project. A Site effort is needed to plan a disposal route.
PCB-contaminated oil is planned for shipment to Oak Ridge but schedule is uncertain.	Building 774 closure would be delayed or the expense of building a new, alternate storage facility incurred.	Medium	Continue to work on the shipment to Oak Ridge, with support from outside the 771 Closure Project, to meet the FY00 target.

*High, Medium, or Low

3.2.3 ER Characterization Strategy

Decommissioning will interface with ER to achieve an integrated process to minimize risk to workers and the environment, minimize generation of remediation wastes, streamline the technical process and reduce project costs. The first essential interface activity will be ER characterization. Figure 3-2 in Section 3.2.10 documents the key ER interfaces during the demolition process. The ER characterization will be completed before the end of FY01. The characterization will be sufficient to determine soil contamination external to the foundation walls, around the footings of the foundation walls, around the pilings internal to the facility, around and beneath the Building 771 exhaust tunnel, and the appropriate protection for the ER remediation. For the purposes of the baseline, it is assumed that building will be used as the containment for the ER activities. Section 3.2.10 contains additional detail on the remediation of under building contamination.

Everything that does not meet the free release criteria will be removed, and items three feet below grade that do meet the free release criteria will remain; estimated completion is 2003. Grade level is considered the final grade of the hillside after restoration activities are complete. The following bullets outline the interface points between the 771 Closure Project and ER:

- Demolition of the building will include removal of ½ of the slab. Concrete slab will be removed in rooms 114, 141, and 149 and other process areas. The slab will be removed and ER will excavate and remove any under building contamination before the demolition is initiated.
- The 771 Closure Project will disposition USTs and empty plenum deluge tanks.
- The 771 Closure Project will flush and remove the sanitary sewer lines, tanks, and equipment associated with the buildings to the edge of the foundation. The lines will be capped and tagged. The system will be flushed with clean water.
- The 771 Closure Project will remove all structures, foundations, etc., down to three feet below grade and any areas below three of grade that do not meet the free release criteria. Grade is considered the final grade of the hillside after site restoration is complete.
- The 771 Closure Project will cap all lines outside of the building. ER will be responsible for removing underground lines back to valve if required.
- The 771 Closure Project will excavate the south, east and west sides of Building 771 and the south side of Building 774 at a 1½:1 slope, assuming the soil is clean. The clean soil will be stockpiled for use as backfill.
- The 771 Closure Project will decontaminate, survey, and fill the transport tunnel to Building 776 with flowable fill. The 771 Closure Project will modify the DOP to include this activity.
- The 771 Closure Project will decontaminate, survey, and fill the exhaust tunnel to the 771 stack with flowable fill. The 771 Closure Project will modify the DOP to include this activity.
- The 771 Closure Project will modify the DOP to include the ER activities outlined in this section and the Section 3.2.12.
- The 771 Closure Project will conduct the sampling associated with RCRA Units including the hydrofluoric tank behind Building 771.
- ER will budget for any required containment.
- ER will characterize the soil beneath Building 771 and Building 774 and around the exhaust tunnel, transport tunnel, and pipe chase.
- ER will expedite the return of validated chemical analytical data for soil issues related to UST removals, aboveground storage tank (AST) removals, and other soil handling or excavation tasks as required.

The following table documents the risks and uncertainties associated with the ER characterization strategy:

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Structural integrity of the building cannot be maintained with the proposed floor removal	Schedule and budget impact	Low	Coordinate structural analysis and ER characterization to validate this assumption as soon as possible
Filling the exhaust tunnel will flowable fill is an unacceptable method	Schedule and budget impact	Low	The DOP modification should be expedited to ensure that this is an acceptable dispositioning method for the tunnel.
A tent has to be constructed over the building instead of completing the excavation while the building is intact	Delay in ER schedule, cost and budget impacts	Medium	Early characterization of the under building contamination

*High, Medium, or Low

3.2.4 Reconnaissance Level Characterization Strategy

The objective of Reconnaissance Level Characterization (RLC) is to assess current radiological and non-radiological hazards in order to Type/Classify the facilities and prepare a RLCR, which is issued to the LRA for concurrence. The data generated from this phase also supports planning for decommissioning, subsequent characterization, and the Pre-Demolition Survey. The goal of RLC is to answer the following questions:

1) What surfaces are suitable for free-release?
2) What surfaces will require further decontamination?
3) What surfaces will be classified as hazardous or radiological waste?
4) What type of decontamination will be required on specific surfaces? How will it be completed? What technology will be used or implemented?
5) How will the surfaces be classified for Pre-Demolition Survey?
6) How will the volumes of waste be classified?
7) How will the volumes of waste be disposed of?
8) What equipment presents a decommissioning hazard?

The strategy for RLC is to fill data gaps. Existing data includes historical data, and data presented in the Building 771/774 Cluster Closure Project RLCR, Revision 2, and the DOP. Both radiological and non-radiological data gaps have been identified based on a review of existing information for Buildings 771/774 and the remaining facilities within the Cluster. Additional data (i.e., surveys, scans and samples) are necessary in order to satisfy the objectives of RLC.

The existing RLCR only addresses Building 771 and Building 774, and does not address any structural components (e.g., walls, floors and ceilings). Table 1 of the RLCR identifies contaminants of concern, but details are missing. Also, the process equipment hazard analysis (spreadsheet) is incomplete and outdated. In addition, some hazards are identified that have been cleaned up (i.e., are no longer present). The following is a list of information/data that are available to support the additional characterization effort.

- List of RCRA units with waste codes (there are 20 – 30 permitted units, 90-day WAAs, and SAAs, and ~50 interim status gloveboxes)
- List of idle equipment with hazardous substance tank and equipment inventories (however, content knowledge prior to tap and drain and strip-out activities is only 50% accurate)
- Results of tap and drain activities
- Inventories of in-process nuclear materials and hold-up inventories of excess/waste chemicals
- Results of Be surveys (~ 1500 – 2000 smears taken)
- Lists of historical spills and leaking valves (not comprehensive; does not cover pre-1980)
- Summary of process knowledge regarding heavy metals, organic compounds, and PCB contamination.

Based upon a review of existing data, very little information exists regarding the presence of ACM. Generally, ACM is associated with gloveboxes, piping, gaskets, and other equipment (e.g., furnaces). In addition, most of the old floor tiles contained ACM, are present, and have been overlaid with newer tile.

There is also a potential of PCB contamination from spills. Locations, nature and extent of these spills are unknown. There are thousands of pieces of equipment that could contain PCBs; the inventory and draining of equipment will be completed by the end of 2002. There are two, 10,000 gallon, PCB tanks in Building 774. In addition, most of the building surfaces could be covered with PCB paints.

There were countless spills of process solutions throughout the facility. Many solutions contained RCRA heavy metals (i.e., Pb, Cd, Se & Ag). Contaminants, concentrations and extent are not well documented, nor understood.

Based upon available data/information, the following sampling plan is recommended in order to support the reconnaissance characterization effort for both radiological and non-radiological constituents. The following bullets briefly outline the non-radiological sampling approach:

- Asbestos inspection and sampling: ~500 samples - 580 hrs for a certified inspector, and 480 hrs for an RCT - approximately 3-4 months with 2-3 weeks of report writing.
- Be surveys: existing data is satisfactory for RLC. Additional Be samples will be collected, as necessary, as systems are breached during decommissioning.
- Concrete cores: ~200 samples analyzed for RCRA heavy metals and PCBs.
- Volatile organic compounds/semivolatile organic compounds (VOC/SVOC) analysis: existing data is satisfactory for RLC. Additional VOC/SVOC samples will be collected, as necessary, as systems are breached during decommissioning.

The building surfaces will be divided into survey areas based on similar contamination potential. The types of measurements that will be performed during RLC include the following:

1) Total surface contamination
2) Removable surface contamination
3) Surface media samples
4) Surface scans

The types of measurements to be collected in a given survey area will be based on historical data that provide information regarding suspect contaminants in a given area.

The surveys performed on structures/areas anticipated to be Type 1 (Class 3) will be designed to type the area in accordance with the DPP, generate a RLCR, and satisfy PDSP requirements. Isolation controls, which require restricting the transfer, storage, and use of radioactive materials, will be maintained in these areas. Verification surveys will be performed prior to the release of these structures to confirm that radioactive material was not introduced into these areas. Structures such as administrative support trailers, guard stations and trailers, and auxiliary support trailers and outbuildings (acid storage, maintenance, etc.), as well as the Building 771 IDEC (Indirect/Direct Evaporative Cooling) Area are included in this category.

In addition, all samples (surface media) will be collected in accordance with the PDSP, such that additional sampling will not be required following decontamination. Surface media will be removed during the decontamination phase in areas where sample results indicate contamination levels in excess of the PDSP specified limits. Verification surveys will be performed prior to the release of these structures to confirm that radioactive material was not introduced into these areas. Structures such as administrative support trailers and outbuildings (acid storage, maintenance, etc), as well as the Building 771 IDEC are included in this category.

Limited RLC data will be collected in survey areas that will be classified as hazardous or radiological waste, i.e., no decontamination will be performed. This data will be utilized to estimate waste volumes, and to characterize in accordance with SCO requirements.

For this estimate, the 771 Cluster will be divided into 27 survey areas, which includes a total of 495 samples, 150 SCO samples, 3000 total surface contamination measurements, 3000 smears, 3000 square meters of alpha scans, and 800 square meters of beta scans.

RLC will typically be performed in crews of two. A total of four crews shall be utilized depending on schedules. A typical crew shall consist of at least one site qualified RCT. Each crew will collect the required types of measurements in a given survey area, based on data gaps identified in Revision 2 of the RLCR. Typical instrumentation includes NE Electra's-DP6/DP8, Tennelec-SAC-4, AP-2, etc. Non-radiological surveys and sampling, as well as radiological sampling, will follow a similar plan. However, sampling crews will be mobilized to acquire concrete cores, paint chips, sludge samples, and asbestos sample.

3.2.5 Dismantlement

This activity entails the removal of equipment, piping, tanks and other machinery from the building. It is necessary to remove these items to allow access to building surfaces for decontamination and PDS.

Initially, as work begins in each room, machinery and some equipment will be removed. These are items that are at floor level, do not require size reduction, and are not attached to critical safety systems (i.e. zone I ventilation, zone II ventilation, criticality alarms, etc.). These items will be isolated from utilities, any other potential energy producing systems and removed as waste or a recyclable product.

Many items will require size reduction and/or decontamination to placed them into waste containers. Those components that can be moved will be taken to a central size reduction area within the building. Those that are too large to move will be size reduced in place.

3.2.5.1 Waste Pipe Characterization Strategy

This section details the waste streams and handing of those waste streams associated with the removal of pipe on the 771 Closure Project during dismantlement activities. The pipe waste stream consists of piping, valves, and other fixed, metal components, and the waste description is IDC 480, Light Metal. Pipe ranges in nominal diameter from ½" to 3" with an inside diameter of ½" to 2¾". Valves consist of manual, air actuated, electronic, and directional flow (backflow preventer) varieties. Flanges, including their gaskets and shrink-wrap, can be disposed of along with the pipe and valves as long as a different IDC is not added. Most of the piping and valves are made of stainless steel. Exceptions to stainless steel include a composite-plastic material used for hydrofluoric acid system, minor amounts of mild steel pipe used for the new hydrofluoric acid line, and Kynar®-lined pipe used for chloride processes. Incidental metals include nuts, bolts, pipe supports and associated threaded rods/hardware.

Free liquids of any volume are not permitted in final waste packages. Free liquids will be removed from the pipe waste before packaging by pouring liquid from the pipe or valve into a catch pan or other container. Liquids collected will be sampled, characterized, and treated. Incidental liquid can be wiped up with chemical wipes, and the wipes disposed of as combustible waste. Lengths of pipe can be racked (or stood in an upright position) to drip dry if deemed appropriate or necessary. Additionally Abzorbit®, or other solidifying/drying material, can be added to the waste package as appropriate to protect against liquid pooling that could occur subsequent to packaging.

Sludge is an inexact term used to describe any material that is not liquid and is not solid, but is some combination of both. Like liquid, sludge of any volume is not allowed in final waste packages. Sludge may

be readily removed from the pipe by standing the pipe on end, or it may be solid enough to require mechanical removal techniques. Mechanical methods could include reaming out the pipe using a tool like a wire brush or rod. Sludge will consist of the chemical's concentrated salts (corresponding to the solution system from which the pipe is taken) and corrosion products from the stainless steel piping. Impurities that have been observed in the liquid may also be present in the sludge; these have included arsenic, cadmium, selenium, silver, barium, and lead and nonhazardous chromium and iron.

Sludge must be treated prior to final packaging. There are four potential sludge waste streams for the 771 Closure Project including 771-39-19, 771-39-20, 771-39-21, and 771-39-22 corresponding to organic or inorganic and hazardous or non-hazardous. The treated sludge will have been solidified creating a new waste stream characterized based on the solidification technique.

Solid material is material that has adhered to the inside of the pipe. It may be a coating that may or may not be readily visible if the pipe were sliced open to inspect – it is a solid remnant. Solid material is made up of the same chemicals, salts, and impurities as sludge, but can only be removed with mechanical methods.

Pipe is nonhazardous but can be rendered hazardous when combined with sufficient quantities of remaining residue. While liquid and mobile sludge will be removed from pipe, nonmobile sludge and/or residue may remain. In this case, the sludge must be sampled for actinide content, chemical species, and RCRA metals. The number of samples will be determined based on the volume of residue found. The quantity of the residue will be determined by visual observation. Where the volume of residue is diminimus, residue sampling may not be performed. Where the volume of residue could impact the characterization, sampling and Toxicity Characteristic Leaching Procedure (TCLP) analyses will be performed to determine the levels of characteristic toxic metals. The pipe is characterized and no further sampling will be performed for the pipe waste itself.

Actinide levels are measured using drum or crate counters located in Buildings 371 and 569. During packaging in Building 771, a gram estimator or Site NDA techniques may be used to help preclude packaging material above waste acceptance criteria for actinides.

Size-reduced pipe will be visually inspected. Liquids and sludge will be removed by pouring and/or draining by standing the pipe upright over a period of time (i.e., during one shift). The liquid or sludge will be managed as a new waste stream. The material removed will be sampled, characterized and treated as appropriate based on its characteristics. Liquid and sludge from acid and caustic systems will likely be hazardous under RCRA based on corrosivity, D002; each may also be characteristic for toxic metals that are commonly found in Building 771 process liquid wastes.

Pipe visibly clear of solid residue waste is nonhazardous. Pipe containing visible solid residue waste will be evaluated based on quantity and quality of residue material to determine whether or not the waste stream is hazardous. The quantity of pipe plus the quantity of residue, and the concentration of toxic metals in the residue will be evaluated to determine the waste characterization under RCRA.

The following table details the expected waste quantities from pipe waste characterization.

Waste Type*	Quantity	Waste Stream	Waste Stream #
Stainless Steel Pipe	69,000 feet	480 – Light Metal	771-39-10
Kynar Lined Pipe	1,000 feet	480 – Light metal	771-39-10
Sludge	20 liters	299 – Misc. Inorganic Sludge	771-39-20
Residual Liquid	25 liters	400 – Misc. Residue Solution	771-39-4

*Other insignificant volumes of waste types will be generated.

The following bullets are the assumptions for the pipe waste characterization strategy:

- Includes process steam/condensate and process waters.
- The removal of tanks and other, large ancillary equipment is not within the tap and drain scope.
- Pipe is relatively free of sludge; pipe is all non-hazardous.
- Pipe is visually inspected as prescribed to ensure remaining sludge, if any, is quantified.
- Gram estimator is accurate pursuant to its design and settings.
- No liquids are left in drained piping.

The volume of waste pipe generated, with respect to the number of waste packages, will vary. Pipe may be packaged in 55-gallon drums, standard waste boxes, or IP-2 metal crates. Pipe must be size reduced to fit into whichever package is selected. Further, pipe may be packaged with other IDC 480, Light Metal waste. Packaging is determined at the time of generation considering the actinide levels and other waste with which the pipe may be packaged. The pipe waste stream is 771-39-10.

The following table outlines the potential risks and uncertainties associated with waste pipe characterization and details the level of risk associated with the activity.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Pipe is characterized as hazardous.	Packaging and storage would have to be changed as appropriate.	Low	Adequately inspect and remove sludge, if any, to maintain non-hazardous characterization.
Pipe is not adequately visually inspected.	Pipe is characterized incorrectly.	Low	Pipe inspection is required in the IWCP; a log indicating adequate inspection is included in the IWCP and is signed by supervision.
Gram estimator is inaccurate.	Pipe would have to be repackaged if grams exceed the allowable threshold for package.	Low	Calibrate gram estimator. Operate instrument pursuant to instructions.
Liquids are left in drained piping.	Pipe would fail RTR and would have to be repackaged.	Low	Pipe is drained during size reduction. Pipe is visually inspected.

*High, Medium, or Low

3.2.5.2 Incompatible Liquids

Incompatible liquids are defined as liquids with different chemical constituents that, when mixed together, produce an adverse reaction including heat generation, off-gassing, smoking, sputtering, bubbling, etc. In the worst cases, the generation of heat could be volatile and the gases generated could be extremely toxic; both conditions are dangerous to human health. Considering the amount of time that the systems in

Building 771 have been idle, there is a high potential for encountering unexpected liquids. The following general statements describe the potential incompatible conditions during Building 771 decontamination and component removal:

- Hydrogen may be present in lines containing acid solutions of actinides; hydrochloric acid (HCl); HF; or sulfuric acid (H_2SO_4). The corrosive action of these acids on metal produces hydrogen. There is a potential that the hydrogen concentration will be between the lower and upper explosive limits of 4.1% and 74.2%, respectively. Ignition sources will have to be eliminated when handling the gases coming from these acid systems.
- Nitric acid lines may contain NO_x, arising from the three mechanisms that produce this gas: reaction with corrosion by-products, decomposition, and direct reaction with metal containment.
- The build up of solids in the lines is a by-product of the corrosion process. This will be more prevalent in the lines containing basic solutions. Metal ions arising from the corrosion process tend to be soluble in acid, but not in base. Also, some reagents decompose over a period of time, adding to the buildup of solids.
- Many of the acids can be mixed, but it is probably not advisable to mix different acids if each individual acid has a concentration of 4.0 N or greater. In many cases, the mixture can be more potent than the individual acids in terms of corrosivity and reaction with other chemical species. Also, some very poisonous gaseous by-products can be formed.
- More dilute acids and bases can be mixed without serious heat buildup, pressurization, or other adverse effects. Such mixing should be done only if the concentration of both the acid and the base are less than 3.0 N. Caution should always be exercised in the mixing of any acids and bases.
- Depending upon how well the lines are sealed, it is possible that there could be some pressurization due to the buildup of gaseous products from corrosion and other degradation processes. If at all possible, systems should be vented before tapping drain points.

The tap and drain program was designed using solution systems. Many of the solution systems are defined by a particular chemical, thereby easing incompatible liquid situations. However, other systems are known to contain incompatible liquids; those are often divided into subsystems again alleviating incompatible liquid situations.

There are 38 solution systems including process systems and reagent (or chemical) systems. The reagent systems are those tanks and piping transfer lines that carried reagents to the various process gloveboxes for use in processing. Reagents consist mostly of nitric acids and potassium hydroxides of differing strengths, and much smaller quantities of sulfuric acid, hydrogen fluoride, oxalic acid, ferrous sulfamate, and hydrochloric acid. The reagent systems are drained separately to control chemical segregation.

Process systems are particular process operations that would involve differing numbers of tanks and gloveboxes in which actinide recovery operations were conducted. Some of the processes included special recovery, uranium recovery, americium recovery, hi and lo level dissolution, leaching operations, recovery operations, and scrubber operations. The process systems, because of the nature of staged addition of various chemicals to affect the process, are the systems in which incompatible chemicals will be found.

Liquid removal is accomplished through low point draining using existing valves and installing new taps. This is an engineered activity where the system is defined on engineering drawings indicating all tanks, piping, and other ancillary equipment, the low points in the system, and where vent points and drain points

(either new taps or existing valves) are located. Detailed process knowledge is applied to the system to indicate what liquid is expected from each drain point. Each drain point is then accessed and drained by gravity and/or by vacuum. Liquids are drained into flasks and the contents poured into pre-numbered, 4-liter polyethylene bottles for temporary storage. During draining, selected drain points are sampled to confirm process knowledge with respect to actinide levels and chemical composition. Safe, compatible draining and storage is based on confirmatory sampling results. When each solution system draining is completed, characterization sampling is performed for criticality safety, RCRA, and chemical characteristics.

Based on analytical data, liquids are transferred to various processes for further treatment. Available treatment processes include the Building 774 Bottlebox cementation process. Liquids that are less than 6.0 grams per liter total actinides may be cemented in the Bottlebox. A neutralized solution of about 70 liters (about 50 liters of waste solution and 20 liters of water and neutralizing chemicals) are mixed with cement in a 55-gallon drum resulting in a final waste form that is Land Disposal Restriction (LDR) compliant.

Liquids that are less than 4.0 E-3 grams per liter total actinides may be precipitated in the Building 374 Carrier Precipitation. Waste liquids are neutralized and precipitated removing the solids from the water; water is then turned into process steam and the solids become a saltcrete that is later solidified.

Liquids that are greater than 6.0 grams per liter total actinides are transferred to the Building 371 Caustic Waste Treatment System (CWTS) for treatment. Waste liquids are neutralized and precipitated removing the high actinide solids. The effluent from CWTS is transferred to the Building 374 Carrier Precipitation. The solids resulting from CWTS are dried and stored as plutonium oxide and stored.

Organic liquids can not be processed in any currently operating treatment facility on Site. Treatment options that may be feasible include the Oak Ridge Incinerator in Tennessee for PCB-contaminated and low-level actinide organic materials and third tier contractors currently evaluating very low-level, non-PCB oils. Two 5000-gallon tanks in Building 774 contain approximately 9000 gallons of PCB-contaminated oils, which are scheduled to be shipped to Oak Ridge early summer FY 2000. Currently under discussion is the possibility of reloading the two Building 774 tanks with oils from various other Protected Area buildings, which are currently stored in drums. Whether the drummed oils are PCB-contaminated or not, they will become PCB-contaminated if introduced into the Building 774 tanks. Then, another shipment can be made to Oak Ridge. The Building 774 OASIS solidification process is defunct and there are no plans to restart that treatment. The following table outlines the projected liquid quantities by system:

SYSTEM #	EXPECTED LITERS	ACTUAL LITERS	SYSTEM #	EXPECTED LITERS	ACTUAL LITERS
1	DRAINED	27.90	20	258	133.85
2	DRAINED	2.70	21	246	
3	13	26.80	22	0	
181A	50	275.75	23	4	19.45
4	<1	7.25	24	5	
5	175	94.33	25	3	
6	22	40.50	26	5	78.75
7	14	1.70	27	22	
8	16	4.30	28	217	
9	29	41.30	29	77	
10	5		30	62	

SYSTEM #	EXPECTED LITERS	ACTUAL LITERS	SYSTEM #	EXPECTED LITERS	ACTUAL LITERS
11	34		31	26	3.30
12	11	9.75	32	5	2.40
13	5	0.00	33	10	2.00
14	2	0.02	34	12	
15	N/A		35	13	
16	4		36	0	0.00
17	7	Stuart	37	UNKNOWN	
18	8	7.36	38	0	
19	233	143.60			

Tank Codes: D002, 4, 6, 8, and 10.

The following are the assumption with respect to the incompatible liquids strategy for the 771 Closure Project:

- Process knowledge about the solution systems is accurate with respect to expected liquid.
- Engineering boundaries and valve line-ups adequately isolate solution systems with respect to incompatible liquids.
- Incompatible liquids are not commingled.
- Chain of custody is maintained.
- Laboratory data is accurate/correct
- Current, available processes remain accessible
- New treatment is found for organic liquids
- Building 374 will budget the costs associated with treating the 771 Closure Project liquids

The following table provides the risks and uncertainties with respect to the incompatible liquids strategy.

Uncertainty/Risk	Impact	Probability of Occurrence*	Mitigation Measures
Process knowledge is incorrect.	Incompatible liquids could be commingled.	Medium	Conduct confirmatory sampling; use pH paper for immediate, initial compatibility.
Engineering boundaries and/or valve line-ups are incorrect	Incompatible liquids could be pulled across each other in the line during draining.	Low	Conduct adequate ISM, walkdowns, SME involvement.
Incompatible liquids are commingled.	Heat generation, splattering, off gassing, and smoking.	High	Drain liquids into gloveboxes. Use pH paper if mixing or adding to liquids.
Chain of custody is not maintained	Analytical data could be improperly matched to wrong liquid.	Low	Create/maintain: Sample APO logs, bottle generation logs in IWCP, system bottle numbering.
Laboratory data is incorrect.	Liquids could be improperly stored, treated, and disposed.	Low	Perform a confirmatory sampling and follow up with characterization sampling. Compare data. (MVM-15)

Uncertainty/Risk	Impact	Probability of Occurrence*	Mitigation Measures
Current solution processes are eliminated.	Liquids would have no disposition path. Could delay decommissioning activities.	Medium	Disposition liquids as soon as possible. Communicate with management accurately the needs for processes.
No treatment is identified for organic liquids.	Organic liquids would have no disposition path. Could delay decommissioning activities.	Medium	Aggressively pursue pending disposition options including off-site, disposal facilities and Oak Ridge Incineration.

*High, Medium, or Low

3.2.5.3 Central Size Reduction Strategy

Size reduction is the process of reducing contaminated pieces of equipment to a size compatible with the intended waste container. Potential strategies for performing size reduction are:

- Manual in-situ involves size reduction of components in place by personnel using hand held tools. For highly contaminated equipment, extensive Personnel Protective Equipment (PPE) is required such as supplied breathing air and contamination control tents with dedicated ventilation.
- Automated in-situ involves size reduction of components in place by automated means such as hydraulic arms with end effectors (tools) that are controlled by operators outside of the contaminated area. This strategy reduces the routine use of extensive PPE but still requires the construction of specialized contamination control enclosures with dedicated ventilation.
- Manual centralized size reduction involves transport of components to be size reduced to a size reduction containment located within the facility. Improved ventilation controls and tool handling supports are in place to reduce the risk to personnel. High levels of PPE may or may not be required depending on the effectiveness of the centralized containment and ventilation system in controlling airborne contamination. There is currently one manual centralized size reduction station located in room 183, the inner tent chamber (ITC) or Birdcage I-1.
- Automated centralized size reduction involves transport of components to be size reduced to a size reduction containment located within the facility. Size reduction of components takes place by automated means such as hydraulic arms with end effectors (tools) that are controlled by operators outside of the contaminated area. This strategy reduces the routine use of extensive PPE and risk to the worker.

Due to the risk to the worker, manual in-situ size reduction is the least preferable method and if possible this method of size reduction will not be used for highly contaminated components. However, in some instances, it may be the only option for size reduction. Technology for automated in-situ size reduction is not projected to be available until FY 02. When a component is encountered that cannot be moved to a centralized size reduction enclosure, manual in-situ size reduction will be considered. Manual in-situ size reduction will be selected if required to meet project objectives and automated in-situ size reduction technology is not available.

In-situ size reduction for a few, high-risk gloveboxes (SR-12, Ln 7, Ln 43) that cannot be moved to a centralized location will be scheduled towards the end of the process equipment dismantlement phase of the project. This will allow time for evaluation of automated means for in-situ size reduction and implementation if feasible. The following table documents the gloveboxes and tanks that are expected to exceed SCO levels and cannot be moved. Plenums cannot be moved to centralized locations and are all

planned for in-situ size reduction. This table is based on the current historical knowledge and characterization data.

Gloveboxes that cannot be moved Building 771	Tanks that cannot be moved Building 771
• A20, room 180A • A10, room 180A • A30 & 31 room 180A • 228, room 182 • 37 & 38, room 149 • 42 , room 149 • 29, room 149 • 43 south, room 149 • SR12, room 146A • 6 & 7, room 114 • 18, room 114 • 15, room 114 • 8A, room 114	• D927, room 149 • D933, room 149 • Plenum Deluge Tank, room 190 • 309 East & West, room 309

Gloveboxes that cannot be moved in Building 774	Tanks that cannot be moved in Building 774
none	• F-5 • T-40 (new) • T-40 (old) • 102 • 103 • 201 • 202 • 203 • 204

There is currently one manual centralized size reduction station located in room 183, the ITC or Birdcage I-1. A second manual centralized size reduction station, ITC I-2, is expected to be operational in room 181A by the end of FY 00. An automated centralized size reduction station, ITC II-1 is expected to be operational in room 149 in early FY 01. Since the automation technology is experimental, there is a probability that automation may not prove to be feasible in time to support completion of the project. Should that be the case, ITC II-1 would be converted to manual operation. The following are the assumptions used for the development of the size reduction/in situ strategy:

- If the SCO requirements can be met, complete size reduction will not be necessary. For more information on SCO, see Section 3.2.5.4.
- Although automated size reduction is preferred for highly contaminated items, manual in-situ size reduction can be performed safely. Substitution of plasma arc for mechanical tools would mitigate many ergonomic concerns. The project's completion date will not be delayed solely to allow automated equipment to be used.
- In general, if a glovebox or tank exceeds SCO levels and can be physically moved into a centralized size reduction station, it will be size reduced in the centralized station. Decisions on individual items will, however, be made during the detailed planning (see Section 3.1.4) and many factors can impact the decision. Ability to control airborne contamination during the size reduction, the relative hazards of moving the item versus in-situ work, the availability of a centralized station, and lessons-learned during decommissioning are some of these factors.
- Only 15 gloveboxes will require in-situ size reduction.
- An automated means for in-situ size reduction will be evaluated and if feasible implemented for the size reduction of high-risk gloveboxes (SR-12, Ln 7, Ln 43).

The following table addresses the uncertainties and risks associated with the size reduction/in situ strategy.

Uncertainty/Risk	Impact	Probability of Occurrence*	Mitigation Measures
Automated methods of size reduction are not feasible in time to support the site closure schedule.	Manual methods of size reduction will continue to be used.	High	Implementation of improved cutting techniques such as plasma arc will decrease the risk associated with manual size reduction.
Large items that are not currently identified for in situ size reduction will not be able to be moved.	Manual methods of size reduction will need to be used.	Medium	Implementation of improved cutting techniques such as plasma arc will decrease the risk associated with manual size reduction.

*High, Medium, or Low

3.2.5.3.1 Plasma Arc Cutting Strategy

Conventional size reduction tools for light and medium duty, such as saws and nibblers, lack the ergonomic efficiency for sustained, heavy-duty operations. Plasma arc is a cutting process that melts electrically conductive metals and blows the melt away from the cut. In addition to the ergonomic benefits from the light-weight torch, it also greatly reduces burrs and chips that present a puncture hazard to workers and can be used manually or via remote manipulation; however, it increases fire and noise hazards. The AB and Readiness processes have been initiated to include the use of plasma arc torches during decommissioning activities at Building 771.

Plasma arc torches cut dramatically faster than nibblers. Since the actual cutting represents about half of the activity duration of a size-reduction entry in a contamination containment, the plasma arc torches double the amount of cutting accomplished in an entry.

The most significant benefit of plasma arc is the improvement of throughput at the size-reduction workstations. For contaminated equipment, these workstations consist of a soft-sided containment (or tent) with an ITC. Since the original baseline assumption that each glovebox would be size reduced in its own, one-use, containment, the limited number of size reduction workstations has become a bottleneck for size reduction activities. Improving the cutting rate will increase the throughput and, either allow schedule acceleration or avoid the cost of fabricating and installing additional ITCs.

The following are the assumptions with respect to the plasma arc cutting strategy:

- Building 771/774 BFO will authorize use of plasma arc in Building 771 and Building 774 prior to the June 30 contract start date.
- Subsequent AB revisions will sustain the use of plasma arc.
- Fume control equipment and ventilation control is considered part of a plasma arc torch workstation.
- Size reduction productivity will increase by 20% the first year and 10% the second year.

An ITC is the preferred housing for a plasma arc unit. A prototype unit and ITC are in use with conventional size-reduction tools, but this area has a tight configuration where the unit is installed and numerous ergonomic issues. Two units will replace the prototype. A duplicate unit will be installed in a larger room, which offers modest improvements. A larger, second-generation unit will also be installed with remote handling capabilities and substantial ergonomic improvements. Both of these new units will be potential plasma arc workstations and one will be used for the plasma arc Readiness Demonstration. As

the AB is implemented, it may also be possible to arrange for the use of plasma arc on selected in-situ gloveboxes.

The project strategy is to provide as many plasma arc workstations as feasible. The specific sequence of work established during re-baselining will help determine the optimum layout. Conventional size-reduction tools will continue to be used, especially for light and medium duty work.

The following table provides a listing of the uncertainties and potential risk associated with plasma arc cutting.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
The actual rate of cutting that will be realized is not known for manual or remote operation.	Schedule projections cannot be made with confidence.	High	Initiate activity as soon as feasible to ensure that adequate time is available to modify processes
Capability to use plasma arc for in-situ size reduction, where no ITC is available, is not established.	Schedule projections cannot be made with confidence.	High	Initiate activity as soon as feasible to ensure that adequate time is available to modify processes

*High, Medium, or Low

3.2.5.4 Surface Contaminated Objects

Low level wastes can be packaged in several containers. While low level wastes follow the same management and disposal process regardless of the U.S. Department of Transportation (DOT) container, when the wastes meet DOT SCO regulations, there are more packaging options.

DOT regulations recognize two categories of SCO waste. SCO I has plutonium limits of 2400 dpm/100cm^2 for removable contamination on accessible surfaces and 24,000,000 dpm/100 cm^2 for total plutonium contamination on accessible and inaccessible surfaces. SCO II has corresponding limits that of 240,000 dpm/100 cm^2 and 480,000,000 dpm/100 cm^2. SCO I waste must be packaged in a minimum DOT Strong Tight or IP-1 package. SCO II waste must be packaged in a minimum IP-2 package. A combination of decontamination techniques, application of fixatives and engineered features to render contaminated surfaces inaccessible will be used to assure compliance with DOT limits. The RFETS program for compliance with SCO requirements was developed during the 779 Closure Project and has been in use for approximately two years.

SCO waste is currently packaged in IP-2 metal waste boxes and 8'x8'x20' Strong Tight, IP-1 or IP-2 cargo containers. All closure project assumptions include an adequate supply of these containers as needed

The primary benefit of the use of large SCO containers (such as cargo containers) is that less labor is needed since only minimal size-reduction is needed for large items. The density of waste in cargo containers has been about 15% less than waste packaged in crates, primarily because items that are not size-reduced have more void space than items that have been size-reduced. Secondarily, the end-loading cargo containers are difficult to pack. Procurement of top loading cargo containers has begun, which should allow some increase in the density of SCO packaging and will also increase safety for large items handling.

Cargo containers are too large to bring into Building 771; therefore, the waste must be transported to the container. Metal crates can be moved to the work site in the building and loaded there. The 771 Closure project has loaded only SCO I waste into cargo containers. RFETS has ordered IP-2 cargo containers in the past, and they are available if packaging of SCO II waste in cargo containers is advantageous. When some experience has been accumulated in the characterization of SCO II wastes, the projected ratios of TRU, low-level, and SCO low-level wastes can be revised.

The cost for a low-level waste container varies from 14 dollars per cubic foot for an IP-2 full metal crate to 2 to 5 dollars per cubic foot for an IP-1 cargo container. The differences in labor costs to use the containers involve differences in wrapping and transporting items to the container, blocking and bracing needs, and transportation of the container. Labor costs frequently are more important than commodity costs in decommissioning. An assessment of labor costs for historical RFETS low level waste packaging versus SCO waste packaging was done during the development of SCO procedures and methods. Based on this assessment, labor costs for SCO waste packaging are lower by approximately $\$300/m^3$.

Decommissioning personnel will package items as SCO whenever contamination levels and waste packaging and shipping requirements support that approach. Standard decontamination techniques and application of fixatives will be used as needed to manage contamination levels within SCO limits; however, decontamination efforts will be conducted within reason. A choice between crates and cargo containers will be made during the detailed work control planning based on the characterization of the waste material, the logistics of safely packaging and moving the waste material from the work location, and the efficiency of the operations.

The projected low-level waste for the remainder of Building 771/774 dismantlement is about 377,000 cubic feet (10,700 cubic meters). Of this, about 80% of the low-level waste is expected to be packaged as SCO waste (343,000 cubic feet or 9700 cubic meters). The projected TRU/TRM for the remainder of Building 771/774 dismantlement is about 76,000 cubic feet (2200 cubic meters). The following table provides examples of items that may meet the SCO requirements after decontamination; the items listed in this table are based on previous operating experience.

Examples of the bulk of low-level waste in B771/774 dismantlement	Low-level gloveboxes and tanks remaining to be dismantled in **B771/774** (rooms in B771 unless otherwise noted)	Items previously assumed to be TRU that may meet SCO requirements
• Ladders • Bench-top equipment such as glassware, pans, scales, furnaces, and instruments • Some cabinets • Desks, tables, and miscellaneous office furniture • Storage bins • Shelves, racks, and brackets • Platforms • Certain pumps, reservoirs, and compressors • Control and power panels • Hoists • Dollies and hand trucks • Miscellaneous small items	• Glovebox 1 center (room 114) • Air tank (room 304) • Fire suppression tank for CC Cell (room 149) • Tank (room 146A) • Tank 1071 (room 146) • Tank 1072 (room 146) • Glovebox MT-8 (room 146) • Glovebox 202 (room 182) • Glovebox 203 (room 182) • Glovebox 204 (room 182) • Glovebox 229 (room 182) • Other glovebox (room 182 at center) • Reservoir tank (room 182) • Other glovebox (room 182 between 224 and 225) • Glovebox D-1 (180D) • Glovebox D-3 (180D) • Hood (room 151B) • Condensate tank (room 149A) • Two tanks (room 233) • Eleven tanks (room 237) • Twenty-one tanks (room 247) • Expansion tank (room 246A) • Tank (room249 north side) • Tank (IDEC northeast corner) • Tank T450-956 (B774 room 202) • Tank T72 (B774 room 202) • Glovebox 5 (B774 room 202) • Other glovebox (B774 room 202) • Glovebox 355 (B774 room 103) • Hot water tank (B774 room 302)	• B-Boxes F60 (room 180F) • B-Box F70 (room 180F) • B-Box 201 (room 182) • Hood (room 182 south side) • Hood (room 174) • Tanks T102 & T103 (B774 room 220, PCB contaminated) • Tanks 205, 206, 207, and 208 (B774 room 342)

The following table documents the uncertainties and risks associated with SCO strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Waste projections may be inaccurate	Resources could be improperly assigned, reducing Site ability to pursue opportunities or respond to problems.	High for Areas and Medium for Sets	Continue to collect actual waste data and adjust projections as appropriate.
Poor forecasts of container needs could create delays or overstocking.	Added expense would be incurred to expedite purchase orders	Medium	Continue to collect actual waste data and adjust projections as appropriate.

*High, Medium, or Low

3.2.6 Ventilation

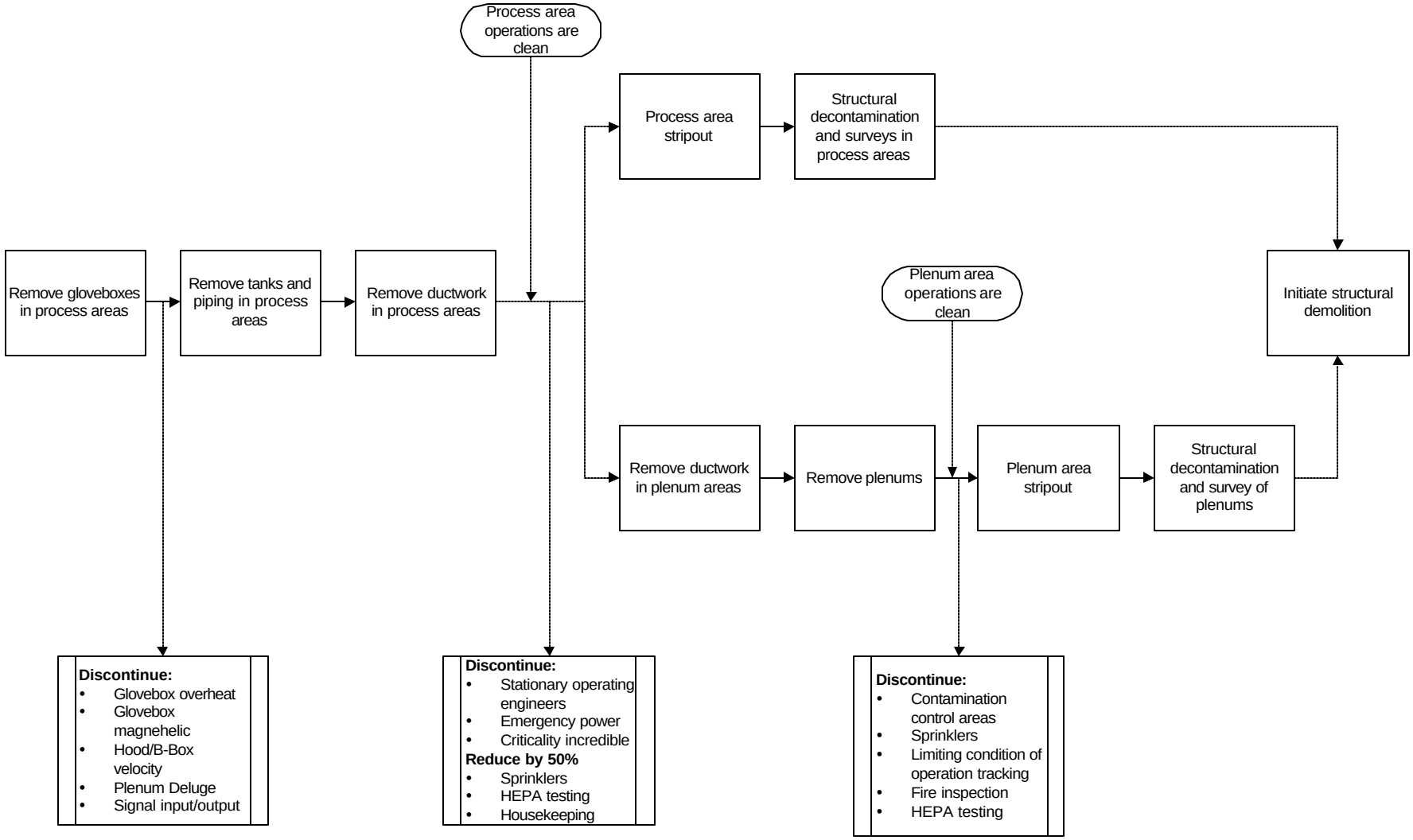
As facility components are removed and/or decontaminated, workers will complete the removal of remaining utilities, including building ventilation and filtration systems. Due to the potential for radiological and/or chemical contamination within system ductwork, there is a possibility for releases of hazardous and/or radioactive materials to the environment. As a result, the removal sequence is extremely important and will be planned carefully for each building/area. Although the approach may differ on a building-by-building or area-by-area basis, the removal sequence described below, and depicted in Figure 3-1, will be followed:

- Airflow studies will be performed in accordance with the Radiological Safety Practices Manual to determine feasibility and identify potential problems and options.
- Zone I plenums will be maintained until the gloveboxes and ductwork have been stripped out.
- Glovebox removal will be initiated at the glovebox furthest away from the plenum and work will continue toward the plenum to ensure that air continues to flow from areas of least contamination to areas of higher contamination. There may be exceptions to this rule depending on access restrictions.
- Air studies will continue throughout the glovebox removal to ensure the zones are balanced and negative pressure is maintained in accordance with the AB. Airflow will be balanced using the Zone II system and/or temporary ventilation and filtration systems.
- Once the Zone I gloveboxes and ductwork have been removed, the areas that were serviced by that ventilation can be decontaminated to the unrestricted release criteria.
- Plenums and associated ductwork will be removed.
- Airflow will be balanced, if necessary, using temporary ventilation and filtration systems.

Currently, the ventilation zones are defined as Zone I - Glovebox exhaust; Zone II - Room exhaust (as in the rooms in back that are contaminated); Zone III - Building corridor exhaust (in the back); and Zone IV - Office and front area exhaust (areas that are not contaminated). These definitions are based on the negative pressure differentials that are maintained for certain equipment and areas. The zones will be redefined to Zone 1 - Glovebox exhaust and Zone 2 – will contain all other ventilation.

A fixative coating will be applied to selected ductwork surfaces to reduce the spread of contamination during ductwork disassembly and movement. The application of the fixative coating will require that ventilation be reduced or terminated in the selected ductwork. Reduction or termination of ventilation may impact or eliminate room and building work activities. Building differential pressure will have to be monitored to assure building balance and negative pressure are maintained following any reduction or termination of ventilation. Depending on the levels of contamination, containments may need to be constructed. It is assumed that the use of containments will be minimal for Zone I and not required for Zone II. This assumption is based on the use of fixatives and assumes that the fixatives will be effective.

Figure 3-1 Ventilation Removal Sequence



Following application of the fixative, rigging will be put in place to hold and lower disassembled ductwork. A confinement tent or sleeve will be placed, as necessary, around the areas where ductwork will be separated to reduce the spread of contamination. Ventilation system flow may be re-established to reduce contamination spread during ductwork separation. Mechanical cutting techniques and standard disassembly techniques (unbolting ductwork connections) will be used to separate ductwork sections. Open sections of separated ductwork will be sealed with plastic wrap and tape in preparation for transport to size reduction areas. Open ductwork that remains connected to the ventilation system will be configured (blanked, capped, valved, filtered, or left open) to support maintenance of negative pressure in the room and the building. Ductwork sections will be hand carried or transported on carts to appropriate size reduction confinements.

Disassembly of ventilation system plenums may be performed just before building demolition activities. Plenums supporting a specific area of the facility will not be removed until radioactive material holdup or contamination levels of gloveboxes, contaminated equipment, and corresponding ductwork in the applicable area are below safety analysis and/or radiation protection defined thresholds.

Plenum disassembly is initiated by replacing the first stage of HEPA filtration (most contaminated stage) and packaging the filters in appropriate waste containers. Following first stage removal, fans will be shutdown and any ductwork holes will be capped. Unnecessary plenum interfaces (e.g., some electrical, instrumentation) will be disconnected from the plenum and connections will be sealed. Remaining stages of HEPA filtration will be removed and packaged in appropriate waste containers. Air movers will be installed on the contaminated sections of the plenum. Where appropriate, the non-contaminated stages of the plenums will be separated from the contaminated sections.

Loose contamination in the plenums will be removed using wet wiping techniques. Depending on the situation, strippable coatings may be used to reduce contamination levels of the plenum surfaces. Application of fixative coating to the plenum surfaces, after or as an alternative to application of strippable coatings, will be performed to reduce the spread of contamination during plenum disassembly.

Following the application of the coatings, radiological surveys will be performed and all remaining plenum interfaces (e.g., plenum deluge, electrical) will be disconnected. Mechanical cutting techniques, concrete removal techniques, and plasma arc cutting techniques may be used to disassemble and size reduce the plenum into pieces of correct weight and contamination level to place into appropriate waste containers.

The following bullets document the assumptions for the 771 Closure Project ventilation strategy:

- Zone I ventilation is TRU.
- Zone II ventilation is LLW.
- The new AB will allow the use of temporary ventilation for the removal of FU2B plenum.
- Hold up will be Category D material suitable for dispositioning at WIPP

The following table provides an estimate of the volumes of waste and waste streams resulting from ventilation decommissioning:

Building 771	**TRU**	**LLW**	**Building 774**	**TRU**	**LLW**
Zone I Ducts	310 m^3	0	Zone I Ducts	34 m^3	0
Zone II Ducts	0	75 m^3	Zone II Ducts	0	8 m^3
Plenums	168 m^3	173 m^3	Plenums	55 m^3	12 m^3

The following table outlines the uncertainties and risks associated with the ventilation strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Zone II ventilation is TRU waste	Budget and schedule	Low	Try to build float into the schedule to allow for the additional time required to remove the ventilation

*High, Medium, or Low

3.2.7 Decontamination

Structural decontamination will involve the removal of residual contamination from the structure; removal of contaminated structural components (e.g., block walls, partitions, etc.); removal of remaining utility systems; decontamination of the remaining structure, and the initial confirmatory survey of release status. This will occur in the following designated areas:

AA Front offices, Room 101 (with dismantlement work-sets 1 and 2)
AB Annex, (with dismantlement work-set 20)
AC Locker rooms, (with dismantlement work-set 3)
AD MTCE Shop, (with dismantlement work-set 4)
AE West side of LA (with dismantlement work-set 49)
AF East side of LA, (with dismantlement work-sets 19 and 47)
AG Stack and Tunnel, (with dismantlement work-sets 54A through 54C)
AH Second Floor Areas
AJ Building 771 Outbuildings (with dismantlement work-sets 77 and 81)
AK Building 790 Calibration Lab (with dismantlement work-set 82)
AL Building 771 Structure (Exterior, with dismantlement work-set 75)
AM Building 774 Area/Structure, (with dismantlement work-set 75)
AN IDEC, (with dismantlement work-set 59)

General Approach to Structural Decontamination

The decontamination of the Building 771 and Building 774 structures will be performed in the following general sequence.

The internal areas of the structure will be dismantled according to work-set. At the close of the work-set dismantlement activities, the areas will be empty of all gloveboxes, tanks, and systems providing services to gloveboxes and tanks. The electrical systems supplying lighting and distribution will remain in place, and the Zone I and II ventilation systems will have been removed, complete to the nearest isolation to area boundary. Asbestos removal internal to the structure will be completed, and the areas will be isolated from the balance of the structure to allow decontamination activities.

Room or area walls will be used as containment barriers, or temporary containment barriers will be installed to ensure that decontamination activities will be isolated from the balance of the structure. This will ensure that migration of contamination can not occur to the balance of the structure. Mobile HEPA ventilation will be installed for ventilation of areas being decontaminated. HEPA ventilation exhausted to the environment will be monitored, or exhausted to the building ventilation systems. Dismantlement activities associated with identified work-sets will be accomplished prior to commencement of dismantlement and decontamination activities associated with the decommissioning areas.

Following dismantlement work-set activities, remaining electrical systems (conduit, switches, and distribution of electricity) will be removed. Temporary electrical services will be installed. Lighting fixtures will be removed, acoustical and metal pan ceiling fixtures removed and packaged for disposal.

Remaining safety systems will be removed back to the area boundary, and any necessary modifications performed to replace required safety items.

Remaining utility supply systems (water, air, etc.) will be removed to the area boundary; and temporary services (for support of the decontamination activities) installed for supply to the area.

Interior, non-load bearing block walls and/or gypsum partition walls within or defining Areas AE and AF will be removed and packaged for disposal as LLW.

Prior to the characterization of the interior concrete surface areas, and physical decontamination activities, all painted surfaces in contaminated areas will be abrasively cleaned of paint. Removed "paint" material will be packaged for disposal as TRU.

Scaffolding will be installed in the area, and upper walls and ceiling areas will be decontaminated first. Concrete ceilings will be decontaminated as necessary, "metal deck" ceilings will be wiped down, initial surveys completed, and the decontaminated surfaces covered to protect against re-contamination. In metal decking areas, the "pigeon holes" (open areas due to the shape of the decking materials) will be physically isolated to prevent re-contamination.

Upper and lower walls will be decontaminated as necessary and preliminary surveys completed. Scaffolding will be removed to allow decontamination and/or removal of the floor surfaces.

Floor areas requiring removal of contaminants exhibiting penetration of less than one inch will be mechanically scabbled to remove contamination. Surface cracks in the floor slabs will be decontaminated with "crack chaser" scabbling equipment.

Floor slabs that exhibit penetration of contaminants greater than one inch will be removed and disposed of as LLW. This will potentially include the floor areas within rooms 114 and 149 and an estimated 25% of the remaining floor areas in Decommissioning Area AE. Surface contamination will be "fixed", and the slabs removed using concrete floor saws and appropriate lifting devices. Services uncovered by floor removal will be removed. Floor drains and "below-slab" services not exposed by floor removal will be isolated, stabilized, and identified for removal by ER.

Areas exhibiting residual contamination following the initial pre-demolition surveys will be physically isolated, decontaminated, and re-surveyed. All waste will be removed from the area, pre-certified, and staged outside the area boundary.

Pre-demolition surveys of interior surface areas will be performed, and permanent isolation barriers for decontaminated areas will be installed to prevent migration of contaminants into the decontaminated areas.

Systems and equipment attached to the exterior surfaces of the structure will be removed, and initial surveys completed. Areas of the exterior surface requiring decontamination will be decontaminated using local area containment and ventilation.

Prior to demolition activities, removal of asbestos bearing materials in the roofs will be accomplished.

Following decontamination of the exterior structure, and removal of remaining asbestos roofing materials, final surveys of the building structure will be completed.

The following table provides a preliminary estimate of the scope of the tasks

AREA	**FLOORS ft^2**	**WALLS ft^2**	**CEILINGS ft^2**	**WALL REMOVED ft^3**	**FLOOR REMOVED ft^2**	**SURFACE DECON FLOORS ft^2**	**SURFACE DECON WALLS ft^2**
AA	8,431	22,432	7,836	9,327	n/a	843	331
AB	5,763	11,025	5,763	5,546	n/a	576	0
AC	7,509	17,383	6,953	7,505	n/a	751	531
AD	5,457	14,433	5,457	6,868	n/a	546	33
AE	26,283	73,178	27,184	33,726	6,571	19,712	3,419
AF	36,240	85,943	31,795	39,797	19,053	17,187	4,359
ROOM 141	291	1,260	291	1,260	291	0	0
AG	2,596	19,047	1,154	6,937	n/a	2,596	19,047
AH	71,532	123,321	71,138	59,329	1,200	28,613	1,925
AJ	7,600	12,200	5,600	0	0	380	610
AK	2,400	8,000	2,400	0	0	0	400
AL	0	52,800	91,181	0	0	0	2,640
AM	38,569	68,370	22,106	8,102	0	5,568	6,115
AN	5,000	10,800	5,000	n/a	0	250	0
TOTALS	**164,101**	**368,023**	**157,569**	**170,295**	**27,115**	**77,022**	**39,410**

Areas AA, AB, and AD

The Office building, Annex, and maintenance shop will have all equipment/fixtures removed, and the structures surveyed to document the PDS. Release and demolition of the structures will occur independently of the main building structure.

Area AC

The locker room facility will have equipment and fixtures removed, and the structure will be surveyed in conjunction with the PDS for the Building 771 structure. Demolition in this area will occur concurrently with Building 771 demolition.

Area AE

The west side of the lower contaminated area will have remaining systems removed to the area boundary. Acoustical and metal pan ceilings will be removed and packaged for disposal. Remaining electrical and HVAC systems will be removed to the area boundary.

Non-load bearing block walls and partitions will be removed by hand or machine mounted pneumatic mechanical methods and packaged for disposal as LLW.

Upper structural surfaces (walls and ceilings) will have all paint removed using an abrasive shot/grit blasting method or by high-pressure water hydrolasing methods. Using characterization data, slab-on-grade (SOG) floors (an estimated 25%) requiring removal will be identified. Remaining floor surfaces will

be decontaminated using mechanical scabblers and/or rotary cutting equipment. Initial PDS surveys will identify surface areas (floors, walls, or ceilings) requiring additional decontamination effort, and an iterative process to complete decontamination will occur. Additional decontamination efforts will be accomplished using mechanical scarifying equipment.

Fixatives to contain any remaining contamination will be applied to the floor slabs to be removed, and segmentation will be accomplished using electric-powered concrete floor saws. Segmentation of the slabs will be accomplished only to a depth allowing cutting of the reinforcing mat of the slab. This will prevent any contamination of sub-surface media below the slab. The floor slabs will be removed and packaged for disposal. Final PDS will occur and the area will be isolated from the balance of the structure to prevent re-contamination of any surfaces.

Area AF

The east side of the lower contaminated area will have remaining systems removed to the area boundary. Acoustical and metal pan ceilings will be removed and packaged for disposal. Remaining electrical and HVAC systems will be removed to the area boundary.

Non-load bearing block walls and partitions will be removed by hand or machine mounted pneumatic mechanical methods and packaged for disposal as LLW.

Upper structural surfaces (walls and ceilings) will have all paint removed using an abrasive shot/grit blasting method or by high-pressure water hydrolasing methods. Initial PDS surveys will identify surface areas (walls or ceilings) requiring additional decontamination efforts, and an iterative process to complete decontamination will occur. Additional decontamination efforts will be accomplished using mechanical scarifying equipment.

The entire floor slab located within Area AF (rooms 114 and 149) is estimated to require removal and replacement. Fixatives to contain any remaining contamination will be applied to the floor, and segmentation will be accomplished using electric-powered concrete floor saws. Segmentation of the slabs will be accomplished only to a depth allowing cutting of the reinforcing mat of the slab. This will prevent any contamination of sub-surface media below the slab. The floor slabs will be removed and packaged for disposal. Final PDS will occur and the area will be isolated from the balance of the structure to prevent re-contamination of any surfaces.

Area AG, Tunnels

The tunnel to Building 776 will be isolated at an appropriate place from Building 776. An area for installation of isolation block wall will be identified. This area will be decontaminated and surveyed, and installation of the block isolation wall will occur prior to decontamination efforts in the balance of the tunnel.

Tunnel surfaces will have all paint removed using an abrasive shot/grit blasting method or by high-pressure water hydrolasing methods. Initial PDS surveys will identify surface areas (floors, walls or ceilings) requiring additional decontamination efforts, and an iterative process to complete decontamination will occur. Additional decontamination efforts will be accomplished using mechanical scarifying equipment.

Final PDS will occur and the area will be isolated from the balance of the structure to prevent re-contamination of any surfaces.

Area AJ, Building 771 Outbuildings

The Building 771 outbuildings and structures will be handled in the following manner:

- The diesel fuel tanks will be drained, surveyed and released.
- Emergency generator #1 will be removed from the structure, surveyed and released.
- Emergency generator #2 will be electrically disconnected, and the external muffler removed. The muffler and the generator with enclosure will be surveyed for release and removed from the pad.
- Trailers will have the skirting and stabilizing blocks removed. Trailers and removed materials will be surveyed for release, and removed from the area.
- Exterior steel tanks (D107 and D08) will be evacuated, surveyed for release, and segmented in place.
- HF Acid, Argon, Propane, and Caustic tanks will be verified as empty, surveyed and released.
- Remaining outbuilding structures will be surveyed, released, removed or demolished.

The following table summarizes the proposed disposition of the Building 771 outbuildings and structures.

Building/Structure	**Disposition**
Trailers A through L	Removed
262 (Diesel Fuel Tank)	Removed
Building 770 (Maintenance And Offices)	Demolished
Building 714/714A	Removed
Building 715 (EG-1)	Removed
Building 716 (EG-2)	Removed
Building 717 (Magnahelic Gauge Building)	Demolished
Building 771B (Carpenter Shop)	Demolished
Building 772/772A (HF Storage)	Removed
Building 773 (Guard Post)	Removed
Building 775 (Lift Station)	Abandoned
Caustic Storage Tank	Removed
Propane Tanks	Removed
Decontamination Trailer	Removed
Argon Tank	Removed
D107/108 Tanks	Demolished
UST's	Abandoned

Available Decontamination Technologies

Scabbler - Abrasion (scabbling) of concrete surfaces is also referred to as "scarifying" (scabbling is a trade name). The scarifying technique is best suited for the removal of thin layers of contaminated concrete. The tool consists of pneumatically operated piston heads that strike the surface and chip off the concrete. The piston heads have points (normally five or nine) and are made of tungsten carbide. The units are available in floor, wall, and hand-held models, depending on the application. The scabbler, while effective at removing surface contamination up to one inch deep, does require containment controls during operation, due to a high generation of dust. All debris generated, even from unaffected areas, will be managed as LLW.

Hydrolasing - Hydrolasing is accomplished by propelling water at very high pressure against the contaminated surface. The abrasive action of the high-pressure water removes the layers of paint and the immediate layer of concrete matrix. Containment of the water is necessary to protect adjacent areas. Water is contained at floor level by temporary berms installed and sealed on the floor surface. Secondary hydrolasing water is collected from bermed areas and is processed through filtration and ion media to meet release criteria.

Grit blasting - Abrasive grit decontamination is accomplished by propelling a grit media against a contaminated surface. The abrasive action of the grit strips the contaminant from the surface. Water and air are the two most widely used grit propellants. Water is preferred because it reduces the amount of airborne contamination. However, water systems produce more secondary waste than air systems, unless the system is equipped to recycle the secondary liquid waste generated.

Most modern grit blasting systems are equipped to not only recycle the propellant used, but also the grit itself. The most common grit media in use are glass beads, plastic beads, and alumina, all of which may be recycled several times before their effectiveness is diminished.

"Shot"- blasting - Vacu-blasting operates on the same principal as grit blasting, i.e., an abrasive grit media is propelled at high force onto a contaminated surface to remove the contaminants. The vacu-blasting system is equipped with a vacuum fitting which evacuates the abrasive media, dislodges debris, and collects it in a reclaimer. The abrasive media is then separated from the contaminated debris for reuse.

Systems currently in use in the nuclear industry effectively remove layers of paint and underlying contaminants while generating a minimum of airborne contamination and secondary waste. However, large compressor units are required to provide the air supply. Larger systems are equipped with several blast heads of various sizes. The number and sizes of the blast heads are dependent upon the dimensions and physical arrangement of the area(s) to be decontaminated. Flexible hosing is used to connect the blast heads to the main unit. This improves the system's versatility and mobility.

Pneumatic Hammers - Chipping hammers are similar in concept but are lighter (14-35 pounds), which allows them to be hand-held for use on walls and ceilings. Their rate of delivery is normally about 2,000 blows per minute but the nail size is about half that of a paving breaker. Chipping hammers are used to scarify small areas of walls where contamination may have penetrated several inches. Hand held and reasonably priced, they are effective for removing surfaces in a partially contaminated structure.

Concrete floor and wall saws - A motor-driven diamond or carbide saw blade may be used to cut a kerf through concrete floors or walls. Most concrete wall saws are track-mounted and operated manually. Most concrete floor saws are wheeled units and are also manually operated. A normal thickness of cut is about 1/3 the diameter of the blade, and saw cut speed can reach 150 square inches per minute, depending on the concrete composition. Since most concrete saw blades are water-cooled to prevent warping, the water is a secondary waste concern. The process of concrete cutting is dependent on the material being cut, but it is a useful dismantling technique. Concrete sawing is cost-effective, but is limited to concrete removal applications.

The following assumptions form the basis for the decontamination strategy developed herein for Decommissioning areas associated with Building 771, Building 774, the exterior of the structures, and the outbuildings:

- Decontamination activities are planned to provide structure at grade slab and above that meets the unrestricted release criteria for release of structure prior to demolition activities.
- PDS for contaminated areas will require the removal of paint from all exposed surfaces to facilitate survey measurements.
- Decommissioning areas AA (Office structure), AB (Annex), AC (Locker room area), and AD (MTCE) exhibit none or very low contamination levels; will require 0-10% decontamination efforts; and surface preparation for PDS (paint removal) will be very minimal.
- Asbestos characterization and removal will be accomplished by an outside contractor.
- Interior non-load bearing block and partition walls in contaminated areas will be removed and packaged for disposal in lieu of decontamination efforts.
- SOG floors will be decontaminated to release levels. SOG and elevated concrete floors exhibiting penetration of contaminants greater than one (1) inch, will be removed in lieu of decontamination. Removed SOG floors will be replaced prior to demolition activities. Penetration of contamination in the floors does not exceed one (1) inch depth except in rooms 114 and 149, and an estimated 25% of the remaining SOG.
- Tunnel structures to Building 776, Building 774, and Building 771 Stack will be decontaminated, abandoned in place, and removed by ER
- Underground storage tanks will be decontaminated, abandoned in place, and removed by ER
- Sampling, evaluation, and removal of contaminated sub-surface media (below any removed SOG) to be accomplished by ER.
- Hold up will be Category D material suitable for dispositioning at WIPP

The following tables summarizes the uncertainties and potential risks associated with the Building 771 decontamination strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Depth of contamination, Areas AF, AG	Schedule, Cost	Medium	Increased RLC and in-process characterization process
Asbestos involvement in block/partition wall removal	Schedule, Cost	Low	Asbestos characterization program, early identification
Surface Area of Contamination, Areas AA, AB, AC, and AD	Increased Scope, Cost, Schedule	Low	Early characterization process

*High, Medium, or Low

3.2.8 Infinity Room Strategy

Room 141, called the infinity room, was originally constructed to function as an SNM storage vault, and subsequently re-configured to function as a pump room. Operational problems with the pumping operation resulted in radionuclide bearing acidic solution spills that contaminated the floor and the pump pedestals. The contamination occurrences were so great that the operation was eventually phased out. Subsequent remediation actions to remove contaminated concrete resulted in high airborne concentrations, and the room was eventually sealed and abandoned. Lead shielding existed during the pump operation periods, and it is expected that acid spills may have deposited some lead contamination in the concrete structures. The infinity room will be removed in lieu of decontamination activities. Room 141 removal will be performed in the following general sequence.

Specialized lifting equipment will be installed at the second floor roof level, and certified for capacity, to accommodate the removal of appropriate sections of floor, ceiling, and wall materials.

Decontamination activities on the second floor area above room 141 will need to be completed prior to the start of room 141 removal. Second floor walls and floors (including any supporting metal floor deck) between columns 12 and 14.5, and columns M and S will be removed back to within five feet of the supporting beams and girders around the footprint of room 141. The west walls of the stairwell, rooms 144 and 244, and the elevator shaft, will remain. This will require the removal of approximately 1,100 square feet of second floor area and the supporting metal deck. Removed floor sections will be sent for final survey and release. Appropriate safety systems will be installed to prevent falls.

The six inch downspout for the stormsewer drain system located on the exterior of the south wall of room 114 will be re-routed from the roof drains, the riser sections removed and the system capped.

To maintain the structural integrity of the Building 771 structure for segmentation activities, additional shoring materials will be added to north side of columns P13 and P14, which constitute an integral portion of the north wall of room 141. Columns P13 and P14 will be left in place, and concrete wall sections will be removed up to but not include these columns.

A three-stage, HEPA ventilated containment structure will be erected from the first floor elevation to the interior of the building roof. The containment will be erected to surround the exterior of room 141, utilizing the existing stairwell and elevator shaft walls. The containment will be maintained negative to the balance of the building. Scaffolding will be installed around the exterior north, south, and east walls of room 141 to allow access to the walls and ceiling concrete of the room.

An adapter to insert a passive aerosol fog will be installed in the door of the room from the hall, and the interior of room 141 will be “fogged” to encapsulate the contaminants on the interior surfaces of the room, and reduce the possibility for airborne contamination. A portable HEPA ventilator will be installed to replace the HEPA filter in the door to maintain the room negative to the outer containment. Manned entry to the room will be accomplished, and any “loose” items will be removed and packaged for disposal as TRU material. Connection to the walls of the room of any pipes, conduit, etc. will be severed or removed. Any systems traversing the room will be isolated and prepared for removal. The final task for manned entry will be the spraying of a final “Insta-cote” covering on all concrete surfaces within the room. The ability to “re-fog” the room will be maintained during the removal operation.

The ceiling concrete will be reinforced with an additional structural member to prevent movement and provide support of the concrete blocks as they are cut for removal. Concrete anchors for installation of lifting eyes will be installed in each section prior to segmenting operations.

Concrete wall saws will be used for the ceiling and wall structure. Cutting operations will penetrate the surfaces only deep enough to sever the reinforcing bars of the concrete. This will reduce the possibility of cooling water from the saw being introduced to the interior contaminated surfaces. Ceiling concrete will be segmented into blocks of approximately 3' by 3'. Following segmentation of the ceiling structure, concrete blocks will be "cracked", removed in sequence, and packaged for disposal. Temporary HEPA ventilation will be placed in the areas being "cracked" to prevent any airborne contamination arising from the cracking/removal process. Ceiling concrete will be packaged as LLW. A temporary ceiling cover will be installed to replace removed ceiling concrete and maintain containment integrity for the room.

The north, south and west walls of room 141 will be segmented with concrete wall saws, and removed in sequence from top to bottom. Concrete anchors will be installed in the top surfaces of blocks to facilitate lifting. Cutting operations will penetrate the surfaces only deep enough to sever the reinforcing bars of the concrete. This will reduce the possibility of cooling water from the saw being introduced to the interior contaminated surfaces. The walls will be segmented into of blocks approximately 3' by 3'. Walls will be removed with the exception of the columns P13 and P14 that are integral to the north wall of room 141. These columns will be wrapped with plastic covering as concrete removal proceeds from top to bottom to prevent migration of contamination from the interior surface. Following segmentation, concrete blocks will be "cracked", removed in sequence, and packaged for disposal. Temporary HEPA ventilation will be placed in the areas being "cracked" to prevent any airborne contamination arising from the cracking/removal process. Removed concrete from the upper walls will be packaged for disposal as LLW. Removed concrete from the lower walls will be packaged for disposal as TRU material.

Scaffolding installed for the removal of the walls and ceiling concrete will be removed and a temporary flooring of plywood will be installed to prevent migration of contamination from the floor to other surfaces.

Scaffolding will be installed around columns P13 and P14 to facilitate decontamination activities. Concrete surfaces interior to room 141 will be scarified using chipping hammers, and if warranted by structural considerations, additional shoring will be installed at these columns.

The east wall of room 141, comprising the structure of the elevator shaft, will remain. Temporary removal of service of elevator will be required. Lower sections will be removed as necessary, following the placement of reinforcement for the wall, and an appropriate containment structure.

Floor slabs will be segmented using a floor saw. Concrete anchors will be installed for lifting eyes, and the slabs will be removed and packaged for disposal as TRU material. Process drain piping below the slab will be stabilized, segmented and removed. Remaining process drain piping not removed will be capped and abandoned in place for removal by ER.

The following table provides a preliminary estimate of the scope of this task.

AREA	FLOOR ft^2	WALL ft^2	CEILING ft^2	WALL REMOVED ft^3	FLOOR REMOVED ft^2	SURFACE DECONTAMINATED ft^2
AF	291	1,260	291	1,260	1,391	100

The following assumptions form the basis for the room 141 removal strategy.

- Decontamination activities on the second floor above the removal area have been completed.
- Internal contamination levels and possible airborne contamination levels (DAC) in room 141 preclude manned entry without special considerations.
- Application of passive aerosol fog will alleviate airborne concerns and allow initial manned entry.
- Room 141 equipment (acid pumps, etc.) has been previously removed, only some conduit and piping traversing room remains.
- Depth of contamination in lower walls and floor precludes decontamination of concrete surfaces in-situ.
- Structural integrity of floor slabs in room 141 is adequate to provide for lifting of slabs and placement into standard waste box (SWB) safely.
- Structural integrity can be maintained with temporary shoring materials.
- Subsurface media removal to be accomplished by ER.

The following table summarizes the uncertainties and potential risks associated with the removal strategy for room 141.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Fogging is inadequate to control airborne	Schedule, Cost	Low	None
Floor sections are not structurally sound	Schedule, Cost	Medium	Possible use of remotely operated "Brokk" with clamshell attachment
Structural integrity cannot be maintained with temporary shoring material	Increased Scope, Cost, Schedule	Low	Emphasis on initial engineering design and controls

*High, Medium, or Low

3.2.9 Pre-Demolition Survey

The objective of PDS is to assess the final radiological and non-radiological conditions within the Project in order to free-release the facilities and prepare a PDSR, which is issued to the LRA for concurrence. The following question will be answered based on PDS results: Is the survey unit suitable for unrestricted release?

The strategy for PDS is to verify that the radiological condition of the survey unit meets the requirements outlined in the PDSP. The type of data necessary to satisfy the objectives of PDS include total surface contamination measurements, removable surface contamination measurements, and scan data. Surface media sampling will only be required on a limited basis, given that all suspect surface media will be removed during decommissioning.

The RLCR will provide much of the information required to design the PDS. Additional information required to design the PDS include in-process survey data (radiological) and updated maps to reflect structural alterations. In-process surveys are performed to assess the changing radiological conditions during the course of decommissioning and to confirm that an area is free of gross contamination. In process survey data will be incorporated into the PDS.

The RLC data for Type 1 (Class 3) survey units satisfies the PDS requirements. PDS will not be repeated for these structures, provided that isolation controls were maintained throughout the duration of the project. Verification surveys will be performed prior to the release of these structures to confirm that radioactive material was not introduced into these areas. Structures such as administrative support trailers, guard stations and trailers, and auxiliary support trailers and outbuildings (acid storage, maintenance, etc.), as well as the Building 771 IDEC are included in this category.

Non-radiological contaminants shall have been addressed at the RLC and in-process phases of decommissioning. All ACM with concentrations in excess of regulatory limits shall be removed prior to the commencement of PDS. All other non-radiological contaminants (Be, RCRA metals, PCBs, etc.) shall also be addressed in a similar manner. In limited cases (e.g., Building 771/Building 774 roof), non-radiological characterization may be required during the PDS phase.

Based upon available data/information, the following sampling plan is recommended in order to support the PDS effort for both radiological and non-radiological constituents.

The building surfaces will be divided into survey units based on the requirements outlined in the PDSP. The types of measurements that will be performed during PDS include total surface contamination, removable surface contamination, and surface scans.

Surface media samples may also be required on a limited basis. For this estimate, the 771 Closure Project will be delineated by the (13) decommissioning areas. The initial surface area estimates and associated survey unit classifications are as follows:

Decommissioning Areas	Description	Estimated Surface Area (m^2)	Initial Survey Unit Classification	Minimum Required Survey Frequency (%)
AA	Office Building	2171	2	50
AB	Annex	1657	2	50
AC	Locker Room	1929	2	50
AD	Maintenance Shop	1714	2	50
AE	West ½ CA	6682	1	100
AF	East ½ CA	8507	1	100
AG	Stack/Tunnel	2159	2	50
AH	2nd Floor	15333	2	50
AI	IDEC	25600	3	10
AJ	Outbuildings	2405	3	10
AK	Building 790 Calibration Lab	5158	2	50
AL	Building 771/Building 774 Exterior	13635	2	50
AM	Building 774 Area/Structure	12489	1	100

An independent verification (IV) survey may be performed on an established percentage of survey units (typically five-percent) following the completion of the PDS. The independent verification contractor (IVC) will be selected and funded by the DOE such that independence is maintained from the Building 771 Closure Project personnel.

PDS will be performed with a combination of contracted vendors and site qualified RCTs. The primary responsibility of the vendor(s) will be to perform scan surveys. Site RCTs will collect total and removable surface contamination measurements. Outstanding samples (for radiological and/or non-radiological contaminants) will be collected by the site sample team or other sampling personnel. The total number of crews to be utilized will depend on schedule constraints. The following are the assumptions associated with the PDS activities:

- The required number of survey crews and instruments will be available.
- Independent verification surveys will not impact the schedule and any support required from the 771 Closure Project team will be minimal.
- Independent verification surveys will be budgeted by DOE.
- The regulators will approve the PDSP.

The following table documents the potential risks and uncertainties associated with PDS activities:

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Required number of survey crews is unavailable.	Cost and schedule impact.	High	Hire outside contractor to support/perform PDS.
Required number of instruments is not available.	Cost and schedule impact.	Medium	• Purchase additional instruments. • Hire outside contractor to support/perform PDS.
Survey productivity is less than 100 square meters per crew shift.	Cost and schedule impact.	High	• Hire outside contractor to support/perform PDS. • Develop/streamline contractor survey protocols/data-processing methods prior to commencement of PDS.
Map development not maintained as parallel path to surveys.	Cost and schedule impact.	Medium	• Early start on map development. • Early start on survey package development. • Hire additional AutoCAD engineers.
Technical support not maintained as parallel path to surveys.	Cost and schedule impact.	Low	Early start on survey package design, etc. and report development.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Additional areas/conditions identified to expand original scope.	Cost and schedule impact.	High	• Minimize spread of contamination during decommissioning, especially for uncontaminated or low contamination areas. • Minimize storage and transport of waste crates in previously uncontaminated or low contamination areas. • Perform thorough in-process surveys prior to turnover for PDS. • Add "buffer" time into schedule to perform decontamination in areas contaminated during decommissioning. • Maintain stringent isolation controls in surveyed areas.
The CDPHE and EPA do not approve existing Site PDSP.	Survey design approach changes, potential cost and schedule impact.	Low	Develop a project-specific plan.
The CDPHE and/or other oversight groups do not accept PDSR.	Schedule and cost impact.	Medium	Maintain consultative process throughout the duration of the survey process.
Areas are inaccessible for PDS due to decommissioning and waste storage	Cost and schedule impact.	High	Determine "critical path" activity to minimize cost and schedule impact.

*High, Medium, or Low

3.2.10 Demolition

This strategy encompasses the physical demolition of 771 Closure Project structures after decontamination and component removal activities are complete. The demolition scope will focus on all remaining structures, facilities, and appurtenances associated with the 771 Closure Project, as globally defined by *Set Descriptions and Designated Areas*. The scope includes such associated appurtenances as retaining walls, loading docks, pads, temporary structures, and underground utilities or structural features to the edge of the foundations. Sidewalks, fences, and aboveground exterior utilities will be removed on a case-by-base basis and coordinated with the South Side Project. ER will remove asphalt roadways and the remaining underground utilities.

3.2.10.1 Overview

Demolition will be accomplished using a variety of mechanized equipment, primarily of the tracked variety due to the high incidence of tire failures that accompanies the use of rubber tired equipment. Tracked excavators fitted with quick-change attachments are the preferred piece of equipment, using a variety of hydraulic shears, grapples, thumbs and vibratory demolition hammers to accomplish various demolition needs. A large tracked excavator properly outfitted can be used effectively on most two to three story tall demolition applications. Additionally, the detachable tools can be fitted with remote operated fogging

water-spray nozzles for dust control purposes in order to prevent personnel with dust control spray hoses from getting into tight locations with limited escape routes. During demolition, airborne dust will be monitored on a visual presence or absence criterion, with dust control water spray being applied as required from a fire hose equipped with a fog nozzle.

Excavators can easily direct load debris into disposal containers or trucks, or front-end loaders can also be brought in depending on the debris haul distance. Should a building structure or system be too tall to successfully demolish with a large excavator, a crane and wrecking ball combination will be mobilized. Figure 3-2 provides an overview of the sequence of demolition activities with the ER interface points, also see Section 3.2.3. The following bullets provide the general sequence of activities associated with the demolition of the 771 Closure Project:

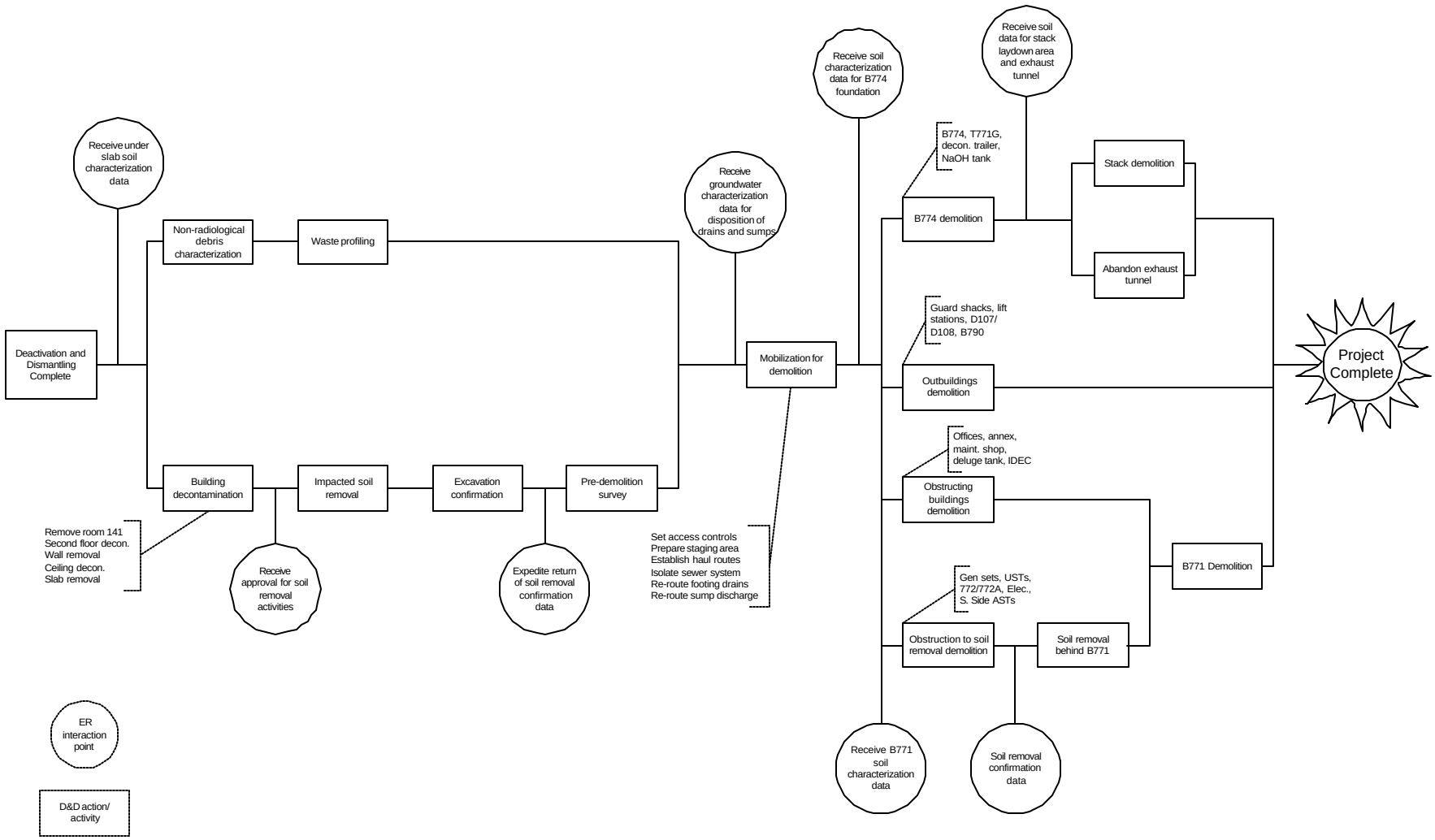
- Mobilization,
- Site preparation,
- Removal of overhead obstructions,
- Removal of site features required to execute demolition (paved lots and streets for ease of access, retaining walls, exterior fire system components),
- Demolition of outbuildings and site features closest to the Building 771 and Building 774 footprints,
- Demolition of remaining outbuildings and site features,
- Demolition of structures and appurtenances specific to Building 771 and Building 774 but independent of the main production floor space of Building 771 (e.g. Building 771 office spaces and maintenance shop) and soil removal around Building 771,
- Demolition of the main Building 774 building structure,
- Demolition of the main Building 771 building structure after using Building 771 as the containment for ER,
- Site cleanup, and
- Demobilization.

The demolition sequence is based on technical requirements. However, starting the demolition process on the smaller outbuildings will ensure that the process is refined before the more complicated structures are initiated.

3.2.10.2 Mobilization

The demolition execution will begin the mobilization of the demolition contractor followed by site preparation. A central contractor's area will be established in an existing improved area, such as the paved area along the north side of Building 771 and Building 774. The decommissioning contractor may mobilize the following items: office trailers, shower/change facilities, lunchroom, portable toilets, hand wash units, and tool/equipment storage. A security fence will be established for access control purposes only.

Figure 3-2. Demolition Activities and ER Interface



3.2.10.3 Site Preparation

As part of site preparation, all existing features associated with site utility systems will be located and marked. All of these systems will be evaluated for isolation purposes. The sanitary sewer system will need to be isolated to preventing inflow of inappropriate wastewater generated by demolition dust control activities. Electrical and communication needs within the 771 Closure Project area will be dynamic, but it is likely that all power fed from the main distribution point at the south side of the Building 771 will be terminated to allow for the removal of site features in the area.

All critical power requirements will be identified as a part of the design process. Maintaining sump and foundation pumps for control of groundwater, power to sanitary sewer lift stations, and some area lighting will be necessary. Temporary power for the subcontractor's office space and infrastructure needs will be required and provided by the RFCP.

Protective barriers or fences will be erected around permanent site features designated to remain after completion of demolition and site restoration. Electrical distribution switchgear, overhead distribution lines, and area lighting to remain operational during and/or after the demolition will be protected as required and flagged for added operator awareness and overall visibility.

Run-on and run-off control features will be erected or implemented. Installation of temporary diversion berms, erosion control silt fencing, and interceptor ditches, as well as the clean out of existing drainage culverts and ditches will be accomplished as required to divert significant overland flow away from the demolition area.

Traffic patterns and specific loading areas for waste management will be established, as will temporary stockpile areas for debris. For any backfill material that appears likely to be in temporary storage for a long period of time, a more permanent area will be created that will encompass additional erosion or run-on/run-off controls as necessary. The location of any long-term backfill stockpile area will be coordinated with ER. Finally, any known contaminated surficial soils in the areas immediately adjacent to planned demolition activities will be delineated and controlled by ER.

3.2.10.4 Removal of Site Features

Initial demolition tasks will involve stripping remnant equipment, stacks, and others materials from roof tops. The removal of overhead obstructions will reduce the possibility of equipment coming in contact with energized electrical lines, and will allow access for operating cranes and long reach tracked excavators. The removal of remnant equipment is required early in the process in order to free up the roof system for dismantling/removal of suspected ACM in the roof membrane.

3.2.10.5 Demolition of outbuildings

The majority of the outbuildings in the 771 Closure Project are small light steel-framed structures with corrugated metal siding and were placed on cast-in-place concrete slabs. These structures will be shredded and sized on their respective concrete slabs with the tracked excavator using a detachable hydraulic shear. Metal materials will be shipped off site for recycling, with any non-recyclable items being direct loaded into containers for off site disposal in a RCRA Subtitle D landfill. Dependant upon identification or investigation of environmental media concerns, the concrete slab/foundation associated with the building will be broken up using a vibratory hammer attachment to the excavator, with the rubble

being designated as suitable for onsite backfill. The remaining outbuildings are temporary trailers, and will be dispositioned as property.

Demolition activities will be initiated with the features closest to the Building 771 and Building 774 footprints to free up these areas for support and preparatory activities. For example, the remnant building shell and foundation associated with Building 715 and Building 716 will need to be removed to clear the area for the removal of soil from the buried south wall of Building 771. Removal of remnant USTs in this area is necessary for the same reason. It is assumed that 5 USTs remain in the area to the south of Building 771. Two former diesel/fuel oil USTs appear to have been abandoned in place using foaming techniques. Three other USTs are suspected beneath the concrete slab of Building 716. These tanks will be removed prior to removing the soil from behind the south wall of Building 771.

3.2.10.6 Demolition of structures and appurtenances specific to Building 771 and Building 774

The next area to address in the demolition process will be those structures and appurtenances specific to Building 771 and Building 774, but independent of the main production floor space of Building 771. The objective is to remove structures, which do not allow unrestricted access to the main building structure. These structures include, but are not limited to: Building 771A and B office spaces, T771C, Building 771C annex, West Dock, Maintenance Shop and Deluge Tank Annex; and Building 774 East Dock, hatch cover, Rooms 206-208, 212, and 250-251. Removal of these features allows access to the elevated portions of the respective buildings, as well as provides loading platforms for loading waste containers and debris hauling trucks. For Building 771, this action exposes the main structure, as defined by the three buried cast-in-place concrete walls on the south, east, and west sides, and the cast-in-place concrete firewall between the office spaces on the north side of the main Building 771 footprint and the main operations area.

At the same time, the demolition contractor will be moving soil away from the east, west, and south walls of Building 771 down to an elevation approximately coincident with the second floor framing/slab. Removal of this soil will relieve passive earth loading pressure from the top one-half of the wall, and will allow for the removal of the roof framing system. The concrete walls making up the main structure of the building were not designed or constructed as retaining walls; demolition will leave as much of these concrete walls in place, as possible. The objective of the soil removal and demolition is to leave the area in a safe configuration until such time as the site is backfilled by ER during site restoration. The maximum amount of wall to be left in place would correspond to a line 3 feet below the anticipated final grade of the hillside. Demolition of the eight-foot retaining wall south of the 771C Annex will be accomplished at this time to facilitate soil removal from the Building 771 east wall.

As soil is removed from the south, east, and west sides of Building 771, it will be transported to a temporary stockpile area adjacent to the demolition project (assumed within one-mile round trip for estimating purposes). The anticipated configuration of the excavation behind the buried walls is a 15-foot horizontal working surface immediately behind the wall with the excavation sloping up to the nearest undisturbed grade at a slope of 1.5 feet horizontal to 1 foot vertical. Engineering calculations will be made to validate the above described scenario of exposed unsupported wall lengths based on the remaining passive soil loading, active loading from machinery operating in the vicinity of the wall, revised wind loading, and interior structural framing to remain abandoned-in-place.

3.2.10.7 Removal of the main Building 774 building structure

The demolition approach for the Building 774 footprint will follow the same overall approach of working off of the existing first floor slab elevation and collapsing demolition materials and debris into, and onto, this surface for segregation, sizing, and direct loading into containers and trucks positioned along the existing north side paved loading area. In addition, the Room 322 Storage Shed and Building 774, Door No. 12 concrete areas will be used to take advantage of working off of the stable grade adjacent to the exterior of these walls. This assumes that all issues associated with the in place abandonment of three USTs beneath the Storage Shed, and any associated RCRA Unit constraints, have been resolved prior to the start of demolition actions.

3.2.10.8 Under Building Contamination Remediation

The UBC will be performed once the slab has been removed, but before the building has been demolished. Once the slab has been removed from over these impacted soils, ER will be prepared to immediately follow the decommissioning workers and commence removal of these soils. This break in demolition is prudent as it takes advantage of the Building 771 structure for use as a containment to control the excavation activities. Once under slab media has been removed and confirmed, the void created by the removal will be left unfilled. No backfill or protective plates are planned to be placed before, during, or after demolition.

Using the Building 771 structure provides control of the soil removal; promotes human health and environment protection during soil removal; provides a containment that will withstand the effects of extreme meteorological events (versus a temporary post-demolition enclosure); and reduces project cost. Project savings come from eliminating design, permitting, installation, monitoring, decontamination, and final survey of the containment system; utilizing the existing containment system and waste handling pathway prepared for the slab removal; eliminates the need to provide a protective surface on the floor slab (e.g. steel plating) to complete the Building 771 structure demolition; gets the overall demolition complete with only one mobilization effort; and reduces project administration and management costs by reducing the overall 771 Closure Project duration.

The least complex scenario for the extent of this anticipated contaminated media is that the impacted soil is limited to the backfill space between the bottom of the concrete slab and the top of building foundation footings. Under this scenario, no structural foundation elements will be disturbed. It is anticipated that contaminants will not have migrated significantly in either a horizontal or vertical direction, because these compounds are insoluble in nature. In addition, there was an absence of hydraulic head, which would drive a spill condition through cracks in the floor and deep into the underlying backfill layer. Therefore, it is assumed that these contaminants will likely be limited to the layer of soil directly beneath the slab.

Should the contamination have migrated vertically beneath the strip footing of exterior walls or interior pilaster pads, options do exist to safely complete the soil removal, or to stabilize a remaining inaccessible contamination until the demolition is complete and a limited final excavation can be performed. If impacted soils are identified beneath an interior pilaster pad, soil will be removed at an angle of 45 degrees from the base of the pad until such time as the removal adjacent to the pad is complete. New concrete pads will be placed upon the clean soil adjacent to the impacted pad. A “saddle” will be attached to the pilaster, transferring the any loading to the new pads. At this point, the affected pad will be disconnected from the pilaster, and the impacted soil beneath the pilaster will be removed.

Should contamination have migrated beneath a spread footing, it will be assessed, and dispositioned depending upon the length of footing. Impacted soil will be removed at an angle of 45 degrees from the toe of the footing until such time as the removal adjacent to the footing is complete. Short lengths of footing (3-4 feet) can be exposed by removing impacted soil from beneath the footing without risking the structural integrity of the building. Limited underpinning will be used, if contamination extends into the soil. Finally, the impacted area will be demarcated, a liner placed to cover the concrete footing and isolate the impacted soil, and a 6-inch cap of low-slump concrete placed over the soil. This concrete cap will isolate the contamination and prevent cross-contamination during demolition. The soil will be removed after demolition is complete.

3.2.10.9 Demolition of the main Building 771 building structure

The demolition of Building 771 will be initiated with the removal of the slab, as required for ER access. After the UBC has been remediated, the remaining demolition will be completed. Once all the office and loading areas have been removed to the elevation of the existing finished floor, and all engineered soil removals have been accomplished to relieve passive soil loading conditions; an opening will be advanced into the main Building 771 structure from the north wall, moving south onto the finished floor slab of the first floor. The building structure will be demolished using tracked excavators, working off the first floor slab, equipped with detachable hydraulic shears and using the remnant slab of the office area as a staging area and loading areas. The concrete wall will be removed to a point a minimum of 3 feet below the proposed grade. This will be accomplished using the tracked excavator, working along the indicated projection of the final cap grade (minus 3 feet) using the demolition hammer to "score" the line, followed by a combination of shears and hammer to remove the loosened concrete wall above the line. This action would likely be accomplished from the exterior of the foundation wall with the concrete failed either into or out of building to be further sized and segregated from reinforcing steel as appropriate for disposition as on site clean fill.

As materials are generated from the demolition process, they will be evaluated and segregated on the basis of ultimate disposal pathway, sized according to predetermined disposition acceptance criteria, and placed into containers or transport trucks for shipping to the appropriate disposition location or destination. Empty disposal containers and haulage trucks will be staged along the north side of this loading dock, with demolition debris loaded directly for transport. Piles of segregated materials may remain staged on the dock until such time as an appropriate amount has been generated and an appropriate container can be delivered. Section 3.2.11 and 3.2.12 provides the demolition details for the exhaust stack and tunnel.

The interim goal of the demolition effort will be to leave a three-sided "handball court" configuration for the Building 771 foundation area. Leaving the first two bays of structural concrete framing between the first and second floors, as well as the associated second floor slab, will provide support for the three walls of the "handball court", leaving the area safe for worker access. This will likely be the final configuration of the foundation for Building 771, prior to ER commencing final site restoration. Figure 3-3 provides a simplified view of the what will and will not be removed during demolition. If required, holes can be punched into the remaining concrete slab surface to facilitate vertical migration of future wetting fronts through the horizontal barrier that the undisturbed slab would create. The presence of an unbroken horizontal barrier may conflict with the goals of the ultimate closure design.

3.2.10.10 Site Cleanup and Demobilization

The final task to be completed by the decommissioning contractor is to perform any backfill and compaction necessary to render the site safe for personnel involved in follow-on site closure actions.

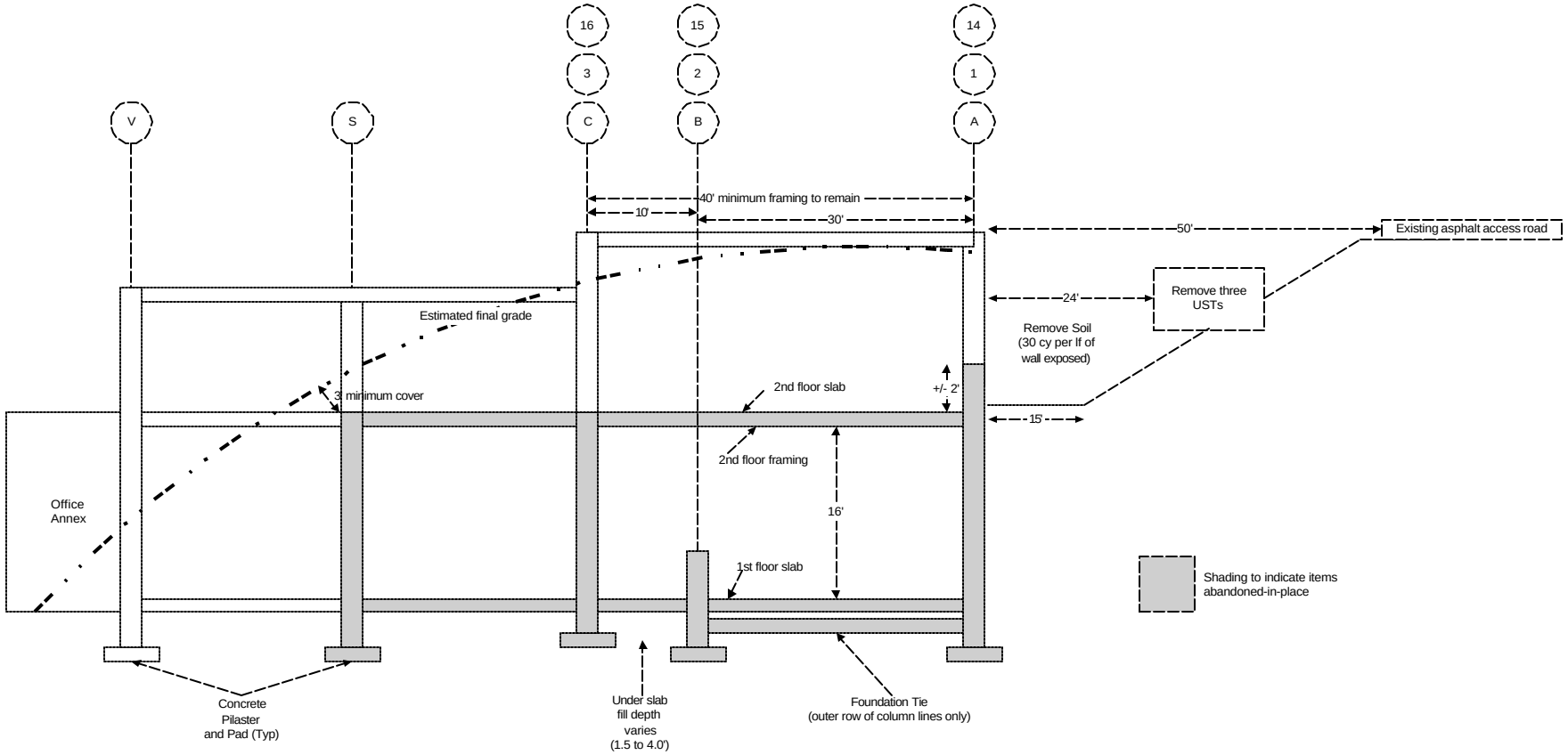
These backfilling operations would be limited to filling basement level openings, and providing fill material against walls to be abandoned in place to ensure they are fully stabilized. Final site backfill, re-grading, and site restoration will be the responsibility of ER. The decommissioning contractor shall also be required to install final, or stabilize existing, temporary run-on/run-off controls or erosion controls. The decommissioning contractor shall then clean up the site for trash and miscellaneous debris, and demobilize.

3.2.10.11 Demolition Assumptions

In order to establish a baseline of activities to be performed under the demolition phase of the 771 Closure Project, the following assumptions for the demolition strategy were documented:

- Site water will remain accessible as a source for implementing dust control measures.
- All building components to be removed and disposed under this demolition task shall be free released.
- Large, non-process related, unrestricted-released equipment or materials not removed during the deactivation or decontamination phases of the Project will be salvaged and the salvage value should be factored into the bidding philosophy of potential decommissioning contractor.
- Suitable unrestricted release concrete debris will be used for on-site non-structural backfill.
- Clean debris and materials suitable will be transferred to an off-site recycling facility (i.e. metal items for smelting/melting only; clean asphalt for crushing and sizing for re-use).
- For metallic recycled materials, Certificates of Destruction will be required of the recycling agent once material has been successfully thermally processed.
- Lead-based paint notifications will be made to all recycling recipients, and inspections for adequacy of off-site sizing and processing with respect to lead paint-coated materials areas will be made.
- No lead-based paint abatement actions will be required.
- All debris streams generated from demolition actions shall be segregated, evaluated (additional characterization, if required), sized, staged, and surveyed for final release at the demolition site, and direct loaded into disposal containers or trucks, without having to be removed to a separate remote location at the RFCP.
- PPE for demolition personnel shall be limited to Level D constraints to include: hard hat, safety glasses, steel-toed footwear, and hearing protection (as appropriate). Personnel monitoring shall be limited to real-time measurements for total airborne dust.
- A demolition plan will be prepared to include pre-approved and well-defined scenarios to accommodate previously unknown site conditions, with respect to the presence of contaminants or hazards, should the condition arise. However, it is assumed that during the normal course of the demolition, workers will not encounter unknown pockets of SNM holdup or environmental/worker hazards.
- The PA boundary has been successfully removed from the 771 Closure Project area. Reasonable unrestricted equipment and personnel access will be available around the entire perimeter of all structures to be demolished, and to the overall demolition site in general, so the project is not constrained with respect to choices of demolition technique or on transfer routes for moving debris and equipment.

Figure 3-3. Building 771 Demolition Concept



Building 771 Demolition Concept

Not to Scale

Items to remain abandoned-in-place

1) South wall to 18' +/- above finished 1st floor slab

2) All structural components and uncontaminated 1st and 2nd floor slab from column line a to C, 1 to 3, and 14 to 16

3) East and West wall to 18' above finished 1st floor slab, and as defined by ER

- All demolition activities shall be planned and implemented such that personnel safety (demolition worker, as well as others with potential for impact) is primary.
- The engineered use of explosives to facilitate the demolition process shall not be excluded.
- All issues associated with the decontamination and dismantling of Room 141 of Building 771 shall be addressed and successfully executed prior to initiating demolition of the Building 771 structure.
- The contaminated floor slab in Rooms 114 and 149 will also have been removed prior to the start of Building 771 structural demolition.
- Validated soil characterization data for potentially impacted media under the Building 771 first floor slab will be available during late FY 01.
- Some quantity of under slab soil will have become impacted from prior operational activities.
- Soil removal will be coordinated with ER and will not impact the 771 schedule.
- Contamination that has migrated vertically to the point that soils beneath the strip footing of exterior walls or interior pilaster pads have become impacted will be remediated after demolition activities.
- Contamination beneath a spread footing, will be mapped, and be dealt with depending upon the length of footing affected.
- A structural engineer licensed to practice in the State of Colorado will approve the demolition plan.
- A structural engineer licensed to practice in the State of Colorado will monitor the progress of the project.
- With the exception of Building 771 and Building 774, all other buildings or facilities in the 771 Closure Project to be demolished and removed shall have potential for impacts associated with environmental media adequately investigated and defined, before demolition commences, such that demolition activities shall not be hindered or constrained.
- ER related investigation tasks required to fully identify conditions that might affect the demolition schedule will be executed and coordinated in conjunction with ongoing decommissioning planning tasks to fully optimize existing containments and environmental controls.
- No unidentified use of atypical facility design or construction was incorporated into the construction of facilities/structures within the 771 Closure Project that will unduly affect the choice of demolition technique or equipment.
- In-place abandonment of concrete foundation structures at a point three feet below grade is acceptable.
- Soil excavation will be required to access the portions of the Building 771 and Building 774 structures that are built into the hillside for demolition.
- There will be no restrictions placed upon soil movements in order to safely access these areas to accomplish demolition goals. It is also assumed that this soil movement task will be limited to removal, loading, hauling to a PA stockpiling location, and dumping the soil to be placed into a stockpile
- All soil moving or handling will be planned and coordinated through ER.
- The decommissioning contractor will move the soil in order to protect the decommissioning schedule.
- ER will have the soil adequately characterized for removal and stockpiling by the decommissioning contractor in a schedule that is synchronized with that of demolition actions.
- All interior partition walls and columns that do not act to maintain the structural integrity of any structure within the primary footprint of Building 771 will be removed as a part of the equipment dismantling or structural decontamination phases.

- Non-process related building system equipment, piping, electrical circuitry, and communication or security system components will be successfully decontaminated in place and may remain after the equipment dismantling or structural decontamination phases, and will be included in the building demolition action, to be segregated as necessary from the overall building demolition debris stream.
- All buildings, outbuildings, and support structures currently identified in the 771 Closure Project will be available for demolition in any sequence deemed appropriate by the Building 771 Closure Team. Should a previously unidentified site condition arise during the demolition of one structure, an alternate will be available so that multiple mobilization actions will not be required. This also assumes that all features within the 771 Closure Project are scheduled for demolition, and that no roadways and walkways have removal restrictions placed on them.
- All interior ACM will have been removed as a part of the decontamination activities for the particular structure, prior to mobilization of the decommissioning contractor. The exception to this assumption will be if ACM is found in the roofing system of Building 771.
- The Building 771 decommissioning contractor will contract with an asbestos abatement contractor to accomplish any exterior asbestos abatement tasks, and that the abatement contractor will be available to work within a timeframe designated and controlled by the Building 771 decommissioning contractor. It is also assumed that the built-up roofing membrane does not contain any radioactive contamination and has been free released as a part of the PDS.
- Any potential for hazard from biological sources (e.g. rodent droppings as a Hantavirus source, bird droppings as a histoplasmosis source) will have been addressed as a part of the decontamination phase as well.
- DOE will accomplish all Real Property requirements for disposal of buildings and improvements, and in a schedule that accommodates the planned implementation of any demolition action.
- No issues exist for the wetland areas immediately north of the current inner asphalt PA access/perimeter road. Recreating wetland areas will not be a part of a final site restoration design upon completion of the post-demolition backfill operation.
- All USTs will have been investigated and prepared for abandonment prior to the start of demolition actions. The method for dispositioning USTs is to abandon-in-place through cleaning and then filling with a foam inerting agent.
- All demolition workers shall be required to comply with monitoring requirements dictated in the OSHA lead and chromium standards for worker protection.
- All underground utilities encountered during the demolition project shall be capped within 5 feet of the nearest building foundation, and abandoned in place.
- All buildings will have been successfully characterized prior to the start of demolition actions for all possible non-radiological hazardous materials of concern, based upon both historic use and operations and visual inspection for staining and discoloration of components indicative of past spill events.

The following table documents the potential risks and uncertainties associated with the demolition strategy:

Uncertainty/Risk	Impact	Probability of Occurrence*	Mitigation Measures
Soil movement behind buried walls is not approved	Cost and schedule impact	Low	Install sheet piling at a cost growth factor of 3-4 times original cost
Building 771 structure unable to stand alone after soil removed due to some unseen condition	Cost impact	Low	Early involvement with engineering department
ER unable to characterize soil in time to support demolition logistics/schedule	Cost impact due to schedule delays	Low	Identify alternate structure for backup, Early and frequent schedule communication with ER
Unexpected building collapse during demolition due to unplanned structural member failure or sequence issue	Cost and schedule impact	Low	Early planning and ongoing involvement and oversight of structural PE, Detailed demolition sequence designed and laid out in IWCP package
Excessive groundwater in excavation or building footprint	Cost and possibly schedule	Medium	Ensure adequate planning and sequencing of tasks to accommodate continuous long-term operation of the existing foundation drains and building sumps
Unanticipated contamination present in the soils planned to be moved to facilitate demolition	Cost and schedule impact to halt work and characterize the nature and extent	Medium/ High	Ensure comprehensive ER characterization of all subsurface conditions in areas planned to be disturbed

*High, Medium, or Low

3.2.11 Demolition of the Stack

The strategy for the demolition of the stack assumes that it meets the free release criteria. The mechanical method for stack demolition without the use of explosives involves erecting a full height scaffolding system from which workers will cut the stack into manageable pieces, and lowering these pieces to the ground outside the stack using a crane or dropped into the stack to be collected at the stack base for disposal. Crews would employ the use of diamond assisted tools to cut the stack into appropriate pieces. These tools could be a diamond wire saw or a diamond-tipped chain saw. Even without the added exposure to risk from working at height, these are inherently cumbersome and dangerous tools to manipulate. With the potential presence of contamination, the risk to workers using mechanical methods increases. Personal protective equipment would be required and personnel working from suspended or raised areas would be exposed to the added risks of impaired vision, temperature stress, decreased dexterity, and limited mobility.

The stack structure will be demolished through the use of explosives. During installation of the exhaust monitoring ports, when core samples were removed, it was observed that the concrete core would not hold its shape. It was concluded that the concrete may no longer exhibit adequate design strength. If true, this loss of design strength could prohibit the successful demolition of the stack through the use of mechanical methods and scaffolding. This use of explosives is essential because it avoids having to perform dangerous manual labor tasks at extreme height on a scaffolding system with questionable integrity. The

presence of contamination is not necessarily deemed a condition that will summarily preclude the use of explosives.

Issues of contractor experience, security and safeguards, and the consequences of a misdirected fall of the stack are valid, but are easily overcome through choosing personnel with appropriate demonstrated experience, early and frequent communication with appropriate plant departments and stakeholders, multiple rehearsals, and careful engineering of the amount and placement of explosives.

Two methods are possible under the explosives alternative: exploding a wedge out of the stack base and allowing the stack to lay over in a controlled fashion into a prepared area, and imploding the stack so that it collapses into it's base. Both methods have been successfully executed at other DOE sites (e.g. INEL and SRS), as well as at the Shattuck Chemical Operable Unit of the Denver Radium Superfund Project.

The baseline case for the demolition of the stack will be developed around the layover method, allowing the stack to fall due east toward Pond 207C, into a prepared trench. As described in the *Historic American Engineering Record No. CO-83-N* (e^2M, 1997), the stack is estimated to extend 150 feet above the average adjacent grade. There is approximately 210 feet from the east side of the stack to the western edge of the Pond 207C berm, and this is adequate distance to prepare the layover area without having to breach the pond basin, and allow for an adequate margin for safety. To minimize impacts to personnel working in the local area, it is anticipated that this stack is one of the last features of the Building 771 Cluster to be demolished.

This layover technique was successfully executed at the Savannah River Site (SRS) in January 1997, during the decommissioning of the tritium facility 232-F. Ventilation air from 232-F was exhausted through a stack quite similar to the 771 stack. Constructed of reinforced concrete, the stack varied in diameter from 10 feet at the base to 5 feet at the top, varied in thickness from 18 inches at the base to 6 inches at the top, and rose to a height of 200 feet. A total of thirteen pounds of explosives were required to bring the stack down in twelve seconds, versus the several months estimated for traditional dismantling.

At the SRS, stack preparation involved filling the plenum opening (building exhaust air inlet) at the base of the stack with reinforced concrete. Two 4-by-6-foot openings were then cut at the base of the stack to form two legs along the direction of the fall. Concrete was removed from small areas at the base of the stack opposite the two legs, and the reinforcing steel severed. Dynamite was loaded in holes in each leg, in a redundant network of detonation cord and delay fuses that would be initiated by a non-electric system. The base of the stack was wrapped with three layers of geotextile fabric and a single layer of chain link fence to control dust and confine projectiles.

The first step in site preparation for the 771 stack will be to remove the propane AST and concrete support saddles from depression due west of the former 207C Pond. Once the tank has been removed, and on approval to excavate soil in the stack area, the Building 771 demolition subcontractor will prepare the layover area. This will involve a combined trench/soil berm feature that follows existing grade, and takes advantage of the existing depression east of the stack occupied by an AST. A typical cross section of this feature would indicate a trench excavated an estimated 5 feet deep and 15 feet wide, with an associated 10-foot berm on either side of the trench. Any extra soil need to construct this feature would be obtained from soil removed to expose the subgrade portion of the stack base, augmented with soil removed to facilitate the safe demolition of subgrade features of Building 771 and Building 774 structures. Appropriate sloping of the sides of the berm will be considered in order to be in compliance with RFETS excavation safety requirements. This berm will be constructed of loose lifts of soil material, with no

formal compaction effort planned. The base of the trench will be prepared by placing two feet of uncompacted soil along the impact zone to dissipate energy. The impact zone may be lined with a cover of wetted geotextile fabric to control dust.

Once the explosives are placed, and all additional preparatory tasks have been completed, an appropriate area of the plant will be evacuated, and the explosion will be initiated. Detonation would remove the two legs and effect a notch, with the presence of the notch combining with the stack's weight to create a downward displacement. The stack structure will fall into the prepared trench. At the SRS, the 232-F stack fell within 6 inches of the predicted impact point. After the explosives expert has verified that no unexploded charges are present, the evacuation area will be released, and the demolition subcontractor will initiate sizing and segregation of concrete debris such that the debris can be loaded out for haulage to the PA concrete stockpiling location at the 207C Pond area. Reinforcing steel will be placed aside at the demolition site for subsequent disposition as recyclable material. A tracked excavator equipped with a vibratory hammer or hydraulic shear will demolish remaining stack base concrete down to a point a minimum of three feet below grade. All concrete debris will be removed from the portion of the stack base that will remain.

Once all concrete debris has been removed from the area, the demolition subcontractor will remove the berm feature, and re-grade the site at the direction of ER. This regrading effort will only focus on leaving the site in a safe and environmentally compliant configuration. ER activities may still be required and executed in these areas. Erosion and run-on/run-off control features will be placed by the demolition subcontractor as directed by ER.

An alternative debris disposition method to evaluate, as a future planning item will be the efficacy of not transporting segregated clean concrete debris to the PA stockpiling area for additional processing. Instead, a proven alternative would be to verify the absence of reinforcing steel from the debris and to place directly the debris into the trench, and the depression once occupied by the AST, as backfill material. The debris will generally have two flat surfaces, and will not exceed twelve inches in thickness. These characteristics would lend the material to be used as backfill in a layered approach that would certainly meet the Concrete RSOP requirements for ultimate subsidence for backfilled areas of less than one percent. Layering the backfill would mean that a uniform layer of concrete debris would be placed in a thickness not to exceed two feet. Then a layer of soil would be placed on top of the concrete, followed by a formal compaction effort to facilitate moving the concrete debris into a stable configuration, as well as forcing soil into void spaces between adjacent pieces of concrete. This layering would then continue to a point 3 feet below the anticipated final grade, with the final 3-foot lift of backfill being entirely soil.

Implementing this approach could significantly decrease cost by eliminating the steps involved with loading and transporting debris to the PA stockpiling area, size reduction at that location, and loading and transportation back to a fill site. This approach will be incorporated into the DOP modification for regulatory and stakeholder approval. The following are the assumption associated with the demolition of the stack:

- Mobilization and site preparation will be conducted as tasks under the scope of the overall Building 771 demolition.
- The demolition of the stack will not require permitting of any confined space entry situations.
- All demolition activities shall be planned and implemented such that personnel safety (demolition worker, as well as others with potential for impact) is paramount. However, the demolition process or technique to be evaluated and chosen for any structure, or sub-component thereof,

shall not be constrained such that industry standard practice shall be excluded. The engineered use of explosives to facilitate the demolition process shall not be excluded.

- The steel AST due east of the stack has been taken out of service and removed from the site prior to initiating stack demolition activities.
- It has been proposed in the *RSOP for Concrete Recycling* that one location appropriate for the temporary stockpiling of clean concrete debris within the PA is in the footprint of former Pond 207C. It is assumed that this proposed location will be accepted prior to initiating demolition activities and that the pond has been capped.
- Stack demolition activities (demolition, segregation of debris, sizing, and load out for disposition) are executed as a subtask of the same demolition subcontractor awarded the overall 771 Closure Project. Only one mobilization/demobilization event will be required. All site access controls, precipitation run on/run off controls, portable sanitary/hand wash facilities, and lock out/tag out requirements are in place as a part of the one-time mobilization activity.
- Stack will be successfully decontaminated for free release prior to demolition.
- The stack is reinforced, cast-in-place concrete, with section properties and construction dimensions correctly described in the *Historic American Engineering Record No. CO-83-N* (e^2M, 1997).
- All other assumptions from the list generated for overall structure demolition hold as appropriate.

The following table documents the uncertainties and risk associated with the stack demolition.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Use of explosives denied	Cost and safety impact	Low	Early communication with stakeholders and non-project decision makers Get expert involved up front to get full stakeholder understanding of the application
Unable to decontaminate stack interior to free release	Cost impact for demolition alternative, waste disposal, and associated safety needs	Medium	Fully investigate decontamination technologies, Fully investigate all fixative technologies
ER unable to characterize soil in time to support demolition logistics/schedule	Cost impact due to schedule delays	Low	Identify alternate structure for backup, Early and frequent schedule communication with ER

*HIGH, MEDIUM, OR LOW

3.2.12 Demolition of the Tunnel

The baseline approach to dealing with the presence of the exhaust tunnel connecting Building 771 and the stack is to abandon it in place by filling the interior void space with flowable backfill - soil/Portland cement mix suitable of achieving compressive strength of approximately 50 psi (historically used at the RFCP to backfill underground electrical duct bank installations). This will be performed as a decommissioning task in order to guarantee that interrelated tasks associated with the removal of Building 771 structure or the exhaust stack are not impeded or delayed.

Once the tunnel has been decontaminated, a cast-in-place concrete bulkhead would be placed at either end of the tunnel. Alternatively, the end of the tunnel that discharges into the base of the stack could be

left open allowing the flowable backfill to fill the abandoned stack base. With either end of the tunnel effectively plugged, the demolition subcontractor would expose the concrete roof of the tunnel by removing overlying soil at twenty-five foot interval along the 100-foot length (3 locations). A hole would be punched through the concrete roof at the exposed location. Flowable fill material would then be pumped/placed through the hole, alternating placement locations to keep a uniform lift of material filling the tunnel void. Once the tunnel was full, the soil removed to expose the tunnel roof would be replaced by the demolition subcontractor, compacted to a density appropriate for the future use of the area or as defined by ER. The following are the assumption associated with the demolition of the exhaust tunnel:

- Mobilization and site preparation will be conducted as tasks under the scope of the overall Building 771 demolition.
- The demolition of the exhaust tunnel structures will not require permitting of any confined space entry situations.
- All demolition activities shall be planned and implemented such that personnel safety (demolition worker, as well as others with potential for impact) is paramount. However, the demolition process or technique to be evaluated and chosen for any structure, or sub-component thereof, shall not be constrained such that industry standard practice shall be excluded. The engineered use of explosives to facilitate the demolition process shall not be excluded.
- It is assumed that ER will have characterized the soil overlying the exhaust tunnel prior to the start of demolition activities. ER will have either characterized the soil as suitable for unrestricted excavation by the demolition subcontractor to expose the roof of the tunnel, or ER will have dispositioned the soil should contaminated media have become an issue. If the soil is suitable for unrestricted excavation by the demolition subcontractor, it is assumed that ER will identify an appropriate location adjacent to the stack for temporary stockpiling of the soil.
- The soil layer overlying the tunnel roof has a minimum thickness of three feet.
- It has been proposed in the *RSOP for Concrete Recycling* that one location appropriate for the temporary stockpiling of clean concrete debris within the PA is in the footprint of former Pond 207C. It is assumed that this proposed location will be accepted prior to initiating demolition activities and that the pond has been capped.
- Manhole assembly, and exhaust tunnel materials will be successfully decontaminated for free release prior to demolition; including all concrete surfaces and the presumed retrofitted steel lining of the tunnel.
- The tunnel is reinforced, cast-in-place concrete, with section properties and construction dimensions correctly described in the *Historic American Engineering Record No. CO-83-N* (e^2M, 1997).
- All other assumptions from the list generated for overall structure demolition hold as appropriate.

The following table documents the uncertainties and risk associated with the exhaust tunnel demolition.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Unable to decontaminate exhaust tunnel to free release	Cost impact for demolition alternative, waste disposal, and associated safety needs	Medium	Fully investigate decontamination technologies, Fully investigate all fixative technologies
ER unable to characterize soil in time to support demolition logistics/schedule	Cost impact due to schedule delays	Low	Identify alternate structure for backup, Early and frequent schedule communication with ER

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Contamination present in the soil adjacent to the walls, or under the floor of the exhaust tunnel (below the minus 3 foot level)	Cost impact due to increased demolition requirements to access soil and for schedule delay, Impact from demobilization of demolition sub and remobilization of soil removal sub	Low	Ensure comprehensive ER characterization of all subsurface conditions relative to the tunnel

*High, Medium, or Low

3.3 Environmental

The 771 Closure Project views environmental stewardship as a critical success factor in achieving 2006 closure. The 771 Closure Project success will be measured, in part, based on environmental stewardship metrics. For this project, environmental stewardship is embodied in the three following areas:

- Environmental monitoring
- Recycling and waste reduction
- Environmental compliance

3.3.1 Environmental Monitoring

The Integrated Monitoring Plan (IMP), required under the RFCA, specifies how decommissioning projects are to be monitored during the active phase of building removal. The IMP establishes the routine surface water, groundwater, air, and ecology monitoring programs. Surface water and groundwater monitoring activities are conducted by the Environmental Systems and Stewardship Project, but the monitoring efforts are supported fiscally by the decommissioning Projects. The Projects are expected to support the cost of monitoring equipment and installation, analytical costs, and follow-on actions if project activities adversely impact water quality.

Project related surface water activities include the identification of the appropriate monitoring location or locations, installation of flow measuring and water sampling equipment, operation and maintenance of the equipment, and collection of data and water quality samples for analysis. Groundwater monitoring is similar. All monitoring is done in accordance with established protocols. A typical surface water installation includes a telemetry node to connect the newly installed site to the surface water data collection system so that each location can be remotely monitored, and serviced as needed. For Building 771/774, two monitoring locations have been identified, GS44 and SW120. These stations will capture all runoff from the decommissioning activities. A small portion of the area disperses stormwater and can not be monitored, but this runoff will not be impacted by decommissioning activities.

Surface water performance monitoring establishes a baseline of water quality information for the sub-basin or sub-basins, which collect stormwater runoff in the project area. Monitoring during the actual decommissioning activities is designed to detect changes from the established baseline water quality. If changes are observed, project activities are reviewed, and, if necessary, additional monitoring activities initiated. These additional activities fall under the IMP Source Location monitoring and would focus on such sources as groundwater seeps, foundation drains, if present, or other water flows capable of being sampled.

Foundation drains for Building 771/774 were described in a 1992 report entitled "A Description of Rocky Flats Foundation Drains." This report indicates that three foundation drains are shown for Building 771

and three foundation drains are shown for Building 774 in Site utility plans. Recent investigations by Surface Water Monitoring personnel, however, located only one identifiable foundation drain for each building. Under dry conditions, there is no foundation drain flow. The stormwater sub-basins for the Building 771/774 complex have been defined, and appropriate water quality monitoring locations established. Two locations, GS44 and SW120, will capture the stormwater run-off, including foundation drain discharge, from the area of building decommissioning.

Surface water monitoring will only determine if a project has had an impact on water quality and, perhaps, identify the source of adverse impacts. The PMP and the implementing IWCPs describe actions that will be taken in the event that project activities impact surface water. Such activities include contaminant removal, erosion controls, stormwater containment or run-on diversion, and other management practices as may be appropriate.

The existing Site Radioactive Ambient Air Monitoring Program (RAAMP) sampler network will be used for ambient air monitoring. The RAAMP sampler network continuously monitors airborne dispersion of radioactive materials from the Site into the surrounding environment. Thirty-seven samplers comprise the RAAMP network. Fourteen of these samplers are deployed at the Site perimeter and are used to confirm Site compliance with the 10 millirem standard mandated in 40 CFR 61, Subpart H. Filters from the 14 perimeter RAAMP samplers and from one on-Site sampler near the 903 Pad are collected and analyzed monthly for uranium, plutonium, and americium isotopes.

In addition to the perimeter network, enhanced radionuclide ambient air sampling will be performed on an as-needed basis utilizing RAAMP samplers in the immediate vicinities of the 771 Closure Project. Currently, it is anticipated that the 771 structures will be free released prior to demolition. Under this scenario, no additional monitoring is anticipated. However, while the UBC is being remediated, an enhanced radioactive ambient air monitoring system will be implemented. It is anticipated that this may include several monitors at the perimeter of the 771 Closure Project that will be screened weekly for gross alpha/beta contamination and monthly for plutonium-239/240, americium-241, uranium-233/234, uranium-235, and uranium-238. This enhanced monitoring effort will be managed and budgeted by ER.

3.3.2 Recycling and Waste Reduction

Recycling and waste reduction will be accomplished through decontamination, automated size reduction, plasma arc cutting, and optimization of materials handling. Decontamination will be used to reduce the amount of TRU waste. Automated size-reduction and plasma arc cutting technologies will allow more efficient packaging of waste, minimizing the number of waste containers, and reducing worker involvement, thereby reducing exposure and generation of secondary wastes. Automated size-reduction allows components to be cut into small pieces and waste containers to be filled to weight capacity.

Process optimization efforts led by the Material Stewardship Project will be implemented by the 771 Closure Project. Specifically, the LLW and TRU streamlining processes will be implemented. The 771 Closure Project team will also receive incentives to reduce sanitary waste by recycling and other waste minimization techniques.

3.3.3 Environmental Compliance

Each major work element of the 771 Closure Project is under jurisdiction of at least one environmental regulation, typically RCRA or CERCLA. The 771 Closure Project has transitioned primarily to a CERCLA facility during the closure process. This transition occurs after deactivation activities are completed within each area. For the purposes of RFCA, deactivation is a set of activities that occurs

primarily in buildings that were used as part of the nuclear weapons production mission. RFCA does not regulate deactivation activities; instead, they are regulated pursuant to the Atomic–Energy Act, overseen by the DNFSB, and RCRA, overseen by CDPHE.

RFCA provides that process wastes and wastes generated during deactivation are CHWA/RCRA-regulated, whereas wastes generated during decommissioning are CERCLA-regulated. However, this project is engaged simultaneously in deactivation and decommissioning. At times, it may prove safer, more cost-effective, and expeditious from an operational stance, to manage the wastes generated from both activities in the same manner. For example, if site personnel engaged in deactivation and decommissioning in different rooms of the same building are generating both process and remediation mixed transuranic wastes, the project manager may choose to store all such wastes in a single area and commingle such wastes in common containers. If this practice occurs, the wastes will be managed under CHWA/RCRA. However, in most cases, process wastes will be managed separately from remediation wastes.

Closure of preexisting and active RCRA units will be conducted in accordance with the RCRA Units Closure Strategy to be included in the modified Building 771/774 DOP. Inclusion of this strategy in the modified DOP is expected to eliminate the need for any further CDD submittals.

3.4 Waste Projections

Table 3-2 provides the projected waste quantities throughout the 771 Closure Project. The table information is preliminary and will be modified in subsequent revisions of the PMP.

Table 3-2 Waste Projections

Waste Type	FY01				FY02				FY03				FY04
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q
TRU/M	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	0	0
LLW/M	45	1	13	38	14	5	15	27	1	31	122	151	0
ACM	1	0	1	2	0	0	0	0	0	7	1	38	9
Sanitary	6	0	5	9	0	0	0	0	0	28	6	151	38

All waste quantities are reported in 1,000 cubic feet
Q = quarter
TRU/M is radiological and mixed radiological transuranic waste
LLW/M is radiological and mixed radiological low level waste
ACM is asbestos containing waste, the radiological level has not yet been characterized
Sanitary is sanitary waste to be disposed off-site
Building rubble to be used for fill and recyclable metal from the structure are not included in the table. The estimate quantity of recyclable material is 9,296 cubic meters of concrete and 1,400 cubic meters of steel.

4. IDENTIFICATION OF PROJECT RISKS

This section will identify and analyze the potential hazards associated with the 771 Closure Project. The hazards identified in this section are upper level and may require subsequent analysis through the ISM process based on the complexity of the hazard. The hazard identification has been divided into several areas including safety, environmental, safeguards and security, quality assurance, and scope, budget, and schedule. In addition to hazards, areas of uncertainty have been identified for each of the potential hazard areas.

In addition to the physical hazards and risks, risks and uncertainties associated with the Project baseline have been included in this section. Risks and uncertainties have also been included with the individual strategies in Section 3.0. A correlation has been made between the risk and uncertainties and the WBS elements. Project Management, CAA, and Support Services, CAE, are cross cutting elements, and those risks are outlined in several areas and are not called out separately.

4.1 Safety

The principle hazards in these buildings consist of plutonium, beryllium, TRU waste, low-level waste, chemicals, asbestos, lead-based paint, and other standard industrial hazards. Most of these hazards will exist throughout the project and are of concern during characterization, hazardous material removal, deactivation, decommissioning, and demolition.

In addition to exposure to radiological and chemical hazards, workers will be exposed to a variety of industrial hazards such as heavy machinery, repetitive motion tasks, and physical agents such as heat and cold. Using a general industry rate for construction to estimate injury and illness cases, Site closure activities are estimated to result in 584 cases of injury and illness during the peak activity period (1997 - 2006) (CID, Section 5.8.3). The portion of these cases that would be estimated to result from the 771 Closure Project alone would be less than the total Site figure.

The general industry rate of injury and illness is considerably higher than the historic incidence rate for the Site; occupational hazards will be controlled and monitored in accordance with the RFCP occupational health and industrial safety programs. The safety and associated hazards to the workers will be mitigated through extensive planning. The ISM process will be utilized for each work activity and will be documented in IWCP packages. Subsequent revisions of this document will contain specific information of the different work activities, associated hazards, and IWCP packages.

4.1.1 **Building Operations**

The risks and uncertainties documented in this section are related to WBS element CAB. Landlord functions are those activities required to keep the facility habitable and in a functional condition. Landlord functions can be divided into three primary activities: maintenance, custodial, and facility management. Hazardous materials removal operations activities include transition to decommissioning, disposition of property, personnel relocation, hazardous chemical disposition, disconnect and stabilization of utilities, and removal of files and documents.

Maintenance and construction activities present inherent physical hazards to the worker and, to some degree, the public. Those hazards are associated with work done on or with electrical systems, pressure systems, mechanical systems, elevated work, confined space, chemicals, heavy equipment, power

equipment and tools, and hand tools. Maintenance and construction activities and their associated hazards are controlled through the use of craft journeymen, specific job training, and the IWCP.

Custodial activities present inherent physical hazards primarily to the worker. Those hazards include chemical hazards and work with power and hand tools. Activities performed include cleaning, material handling, snow removal, and moving furniture and personal supplies.

Custodial activities also incorporate ISM, but not through IWCP packages as is the case with maintenance. Hazards associated with custodial activities are controlled through training, repetition, and supervisory oversight. To a large degree, hazards associated with Stationary Operating Engineer (SOE) activities are handled in the same manner. The scope of work has been well defined over time for custodians and SOEs such that they are seldom subjected to unfamiliar work activities and if so, are trained to accomplish those activities in a safe manner. Feedback and work process improvement is attained through the supervisors.

Hazards for facility management include those associated with office and administrative personnel and SOEs. Hazards for office and administrative personnel include falls, slips, and cuts. SOEs could be subjected to operation of pressure systems, electrical systems, mechanical systems, and thermal hazards. The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to Building 771 operations.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Landlord costs may remain higher for a longer period than previously assumed.	Cost savings in landlord budget may be less and further in the future than expected.	High	The re-baseline plan will tie landlord reductions to project milestones to provide the most realistic projection of cost impacts.
Construction in support of the decommissioning may not be well defined.	Added cost and potential delay could occur while waiting for necessary installations.	Medium	Efforts are underway to provide estimates of needed construction activities. Impacts are mitigated since the some large items – supplied breathing air upgrade in Building 771 and Inner Tent Chamber installations – are underway.
Glovebox and tank removal proceeds at a slower pace then assumed.	Insufficient budget to perform required surveillances on tanks and gloveboxes.	Medium	Focus decommissioning efforts on removal of gloveboxes and tanks to reduce landlord expense.
Decommissioning of Buildings 771 & 774 proceeds at a slower pace than assumed.	At the start of FY 04 facility safety systems are still required to be operational and monitored.	Medium	To maximum extent possible work in parallel safety system removal activities with other project activities.
Changes in operational requirements cause an increase in surveillance, maintenance, or operational activities.	Historical costs are no longer an accurate prediction of future landlord cost trends.	Low	Screen operational requirement changes to quantify potential cost impacts. Inform customer of cost impacts.

*High, Medium, or Low

The following table provides the risks and uncertainties with respect to the regulatory strategy:

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
The Facility Disposition RSOP will not be approved when needed for demolition activities	Schedule and budget impact to prepare new plans	Low	Continue to prepare document using the consultative process - modify the DOP
The Component Removal RSOP will not be approved when needed for decontamination, component removal and size reduction activities	Schedule and budget impact to prepare new plans	Medium	Continue to prepare document using the consultative process – modify the DOP
The PDSP is not approved by the regulators	Schedule and budget impact	Low	Continue to prepare document using the consultative process
RCRA Unit closure strategy is not changed in the DOP	Schedule and budget impact to prepare new plans	Low	CDD will be prepared

*High, Medium, or Low

The following table summarizes the risks and uncertainties and potential risks associated with the RCRA closure strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
The different areas and types of RCRA units are not adequately tracked and incorporated into the closure report	Unable to close the facility	low	Ensure that there has been training on the need for adequate documentation and that there is adequate staffing to meet the documentation requirements
The characterization data is inadequate and unexpected conditions are encountered during dismantlement and decontamination	Budget and schedule, with potential safety impacts	low	Coordinate characterization personnel with operations personnel to ensure that past practices and lessons learned are communicated
Size reduction of large rashig ring and annular tanks is not effective or successful	Budget and schedule	medium	Initiate size reduction activities as soon as possible to mitigate schedule impacts, if the techniques need to be modified
There is a significant amount of residue/sludge in rashig ring tanks	Budget and schedule	low	Initiate sludge removal as soon as possible to mitigate schedule impacts, if the techniques need to be modified

*High, Medium, or Low

4.1.2 Building 774 Operations

The risks and uncertainties documented in this section are related to WBS element CAB. Building 774 has a similar operational history to Building 771; therefore, the hazards are similar. In Building 774, radiological hazards will predominate followed by chemical hazards. Although radiological contamination is present in the processing sections of Building 774, the levels are lower than those experienced in

Building 771. Building 774 used chemicals strictly for waste processing. These chemicals are well defined from procedures and from process knowledge.

The following table provides a listing of uncertainties and risk associated with the Building 774 strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Reagent and process tanks have not been placed in operationally-empty status; equipment capability to perform this task has not been evaluated	Scope of tap & drain for deactivation could increase. Planned transfer and treatment methods might be inadequate. Activity could become critical path.	High for a partial occurrence	Accelerate planning to identify issues and allow contingency for equipment repair.
Shipment plans to Oak Ridge are not finalized.	Building 774 would have to return the oil to drums and ship them back to the generator. Chance for efficient shipping in a tanker could be lost	Medium	Building 771 is relying on support from outside the project to resolve the shipment issues.
Bottle Box treatment process will be closed during Building 774 tap & drain. Building 559 has no alternative in place to treat this liquid waste.	Building 559 analytical operations would be shut down and liquid waste would have to be stored on-Site because no treatment is available.	High	Outside scope of 771 Closure Project. Site action needed to establish disposal route.
Sludge from the PCB-contaminated oil tank has no disposal route planned.	Building 774 deactivation would be delayed and eventually impact Site closure.	High	Provide additional expertise to the 771 Closure Project to establish disposal route.
Amounts and characteristics of Building 774 sludge are uncertain.	Scope not well defined, could lead to delay or added cost.	Medium	Initiate early characterization.
Aqueous-based sludges may be solidified and stratified in Building 774 tanks. Capability to mobilize or remove the sludge is uncertain.	Building 374 project Aqueous Sludge Transfer Process (ASTP) could be wasted if sludge cannot be mobilized. Lead time for solving the problem could be lost if Project relies on an inadequate plan.	High	Establish team effort between Building 771 and Building 374 personnel to review ASTP requirements and validate assumptions or requirements. Pursue or replace ASTP process as needed to improve efficiency.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Current plans may terminate the process waste line between Building 774 and Building 374 before the Project and the Site have alternatives. Tanker transfers, Modular Storage Tank transfers, groundwater sump water, and Building 771 decontamination liquids may have no route to Building 374 for treatment.	Loss of services could lead to failures to manage RCRA-unit run off. Users of the process waste line could incur delays and added expense.	High	Establish a cost-effective alternative. Establish an early task to evaluate the system and provide an alternative. Install the equipment.

*High, Medium, or Low

The following table provides a listing of uncertainties and risk associated with the Building 774 sludge and tank strategy.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Physical characteristics of the sludge are not known	Cost estimate and schedule may be low	High	Fairly difficult characteristics were assumed for the baseline. Early characterization is planned.
Physical characteristics of the sludge are not known, so it may be possible to mobilize the sludge and pump it to B374 per normal operations	Cost and schedule may be too high	High	Early characterization is planned
Chemical characteristics of the sludge are not known	Cost estimate and schedule may be low; handling needs are poorly defined	Medium	Fairly difficult characteristics were assumed for the baseline. Early characterization is planned.
Alternatives to the oily sludge method used have not been evaluated	Excess waste volume could be generated	Medium	A review of methods for managing the oily sludge will be conducted with assistance from the orphan waste program
The amount of sludge is not known	Cost estimate and schedule may be low; handling needs are poorly defined	Medium	Early characterization is planned.
Even if the estimating assumptions are accurate, the basis of sludge removal estimates may be wrong	Cost estimate and schedule may be low	Medium	A project technical team to evaluate and select a sludge removal method will be formed.
Size reduction methodology relies on manual, mechanical means	Cost estimate and schedule may be unnecessarily high if other approaches are possible.	Medium	A project technical team to evaluate and select a tank removal method will be formed.

*High, Medium, or Low

4.1.3 Building Stabilization/Deactivation

The risk and uncertainty documented in this section is related to WBS element CAC. The principal hazards in the deactivation phase include the handling of hazardous materials, hazards from liquids, and other physical hazards. Section 4.1.2 contains additional risks and uncertainties associated with the deactivation of Building 774. The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to SNM removal/deactivation.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
DOE does not agree that endpoints are unnecessary	Addition of endpoints to project planning documentation	low	Coordination with DOE/RFFO

*High, Medium, or Low

4.1.4 Decommissioning

The risks and uncertainties documented in this section are related to WBS element CAD. During decommissioning, there are numerous hazards to the worker, which include: industrial hazards from lifting heavy equipment, cuts and bruises from moving large items and exposure to internal contamination from high radioactive airborne conditions through cuts from contaminated size reduction operations.

For building demolition activities, principal safety hazards are those associated with falling materials and movement of heavy equipment used to remove buildings and load demolition debris into hauling containers. Some building components may contain asbestos and lead-based paint. Some building components may be contaminated with low-level radiological materials. Some confined space entry into pump vaults and belowground tanks to perform characterization and equipment removal activities will be required. A fall hazard will exist when working around tanks that extend below grade and when working on the roofs of buildings. The following tables provide information on the specific activities within the project that may pose a degree of uncertainty with respect to the Decommissioning Program. The uncertainties associated with decommissioning are addressed with the individual strategies in Section 3.0.

4.1.5 Decommissioning Program

Decommissioning Program can be divided into two groups: Site-wide integration and technology development. Decommissioning personnel have primarily office and administrative hazards including slips, falls, and cuts. Personnel conducting walkdowns associated with planning and characterization activities will have the potential for exposure to hazards associated with the activities being conducted in the building/room. These hazards will be mitigated by personnel participating in daily safety meetings and review of the task-specific job hazard analysis (JHAs).

There are no identified risk factors or uncertainties associated with the Decommissioning Program Office activities, which is in WBS element CAF.

4.2 Environmental

The risks and uncertainties associated with this section are associated with WBS element CAB. The 771 Closure Project success will be measured, in part, based on environmental stewardship metrics. For this project, environmental stewardship is embodied in environmental monitoring, recycling and waste reduction, and environmental compliance. The following are the 771 Closure Project assumptions associated with environmental stewardship:

- No air monitoring in addition to the perimeter samplers will be required during demolition if the building has met the free release criteria
- Additional air monitoring will be required during the remediation of the under building contamination and that monitoring will be budgeted by ER.
- If groundwater is encountered during the removal of the soil behind Building 771, it is assumed that this groundwater is clean and can be diverted to the surface water channels and managed in accordance with the Incidental Waters Program.

The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to environmental monitoring.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Surface water is contaminated during decommissioning activities	Budget and schedule	Low	Provide training and ensure that run-on and run-off controls are maintained.

*High, Medium, or Low

The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to recycling and waste reduction.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Automated size reduction technologies are not cost effective	Schedule, budget, and waste reduction potential	low	Pursue alternative waste reduction technologies

*High, Medium, or Low

The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to environmental compliance.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Closure strategy is not sufficient to eliminate need for future CDD submittals	Schedule and budget	low	Continue to prepare CDDs as needed
Remediation waste determined to be process waste not exempt from RCRA	Schedule and budget	low	Manage waste as RCRA process waste prolonging the need for active RCRA units

*High, Medium, or Low

4.3 Safeguards and Security

The risks and uncertainties documented in this section are associated with WBS element CAE. The 771 Closure Project is inside the Protected Area (PA). Although the MAA within 771 is closed, there are numerous areas that contain classified material and significant SNM holdup; access to these areas is controlled. The classified matter and the SNM will be properly dispositioned, which will allow the controls in these areas to be diminished.

There may be special requirements for support from Security Police Officers (SPO) within the scope of this cluster. In the event that during decommissioning SNM is removed and containerized; SPO will need to be available to move this material to a secured area. Depending on the category and quantity of this

material, the 771 Closure Project could be locked down until a material surveillance team could be mobilized from another project to secure the area. The material surveillance team will have to be Personnel Security Assurance Program (PSAP), Q-cleared individuals, and there are no such individuals on the 771 Closure Project team.

There are needs for termination of safeguards and control and disposition of classified matter. The deactivation, hazard stabilization, and property removal activities will remove classified matter, allowing termination of safeguards and elimination of requirements prior to the major decommissioning activities. The following bullets outline the assumptions associated with safeguards and security on the 771 Closure Project:

- Inventories will continue until hold-up concerns are eliminated.
- Inventories will be conducted every six months.
- Safeguards and security requirements will not terminate until the PDS is complete, and it indicates that the facility meets free release criteria.
- Limited areas will be discontinued when the set activities are complete.
- An exemption will be received from document classification after the SNM hold-up is complete, so that future documents will not have to be classified.

The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to safeguards and security.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
VA team concludes that additional hold-up remediation in Building 771 is necessary	Re-direct resources from decommissioning to remediation. 6-12 month delay to decommissioning	Low	Remediation of more accessible hold-up could be pursued.
Significant hold-up is encountered during dismantlement that was not anticipated	Budget and schedule impact while mobilizing security force	Low	Coordinate with other Projects with material surveillance teams
An event after PA closure leads to an increase in physical protection and/or access controls	Budget and schedule impacts due to increased security requirements	Unknown	None
DOE order change requires significant increase in physical protection and/or access control measures	Schedule and budget impacts due to increased security requirements	Low	None

*High, Medium, or Low

4.4 Quality Assurance

The risks and uncertainties associated with this section are associated with WBS element CAB. Quality activities will be managed through the ESH&Q organization and a 771 Closure Project QC organization. The Project QC organization will provide all Project quality support with the exception of independent assessments. The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to quality assurance/quality control.

Uncertainty/Risk	Impact	Probability of Occurrence	Mitigation Measures
Quantity of work controlling documents (IWCPs, etc.) increases beyond available QC support.	Delay in work implementation.	Medium	Hire additional QC support
Changes to quality requirements are made.	Program and work controlling documents change. Potential cost/schedule impact.	Low	Hire additional temporary QC support
PAAA issues are identified or have Site wide implications.	Work slowdown/stoppage	Low	Effective continuous improvement/assessment

*High, Medium, or Low

4.5 Scope, Budget, and Schedule

The risks and uncertainties documented in this section are associated with WBS elements CAA and CAE. The following table provides the specific activities within the project that may pose a degree of uncertainty with respect to technology, scope, budget, and schedule.

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
Increased efficiency from robotic size reduction of 25% is not realized	Increase cost of $10 million in FY01 and FY02. Schedule extension of 90 days	Medium	Develop manipulators and other higher speed techniques for inner tent chambers
Find additional contamination then assumed	Potential increase of $5 million in decontamination and extension of schedule by 60 days	High	Conduct additional characterization as material is removed
Unable to decontaminate the facility as planned. Required to perform contaminated demolition	Four-month delay in schedule for approval of modification to the decision document. Increase disposal costs of $40 million	Low	Obtain approval of contaminated demolition as an alternative in the 771 DOP before demolition. Conduct additional characterization as components are removed.
Insufficient labor force (cleared/non-cleared)	Delay of 4 months to project. Increase of $3 million.	Medium	Steelworkers have already been obtained and the building trades will be started early to increase float and reduce risk
Unanticipated building repairs	Cost increase to repair	Medium	None

*High, Medium, or Low

The following table documents the uncertainties and potential risks associated with the resource strategy:

Uncertainty/Risk	Impact	Probability of Occurrence *	Mitigation Measures
The steelworker contract changes significantly	Schedule and budget	Low	None
Insufficient number of trades	Schedule due to inability of staff to meet work load projections	Medium	Hire outside the state

5. PROJECT CONTROLS

This section addresses the controls necessary for project initiation including safety, environmental stewardship, safeguards and security, quality assurance, and scope, budget, and schedule. The controls are carefully selected, developed, and implemented to prevent or mitigate hazards posed by the activity. The controls presented in the section are not detailed enough for floor-level implementation; however, these controls listed in this section will be expanded upon when the IWCP packages are developed for the individual projects/activities.

5.1 Project Documents

This section documents the primary project documents that govern 771 Closure Project. The following are the primary project documents that govern the 771 Closure Project:

- Rocky Flats Cleanup Agreement (RFCA)
- Decommissioning Program Plan
- Facility Disposition Program Manual
- 771/774 Basis For Operation, Rev. 3
- 771/774 Decommissioning Operations Plan
- RFCP RCRA Part B Permit
- 771/774 Project Baseline Summary (PBS)
- 771 Closure Project Management Plan (this document)

RFCA

RFCA is a legally binding agreement between DOE, CDPHE, and EPA to accomplish the decommissioning of RFETS. The objectives of RFCA are the disposition of usable fissile material and TRU waste; safe on-site and off-site waste management; acceptable surface and groundwater quality after cleanup activities are complete; establish cleanup guidelines; recommend land use; outline environmental monitoring requirements/needs; address building disposition; and reduce operating costs.

DPP

The DPP established the regulatory steps for decommissioning facilities. The DPP is the RFCA decision document for facility disposition execution activities. The DPP consolidates and summarizes many of the requirements of RFCA specifically related to decommissioning and the documentation necessary during decommissioning.

FDPM

The FDPM establishes the processes and requirements for facility decommissioning, and outlines the project-specific documentation requirements and how facility decommissioning activities relate to the Site programs. The FDPM outlines the steps and requirements for each phase of decommissioning, and should be used by project management as a roadmap through the decommissioning process.

771 BFO Rev. 3

The 771/774 BFO is the nuclear license under which this cluster operates. The current revision of the BFO modified the AB to address the decommissioning work and to assess the bounding hazards associated with closure. This established a safety envelope with a suite of controls adequate to address known hazards of anticipated closure activities.

771/774 DOP
RFETS has implemented the CERCLA cleanup process using the RFCA. RFCA describes the process to undertake cleanup of the site through the facility disposition process. Due to the significant levels of contamination found within the 771 Closure Project, the 771/774 Buildings are considered to be Type 3, and require a DOP. The DOP was approved and includes the 771 Closure Project ARARs. The LRA for the 771 Closure Project is the CDPHE. The 771/774 DOP was developed early in the decommissioning planning process. As a result, some streamlining of the decision document and RCRA closure process have been implemented; therefore, the 771/774 DOP will need to be modified to capture these new strategies and expedited decommissioning.

RFCP RCRA Part B Permit
There are a large number of RCRA units within the 771 Closure project. Throughout deactivation and decommissioning, efforts will be made to bring each RCRA unit to a RCRA stable configuration, thus reducing inspections. Formal closure of permitted and interim status areas is subject to the provisions of 6 CCR 1007-3, Parts 264 or 265, wherein basic closure methods are described in state approved closure plans and each closure is certified by an independent Colorado professional engineer. The operating record of each RCRA unit will be reviewed to determine the appropriate closure criteria.

771/774 PMP
The 771/774 PMP is the detailed project control document under which this cluster operates. The PMP will be modified as the project progresses to indicate the current status and short- and long-range planning goals and activities.

5.2 Safety
The primary mechanism for assuring safety in the execution of project work is the Site work planning process, IWCP. All work on Site is required to be planned in accordance with this manual. The IWCP incorporates ISM into the planning process, with particular emphasis on hazard identification. The JHA tool contained in the IWCP manual provides a comprehensive hazard identification process that involves the floor-level workers as well as safety discipline subject matter experts early in the planning phase. This provides an efficient and effective work plan that greatly minimizes the chances of encountering unexpected hazards.

The IWCP provides the necessary links to incorporate elements from each of the Site Safety Management Programs (SMP). SMP, which are largely managed within the ESH&Q organization, follow a requirement flow-down strategy that assures contractual requirements are met at the floor. SMP manuals have been developed for each program that establishes Site requirements based on DOE directives and other regulatory drivers. These top-level documents establish the safety infrastructure governing the development of implementing procedures and work plans within the project. SMP resources have been assigned directly to the Project. These personnel are responsible for incorporating the SMP program requirements in work execution documents. Involvement of appropriate SMP resources in the planning phase is determined by the IWCP JHA.

The IWCP document the tasks to be performed; who is to perform the task; what hazards are present; and controls to be taken to mitigate the hazards. Controls include implementation of safety programs and/or permits such as lockout/tagout, confined space, asbestos mitigation, chemical exposure, elevated surfaces, radiological controls, welding/cutting, excavation, noise, and various other hazards. Finally, the

IWCP provides for feedback expressly for the purpose of improving future work packages including hazard identification and mitigation.

5.2.1 Building Operations

The project-specific controls and authorization basis for the 771 Closure Project include the existing building Programs and the facility AB.

5.3 Environmental Stewardship

Environmental stewardship for the 771 Closure Project is embodied in the following areas: environmental compliance, environmental monitoring, ecology and natural resource protection, natural resource conservation, and recycling and waste reduction. The environmental stewardship activities that will be conducted as part of the project include:

- Conduct all activities in compliance with environmental regulations.
- Reduce worker/environmental risks by conducting deactivation/stabilization/hazard removal, and decommissioning
- Minimize waste.
- Establish environmental stewardship goals for the project, including employee performance.

Environmental stewardship is included in the 771 Closure Project through the Integrated Environmental Management System (IEMS). The IEMS incorporates environmental aspects into the project planning and execution stages for all work performed as part of this project. It defines the environmental requirements, endorses continuous improvement, and measures and verifies compliance through assessments. Specifically, the Environmental Checklist is used during the planning stages and periodically reviewed for each major work activity on this project. Managers will evaluate the potential adverse offsite releases their activities could cause and implement appropriate controls to minimize or eliminate the release.

Environmental stewardship will be incorporated into the IWCP packages for the specific decommissioning activities. Environmental monitoring activities will have a specific IWCP package, if the sampling is not associated with a specific activity. For project-specific compliance, an environmental plan will be developed that includes the following descriptions:

- Compliance activities such as inspections that are budgeted and scheduled.
- Environmental Management Systems (EMSs) project-specific requirements. Specifically, the approach to environmental assessments, Environmental Corrective Action Tracking System (ECATS) responsibilities, and project environmental stewardship reporting and metrics will be described.
- Type of work that is or will be conducted under the IWCP process. Under the IWCP process, work activities will be evaluated to determine their environmental impact. For example, the IWCP process identifies what risks/hazards need to be controlled during decontamination of a wall. Another example is identifying emissions or other waste streams that an activity may generate.

The following activities must be completed to reduce worker/environmental risks:

- Identify high maintenance/cost low value RCRA units within the geographical confines of this project. Close or make RCRA stable.
- Develop necessary regulatory documents with the decommissioning program and ESH&Q to allow stabilization/hazard removal and decommissioning to be initiated in the industrial areas as soon as possible.

- Provide technical support to ESH&Q for the site monitoring during and previous to demolition.

Waste minimization requires close coordination with the Material Stewardship Project. Material Stewardship waste minimization/optimization processes such as bar coding waste will be implemented, as appropriate.

A variety of means will be employed to enable the worker to ensure compliance with the correct regulation depending on the work being performed. Work packages will be reviewed by the 771 Closure Project Material Stewardship organization prior to the start of work to ensure that the waste will be appropriately properly handled, segregated, and categorized. Additional methods of control may include administrative controls, such as identification of the activity and regulating agency on the work package, and physical controls, such as locking waste containers. At all times, process wastes will be managed to the current Federal, State, and Local regulations, as mandated by current site procedures. Remediation wastes will be managed in accordance with the ARARs identified in the 771 Closure Project DOP.

Any 771 Closure Project environmental findings will be tracked on the ECATS. The 771 Closure Project Environmental Compliance group will be responsible for assigning and tracking the finding. The 771 Closure Project group responsible for closing out the finding must do so within 30 days or seek an extension approval from the 771 Closure Project Manager.

5.4 Safeguards and Security

The 771 Closure Project is inside the PA. Although the MAA within 771 is closed, there is one area that contains classified material and several area with significant SNM holdup; access to these areas is controlled. The classified matter and the SNM will be properly dispositioned, which will allow the controls in these areas to be diminished.

There are special requirements for "L" cleared workers for the limited area in building 771 (approximately 80% of the total floor space). During the hazard reduction, stabilization, and property removal activities, the classified matter and SNM holdup will be removed, allowing the clearance requirements to be reduced. This work will be accomplished using existing "L" cleared staff from the RFCP labor pool to the extent possible. Safeguards and security will be maintained and controlled through the current Site program and procedures.

In addition to the physical controls, documents developed by the 771 Closure Project that require review from the public or the regulators must be reviewed for document classification purposes. Once the SNM hold-up removal activities are complete, a letter can be written requesting an exemption from this procedure. The letter will document the current status of the building and why document classification activities are not longer necessary.

5.5 Quality Assurance

The Site Quality Assurance Program Manual has been developed to meet the requirements of 10CFR820.130. The Quality Assurance Program is managed by the ESH&Q organization. This organization maintains the program requirements, and performs those assessments and audits of the Project that require independence of the line organization. All assessments not requiring strict line independence are performed within the Project by quality control personnel matrixed from the ESH&Q organization. The ESH&Q organization will conduct external assessments with personnel not associated with the 771 Closure Project.

Quality control resources have been supplied to the Project. These individuals are responsible for implementing Site quality assurance requirements at the project level including but not limited to: inspection of work and items; records maintenance and management; assessment; corrective action identification and tracking; and purchase order review. The project quality control resources will perform internal assessments, self assessments, and project support to include identifying and implementing work processes. In addition, the Project quality control resources will support the project record and administrative record personnel and function as the Project Price-Anderson interface.

Quality assurance hold points will be incorporated into the IWCP packages. The quality control personnel will be responsible for tracking the hold points and signing off on activities as completed.

5.6 Scope, Budget, and Schedule

Section H.1 of the Rocky Flats Closure Contract between the DOE and K-H states that "…the Contractor shall establish, maintain and use a project control system meeting the requirements specified in the contract…". The overall intent of the Project Control System (PCS) is to support the definition of work scope, assist with organizing project data, and use processes best suited to the RFCP's needs, environment, and K-H's management philosophy.

As part of its support function in the project organization of the RFCP, the Strategic Planning and Integration (SP&I) organization is responsible for issuing project control standards and instructions for use by the Project organizations and for maintaining the systems required for planning and project management. The standards maintained include those for organizing, planning, scheduling, estimating, authorizing, monitoring and changing work on the RFCP. Each standard is further defined through an integrated set of process or task-oriented instructions, responsibility assignment authority designations, and record management instructions. Additional detail can be found in the Project Control System Description (PCSD) on the site Intranet on the SP&I web page. The PCS maintained by SP&I include:

- Basis of Estimate Software Tool (BEST)
- Primavera Project Planner (P3) ©
- P&I Reporting System
- PMP/PBD Database
- Baseline Change Proposal Tracking System
- Milestone Tracking System
- Project Management Reporting System
- Resource Management and Allocation System

These documents and systems provide the project planning and management tools required by the Projects to implement the Closure Project.

5.6.1 Earned Value

Earned value (BCWP) will be measured two different ways: one is for schedule variance and the other is for cost variance. For schedule variance, earned value will be quantitatively measured for mission work (i.e., deactivation and decommissioning WBS elements) only. Mission work earned value is taken when a defined, quantifiable end product is substantially complete. For cost variance, earned value will be taken for all in-progress and completed activities. The accepted methods for measuring earned value are level of effort (LOE), quantities, modified milestone, milestone, and percent complete (based on a pre-

determined method of measurement). The 771 Closure Project will use percent complete for earned value for the majority of activities.

5.6.2 Subcontractor Invoice and Claim Management

Following the reorganization of the RFCP around six main projects, the subcontract management and administration functions were also reorganized. The formerly centralized procurement organization has been decentralized to give each of the Projects control of their subcontracting functions, with the Administration Organization serving in a support function to the projects.

Specifically, each of the projects has a Subcontract Administrator Lead and necessary professional and support staff, working directly for the Manager of Project Planning in managing and administering all subcontract work for the project. The Administration Organization supports the projects by administering the Master Task Agreements that all of the projects utilize. The administration organization also manages subcontract close out and provides the small business liaison.

The Procurement Systems Organization within the Material Stewardship Project provides matrixed Procurement Leads to each of the projects for the procurement of commodities. This organization also provides procurement engineering and quality assurance and material logistics management to the projects.

Management of subcontracts, including subcontractor invoicing and claims management, will continue to follow the guidance as described in the Acquisition Procedure For Requisitioning Commodities And Services.

5.6.3 Change Management

The change control process governs the documentation and approval of changes to the Closure Project Baseline, ensuring the validity of the project technical scope, schedule, estimated cost, and allocation of funding is maintained. Change control actions may result in modifications to the contract between DOE and K-H, and as such documentation and actions are subject to rigorous oversight (additional detail on change management can be found in the PCSD).

Under the RFCP Contract there are two sub-projects under: (1) the contract baseline - developed and submitted to the DOE for baseline approval; and (2) the working target - used to manage the Closure Project's day-to-day activities. DOE has authorized K-H to complete the full scope of work in the Closure Project Contract. This authorization allows K-H to accelerate or defer work without having to seek DOE approval for changes in the working target.

The Project Manager has authority to make changes within the project up to certain thresholds (Type III changes). Generally speaking, these changes include: funding transfers between CADs within the project; adjustments to schedule duration and logic ties that don't affect the project end date; and, minor editorial changes to scope documents. Additionally, the Project Manager has certain responsibilities for change control. The Project Manager:

- Authorizes actions necessary to sustain operations in a manner consistent with applicable environmental, safety, and health statutes, regulations, and procedures, regardless of established SCCB or ICCB change control approval thresholds.
- When such corrective actions are necessary, notifies the K-H Contracting Officer who in turn notifies the DOE Contracting Officer in writing within 24 hours of any action taken pursuant to this provision.

- Forwards a copy of this notification to the K-H Change Control Manager.
- Manages the contingency account for the project.
- Requests formal written direction from the DOE Contracting Officer prior to performing requested work if the DOE-directed changes are received in an informal manner (e.g., e-mail, voice mail, verbal, informal notes).
- Reviews correspondence from K-H Correspondence Control, project initiated correspondence, external correspondence from the regulators, changes to Standards, Directives or regulations and determines if contract modification is necessary.
- Prepares a draft Notice of Pending Change letter if responses are not received from the DOE within the requested timeframe or if DOE responses may result in a change to the Contract Baseline. Forwards the letter to K-H Contracts Administration (copy K-H Change Control Manager) for submittal to the DOE Contracting Officer.
- Monitors GFS/I requests and deliveries to determine if an excusable delay or other contract modification is necessary.
- Prepares draft Notice of Pending Change letter when an excusable delay or other contract modification is warranted, and provides letter to K-H Contracts Administration (copy K-H Change Control Manager) within three (3) days of first knowledge of impact (e.g., K-H Correspondence Control receipt date).
- Prepares and submits initial REA/Type I baseline change proposal (BCP) for changes to the Contract Baseline, documenting the scope, schedule, and cost impact of the change. Forwards the REA/CP to the K-H Change Control Manager after the Notice of Pending Change is submitted to DOE.
- Ensures necessary reviews and approval signatures (including K-H Contracts Administration review, other impacted projects, and scope/cost/schedule impact analyses) are completed in a timely manner, enabling CPs processing to be completed according to the designated reporting cycle schedule.
- Uses the Integrated Change Control Checklist to review all potential life-cycle scope, schedule, and cost impacts to the Contract Baseline, are completely and accurately documented.
- Compares internally generated changes against the change control thresholds (audit findings, planning changes) and, if warranted, prepares appropriate change documentation to update the K-H Working Target or Contract Baseline.
- Ensures the Project Management Plan is appropriately updated according to established configuration control procedures.
- Maintains the record file for all Type III changes
- Notifies Cost Account Managers (including those of other impacted projects) regarding the disposition of submitted CPs.

6. PERFORMANCE FEEDBACK

This section addresses the processes by which feedback will be incorporated into the project activities. Feedback occurs within and between all of the functions of K-H ISM system. Feedback is an integral part of the management system and will not be used occasionally to detect and study current and potential problems or only when necessary to counter a problem.

The following table documents the methods that will be used to ensure that feedback is incorporated into project.

Area of Interest	Feedback Activity	Potential Outcome
Safety Performance	Radiation survey monitoring and review – the data will be collected and evaluated pursuant to specific performance objectives and criteria – all data will undergo this evaluation	Should indicate whether the project scope is within the original parameters and if additional scoping and controls are needed
	Industrial hygiene monitoring and review – the data will be collected and evaluated pursuant to specific performance objectives and criteria – all data will undergo this evaluation	Should indicate whether the project scope is within the original parameters and if additional scoping and controls are needed
	Site Monthly Safety Report – summarizes the safety across the RFCP for a particular month	The report can be used as feedback to share with floor level workers to stimulate safe practices, additional feedback, and lessons learned
	Monthly/Quarterly Safety Meetings – provides a forum to cover safety topics about reoccurring safety concerns or upcoming events that could have unusual safety concerns	Provides a forum for feedback at a level outside an individual project
	Self assessment – all levels of project will participate from management to floor level workers – conducted at least annually	Identification and elimination of performance weaknesses; increases overall safety and health of worker and public
Environmental Stewardship	Environmental monitoring and review – the data will be collected and evaluated pursuant to specific performance objectives and criteria – all data will undergo this evaluation	Should indicate whether the project scope is within the original parameters and if additional scoping and controls are needed
	Self assessment – all levels of project will participate from management to floor level workers – conducted at least annually	Identification and elimination of performance weaknesses; increases overall safety and health of worker and public
Safeguards and Security	Self assessment – all levels of project will participate from management to floor level workers – conducted at least annually	Identification and elimination of performance weaknesses; increases overall safety and health of worker and public
Production	Self assessment – all levels of project will participate from management to floor level workers – conducted at least annually	Identification and elimination of performance weaknesses; increases overall safety and health of worker and public
Project Controls	Self assessment – all levels of project will participate from management to floor level workers – conducted at least annually	Identification and elimination of performance weaknesses; increases overall safety and health of worker and public

Area of Interest	Feedback Activity	Potential Outcome
	Subcontractor evaluation program – subcontractor will be assessed throughout their subcontract	Elimination of subcontractors that cannot perform in accordance with the RFCP standards and schedule

In addition to the feedback activities noted in the table, there are specific processes and programs on-Site that will ensure that feedback is received for all areas of interest within the project. Those programs are:

- Conduct of Operations, particularly the Plan-of-the-Day – Provides an opportunity for feedback associated with the next day's activities; it facilitates coordination between groups with activities in the same areas.
- Toolbox meetings – Provide a daily opportunity to provide feedback on the activities planned for that particular day and to provide lessons learned from the previous day's activities.
- Personnel Performance Reviews – Provide feedback to individual employees on job performance and gives the employee an opportunity to provide feedback.
- Site Lessons Learned/Generic Implications Requirements Manual – Describes the responsibilities and requirements for performing lessons learned and generic implication process and provides programmatic requirements for performing lessons learned.
- Site Integrated Oversight Manual – Requires management assessments of processes under a manager's control; requires knowledge of the process under assessment; and provides reasonably objective assessment of effectiveness of the process under review, corrective action, and/or feedback to program owners and processes under review.
- Occurrence Reporting Process – Reports occurrences as defined by the process; identifies occurrences; and results in corrective actions and lessons learned.
- Integrated Work Control Program – Describes formal mechanisms for providing feedback and post job evaluation; requires knowledge of the work activity planning and/or execution; and results in post job review, lessons learned, and work document reference library.

6.1 Reporting

This section will detail how the project will report performance and status of safety, environmental stewardship, safeguards and security, and project controls.

6.1.1 Safety

Safety metrics must be reported as the raw numbers based on the actual hours and numbers normalized for 200,000 hours per year. The metrics that must be reported are the raw numbers and case rate for first aid cases, recordable cases, day away from work cases, and number of restricted days.

6.1.2 Environmental Stewardship

Reporting requirements associated with environmental stewardship include the data associated with the surface, groundwater, and air monitoring programs and recycling and waste minimization statistics. The monitoring data will be managed by the environmental personnel matrixed to the 771 Closure Project. The surface water monitors are set-up on a continuous monitoring system and the data are compiled monthly. The groundwater wells are sampled every six months. Currently, there are no special air samplers set-up around the 771 Closure Project; therefore, air monitoring data will come from the RAAMP system. All of the air monitoring data is compiled annually into the RFETS Integrated Monitoring Report.

The recycling and waste minimization metrics will be maintained by the material stewardship personnel matrixed to the 771 Closure Project. In addition to these specific reporting items, environmental stewardship reporting could involve the Lessons Learned Program, Price-Anderson Amendment Act requirements, event/spill reporting, and nonconformances.

6.1.3 Safeguards and Security

Reporting requirements associated with safeguards and security include the material inventory, including hold-up quantities. These inventories are currently scheduled every six months and are completed by the Material Stewardship personnel matrixed to the 771 Closure Project. A request has been submitted that the frequency of the inventories be reduced to annually.

In addition to the material inventory, every other month an inventory must be conducted and submitted on the tamper indicating devices within the 771 Closure Project. Other safeguard and security submittal requirements are driven by decommissioning requirements. For instance, a submittal will be prepared requesting an exclusion from document classification. This is a one time submittal.

6.1.4 Project Controls

Section H.1.03 of the Rocky Flats Closure Contract between the DOE and Kaiser-Hill requires that "Differences between planned and actual performance, shall be analyzed and reviewed monthly against the total project baseline and the Target Cost and Target Schedule for the current fiscal year portion of the total project." Additionally, this contract clause states that "Once each quarter, the Contractor shall prepare and submit a comprehensive report [Quarterly Critical Analysis (QCA)] which critically analyzes the overall status of the closure project as well as many key metrics."

The responsibility for reporting project performance will be shared by the Project and SP&I. In general, the 771 Closure Project will be responsible for maintaining current and accurate cost, scope and schedule status information in the Project Control System integrated databases. Utilizing this information, SP&I will roll-up project information into consistent monthly and quarterly project performance reports.

For the QCA, the 771 Closure Project will prepare the following specific project information that will be included in the QCA (format and submittal instructions are issued by SP&I):

- Cost and schedule performance status
- Critical path schedule
- Critical path analysis, including analysis of schedule trends and float analysis at the PBD level
- Project issues including analysis of critical labor skills and other resources

The Project will also prepare updates to project risk management/mitigation plans and the risk-based contingency analysis. This information will be provided to SP&I for incorporation into the Site Summary Briefing.

7. REFERENCE INFORMATION

7.1 Acronyms

AB	Authorization Basis
ACM	asbestos containing material
ACWP	actual cost of work performed
ARAR	applicable or relevant and appropriate requirement
AST	aboveground storage tank
AWS	alternate work schedule
BCP	baseline change proposal
BCWP	budgeted cost of work performed (earned value)
BCWS	budgeted cost of work scheduled
BEST	basis of estimate description
BFO	Basis for Operations
BIO	Basis for Interim Operations
CCA	configuration control authority
CDD	Closure Description Document
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CPB	closure project baseline
CPPF	cost plus performance fee
CV	cost variance (BCWP-ACWP)
CWTS	Caustic Waste Treatment System
DDCP	D&D Characterization Protocol
DNFSB	Defense Nuclear Facilities Safety Board
DOE	Department of Energy
DOE/HQ	DOE Headquarters
DOP	Decommissioning Operations Plan
DOT	U.S. Department of Transportation
DPP	Decommissioning Program Plan
EAC	estimate at completion
ECATS	Environmental Corrective Action Tracking System
EMS	Environmental Management System
EPA	Environmental Protection Agency
ER	Environmental Restoration
ESH&Q	environmental, safety, health and quality
FDPM	Facility Disposition Program Manual
FY	fiscal year
GSA	General Services Administration
H_2SO_4	sulfuric acid
HASP	Health and Safety Plan
HCl	hydrochloric acid
HEPA	high efficiency particulate air
HF	hydrofluoric acid
HUD	Department of Housing and Urban Development
HVAC	heating ventilation and air conditioning
IDC	item description code

IDEC	indirect/direct evaporative cooling
IEMS	Integrated Environmental Management System
IHSS	individual hazardous substance site
IM/IRA	Interim Measures/Interim Remedial Actions Document
IMP	Integrated Monitoring Plan
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
ITC	inner tent chamber
IV	independent verification
IVC	independent verification contractor
IWCP	Integrated Work Control Program
JHA	job hazard analysis
K-H	Kaiser-Hill
LAA	limited access area
LCO	limiting conditions for operations
LDR	land disposal restriction
LLW	low-level waste
LOE	level of effort
LRA	Lead Regulatory Agency
m	meter
MAA	material access area
MAP	Management Assessment Program
MST	Modular Storage Tanks
NDA	nondestructive assay
NTS	Nevada Test Site
OASIS	Organic and Sludge Immobilization System
PA	protected area
PAM	Proposed Action Memorandum
PBS	project baseline summary
PCB	polychlorinated biphenyls
PCS	project control system
PCSD	project control system description
PDS	Pre-Demolition Survey
PDSP	Pre-Demolition Survey Report
PDSR	Pre-Demolition Survey Report
PMP	Project Management Plan
PPE	personal protective equipment
PSAP	Personnel Security Assurance Program
Pu	plutonium
QA	quality assurance
QC	quality control
QCA	quarterly critical analysis
RAAMP	Radioactive Ambient Air Monitoring Program
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RFCA	Rocky Flats Cleanup Agreement
RFCP	Rocky Flats Closure Project
RFETS	Rocky Flats Environmental Technology Site

RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSOP	Rocky Flats Cleanup Agreement Standard Operating Protocol
RTR	real time radiography
SCO	surface contaminated object
Site	Rocky Flats Environmental Technology Site
SNM	special nuclear material
SME	subject matter expert
SMP	Safety Management Program
SOE	Stationary Operating Engineer
SOG	slab-on-grade
SOW	statement of work
SPO	security police officers
SP&I	Strategic Planning & Integration
SRS	Savannah River Site
SV	schedule variance (BCWP-BCWS)
SVOC	semi-volatile organic compounds
SWB	standard waste box
SWP	standard work packages
TCLP	Toxicity Characteristic Leaching Procedure
TRU	transuranic
TRM	mixed transuranic
TSCA	Toxic Substances Control Act
TSR	technical safety requirement
UPS	uninterruptible power supply
USQ	unreviewed safety question
UST	underground storage tank
VA	Vulnerability Assessment
VOC	volatile organic compounds
VSS	vital safety systems
WAC	waste acceptance criteria
WBS	work breakdown structure
WIPP	Waste Isolation Pilot Plant

Appendix A
Contract Statement of Work

DETAILED DESCRIPTION OF SCOPE AND SERVICES

Special Nuclear Material

The Contractor will be required to perform the work listed below for the removal of all Special Nuclear Material (SNM).

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS[1]
A. Plutonium Ship all non-classified plutonium metals and oxides to the Savannah River Site or other DOE approved alternative[2] by September 30, 2002 (except for Pu holdup discovered and/or removed after 9/30/02). Ship all classified, by shape, plutonium metal to the Savannah River Site or DOE approved alternative by September 30, 2002. Ship all plutonium fluorides to the Savannah River Site or DOE approved alternative by September 30, 2002. Ship all plutonium metal composites to Lawrence Livermore National Laboratory or DOE approved alternative by September 30, 2002. Ship all IAEA material to Savannah River Site or DOE approved alternative by September 30, 2002. .			Non classified plutonium metal and oxide must be packaged to the DOE-STD-3013-96 prior to shipment to the DOE approved receiver site. All Special Nuclear Material must be shipped in a DOE approved shipping container (i.e. 9965, 9975, DT22, etc.) DOE Orders 5610.12, 5610.14 and 460.1A must be followed.	Safe, Secure Transport services (e.g., escorts, tractor and trailer) at a rate and number sufficient to support SNM shipments (average number of 5 shipments per month not to exceed 9 shipments per month) started on 10/01/99 and ending as early as 10/1/01 and no later than 9/30/02 for a total of 175 shipments. DOE approved receiver sites that can receive SNM and plutonium fluorides and IAEA materials at a rate to support shipment completion as early as 10/1/01 and no later than 9/30/02 (average number of 5 shipments per month not to exceed 9 shipments per month). DOE-provided containers for SNM at a rate and number consistent with the planning and approval process described in C.3 to support the SNM shipping schedule. (DOE to certify but not provide 9975 and 3013 containers) Specific container list TBD

[1] As used throughout this Technical Exhibit A, "None" is used solely to indicate that the Government has not identified a specific service or item to be provided by the Government in support of the particular scope description.

[2] Dependent upon the completion of the NEPA process for the Record of Decision for Disposal.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS[1]
B. Highly Enriched Uranium Ship all highly enriched uranium metal that is contaminated with plutonium to the DOE approved receiver site by September 30, 2002. **C. Other Nuclear Materials** Ship all depleted uranium, 4.5% LEU, radioactive sources, thorium samples, U-233 non-combustibles to designated DOE or other approved receiver sites by September 30, 2002.			All Special Nuclear Material must be shipped in a DOE approved shipping container (i.e. 9965, 9975, DT22, etc.) DOE Orders 5610.12, 5610.14 and 460.1A must be followed.	Same items as for Section A. Plutonium. In addition for C, NEPA as required Designated receiver sites Certified shipping containers DOE-provided containers for SNM at a rate and number consistent with the planning and approval process described in C.3 to support the SNM shipping schedule. (DOE to certify but not provide 9975 and 3013 containers) Specific container list TBD

II. Facility Deactivation, Decommissioning and Demolition

The Contractor will be required to deactivate, decommission and demolish the Rocky Flats facilities in accordance with the Rocky Flats Cleanup Agreement, except for those facilities specifically defined by DOE to remain as detailed below:

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
A. SNM Buildings The Contractor shall deactivate, decontaminate and demolish all former Special Nuclear Material building clusters & supporting facilities to include (See Project Baseline Descriptions, for cluster descriptions) B371/374 cluster by March 1, 2006, B771/774 cluster by October 1, 2004, B707/750 cluster by February 1, 2005, B776/777 cluster by March 1, 2004, and B559 cluster by September 1, 2004.	AAC, AAD CAC, CAD BAC, BAD DAC, DAD		Planning, characterization, area preparations, physical decontamination, dismantlement, demolition and reporting requirements shall be accomplished in accordance with the Rocky Flats Cleanup Agreement.	CERCLA Administrative Record Repository DOE shall provide comments on draft decision documents and regulatory reports within 20 business days of receipt.
B. Other Facilities The Contractor shall decontaminate and demolish the remaining building clusters & supporting facilities by September 30, 2006. (See Project Baseline Descriptions for cluster and supporting facility descriptions.)	ECC, ECD, EDC, EDD, EEC, EED, waste storage bldgs		Planning, characterization, area preparations, physical decontamination, dismantlement, and demolition shall be accomplished in accordance with the Rocky Flats Cleanup Agreement.	CERCLA Administrative Record Repository DOE shall provide comments on draft decision documents and regulatory reports within 20 business days of receipt.

III. Waste Management

The Contractor shall store, process and/or package and ship to DOE approved or other storage, treatment or disposal sites all wastes. These wastes consist of transuranic (TRU) and transuranic mixed (TRU mixed), low level radioactive (LLW) and low level radioactive mixed (LLW mixed), hazardous, and sanitary waste. These wastes must be processed and/or packaged to meet disposal or receiver site criteria as stipulated below:

SCOPE	CORRESPONDING WBS ELEMENT EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
A. Transuranic and Transuranic Mixed Waste Ship to the Waste Isolation Pilot Plant (WIPP) and other DOE designated sites, all transuranic and transuranic mixed waste by December 15, 2006.			The Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria (WAC) Rev. 5, dated April 1996, and DOE Order 435.1. The TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) procedure and Site-Specific TRAMPAC for TRU waste loading requirements. The TRUPACT-II SARP (Safety Analysis Report) and TRUCON (TRUPACT-II Content Code). All DOT transportation requirements applicable at the time of shipment for hazardous and radioactive waste must be met as well. --10 CFR Parts 70 & 71 (packaging) --49 CFR Parts 107, 110, 171, 173 (transportation) --Packaging QA Program Plan	TRUPACT II containers and trailers to support transuranic and transuranic mixed waste (including classified waste) shipments to WIPP and other DOE approved storage, treatment or disposal sites. TRUPACT IIs were delivered to Rocky Flats Site beginning on 10/01/99, and will be delivered at the following rates per month: FY00 36/mo FY01 72/mo FY02 120/mo FY03 120/mo FY04 120/mo FY05 80/mo FY06 36/mo FY07 36/mo DOE will also provide all transportation services from the loading facilities at Rocky Flats to all DOE approved sites.

SCOPE	CORRESPONDING WBS ELEMENT EXECUTION WBS	CORRESPONDING WBS ELEMENT INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
B. Low Level Waste Ship to approved DOE or commercial disposal sites all low-level waste by December 15, 2006. The Contractor shall provide transportation services to the disposal site and disposal site fees unless otherwise stipulated by DOE.			Disposal site waste acceptance criteria and DOE Order 435.1, All applicable DOT requirements at the time of shipment for radioactive waste must be met. Currently available disposal site – the DOE Nevada Test Site (NTS) in accordance with NTS Waste Acceptance Criteria dated August 1997, Rev 1, or Commercial Waste Acceptance Criteria if that disposal option is chosen.	DOE receiver sites that can accept waste at a rate and number consistent with the planning and approval process described in C.3. to support low level waste shipments.
C. Low Level Mixed Waste (less than 10 nanocuries per gram) Ship to approved DOE or commercial treatment and disposal sites all low level mixed waste less than 10 nanocuries per gram by December 15, 2006. The Contractor shall provide transportation services to the disposal site and treatment and disposal site fees unless otherwise stipulated by DOE.			Disposal site waste acceptance criteria and DOE Orders 5480.3 and 435.1. All applicable DOT requirements for shipment of radioactive and hazardous waste must be met.	DOE fulfills its commitment in the Waste Management Programmatic Environmental Impact Statement to designate DOE or commercial receiver site(s) that can accept waste at a rate and number consistent with the planning and approval process described in C.3 to support low level mixed waste shipments.

SCOPE	CORRESPONDING WBS ELEMENT EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
D. Low Level Mixed Waste (greater than 10 nanocuries per gram and less than 100 nanocuries per gram) Ship to approved DOE or commercial treatment and disposal sites all low-level mixed waste greater than 10 nanocuries per gram by December 15, 2006. The Contractor shall provide transportation services to the disposal site and treatment and disposal fees (up to the unit price in III.C. above) unless otherwise stipulated by DOE.			Disposal site waste acceptance criteria and DOE Orders 5480.3 and 435.1, All applicable DOT requirements for shipment of radioactive and hazardous waste must be met.	DOE fulfills its commitment in the Waste Management Programmatic Environmental Impact Statement to designate DOE or commercial receiver site(s) that can accept waste at a rate and number consistent with the planning and approval process described in C.3 to support low level mixed waste shipments.
E. Sanitary Waste Ship to commercial facilities for disposal, or recycle, all sanitary waste by December 15, 2006.			Local and state regulations regarding waste acceptance at sanitary landfills as well as any requirements associated with individual disposal sites. Sanitary waste leaving the Rocky Flats Site must be inspected to assure that no radioactive materials are present in accordance with Colorado Sanitary Waste regulations (6 CCR 1007-2) for landfills and individual landfill permits.	None
F. RCRA Regulated Hazardous Waste Ship to commercial facilities, all RCRA Regulated Hazardous Waste by December 15, 2006.			Disposal sites waste acceptance criteria, the Resource Conservation Recovery Act and DOE Order 435.1	None

SCOPE	CORRESPONDING WBS ELEMENT EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
G. Waste Minimization The Contractor shall develop and implement a pollution prevention program incorporating waste prevention, recycling and an affirmative procurement program. The Contractor shall establish waste reduction goals for transuranic, low-level waste, low level mixed and RCRA regulated hazardous waste.			Executive Order 12856 Executive Order 13101 DOE Order 5400.1	None

IV. Environmental Remediation

The Contractor shall prepare a draft interim final record of decision (ROD), submit to DOE for DOE, EPA, and CDPHE approval, and complete all actions required by the approved interim final ROD to remediate soil, surface water, ground water, and other contaminated media. The remediation shall be completed as stipulated below:

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
A. Remediation The Contractor shall remediate Individual Hazardous Substance Sites (IHSS)[3], Potential Areas of Concern (PAC), or under building contamination (UBC) by December 15, 2006. **The total waste volumes for this environmental remediation portion of the project are assumed not to exceed those quantities as follows:** Non-Rad Waste: 11,000 cubic yards Low Level Waste: 107,000 cubic yards Low Level Mixed Waste <1 nanocurie: 41,000 cubic yards Low Level Mixed Waste >1 nanocurie: 220 cubic yards			Planning, characterization, area preparations, remediation, disposition, final regulatory approvals and reporting requirements shall be accomplished in accordance with RFCA Remediation shall be specified in the approved interim final Record of Decision (ROD) and Proposed Plan Contractor must transport and maintain CERCLA administrative record IAW 40 CFR 300-311	CERCLA Administrative Record Repository DOE shall provide comments on draft decision documents and regulatory reports within 20 business days of receipt.

[3] If the 903 Pad Remediation Project removal option is exercised, then the project planning, execution and completion as identified in WBS #1.1.03.12.06.02 shall be removed from the scope of work and this contract.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
B. Post Closure Care under RCRA Permit The Contractor shall perform the closure and post-closure care requirements for RCRA permitted and interim status units during the performance of this contract.			The Contractor shall comply with closure and post closure care requirements under the RCRA permit in accordance with RCRA, 40 CFR Parts 264 and 265, the Colorado Hazardous Waste Act requirements, 6 CCR 1007-3 and RFCA.[4]	None
C. End State The Contractor shall develop and submit for RFFO and regulatory approval a Draft Interim Final ROD and Proposed Plan. The end state is defined in Clause C.1.2.			Draft Interim Final ROD shall be in accordance with RFCA and be of sufficient quality and completeness to obtain regulatory approval and issuance of an approved Interim Final ROD and Proposed Plan. Draft Interim Final ROD will be prepared and presented in sufficient time to allow: Public and regulatory review as provided in RFCA Regulatory approval and publication Completion of remediation actions described in the ROD and Proposed Plan prior to December 15, 2006 Contractor must transport and maintain CERCLA administrative record in accordance with 40 CFR 300-311.	CERCLA Administrative Record Repository DOE shall provide comments on draft decision documents and regulatory reports within 20 business days of receipt. DOE will use its best efforts to obtain an approved Interim Final ROD.

[4] Assumes RCRA Permit is not extinguished and its requirements are not absorbed into RFCA.

V. Infrastructure and General Site Operations

The Contractor shall perform the infrastructure operations and general support services listed below in support of the site closure mission.
All items listed below are required until the end of this contract unless otherwise approved for termination by DOE.
These items are generally required to support the items listed Sections I through IV above, or the general operation of the site until closure
It is recognized that this is a closure site, all facilities have a limited life span, and the nuclear safety risk and required controls should be steadily declining throughout the project. The standard requirements referenced in this contract are generally designed for continuous ongoing facility operations. this will create the desirability for a number of interpretations and/or exceptions and deviations from the standard requirements to ensure that project costs are being deployed for the maximum net government risk reduction. The Contractor and DOE shall actively engage in early identification and appropriate requirements reduction activities to ensure a safe and cost effective closure.
The Contractor shall provide any other services or operations not listed below as required by other contract requirements including those DOE Orders listed in Section J, Attachment B.
Safety services are subdivided into three sections: 1) Nuclear safety requirements which apply to handling and processing fissile material and to the operation of facilities that house fissile material, 2) radiological safety requirements that apply to handling and processing of radioactive waste and operations in facilities that are radiologically contaminated or house radioactive materials, and 3) industrial safety requirements which apply to all work activities and facilities at the Site.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
A. Environmental Monitoring The Contractor shall conduct required environmental monitoring in compliance with environmental laws, regulations, permits, agreements, decision documents and in support of emergency response activities. The Contractor shall provide annual updates to the Historical Release Report and CERCLA Administrative Record. The Contractor shall maintain the current and any new enforceable agreements at the Site as identified in the technical exhibit D in this section C.	H..	F.. (for information to better plan characterization and remediation), AAB, BAB, CAB, DAB, ECB, EDB, EEB, waste storage bldgs (for access to monitoring locations)	Environmental Monitoring shall be accomplished in accordance with the provisions of Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Clean Air Act; the Clean Water Act; the Colorado Water Quality Control Commission (CWQCC) standards; natural resource management regulations, and RFCA. [5]	DOE will provide necessary access to accomplish all offsite environmental monitoring.
B. Facility Operation and Material Storage The Contractor shall operate all facilities until they are demolished in accordance with applicable safety, security requirements and store all materials (chemicals, etc.), waste, property, etc., in accordance with applicable requirements.	AAB, BAB, CAB, DAB, ECB, EDB, EEB, waste storage bldgs		Applicable requirements for facility operation or material storage are listed in Section J, Attachment B..	None

[5] Requirements will be revised if RFCA is amended to include above stated requirements as ARARs.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
C. Safeguards & Security The Contractor shall ensure appropriate levels of protection against unauthorized access; theft, diversion, loss of custody of Special Nuclear Material; espionage; loss or theft of classified matter or Government property; and other hostile acts that may cause unacceptable adverse impacts on national security or the health and safety of DOE and contractor employees, the public or the environment. The Contractor shall promptly prepare and submit applications for security clearances as required for work under this contract. The Contractor shall deter, prevent, detect and respond to unauthorized possession, use, or sabotage of Special Nuclear Materials. The Contractor shall provide an integrated system of activities, systems, programs, facilities and policies for the protection of classified information, nuclear materials, and DOE and certain DOE contractor property and personnel as required by the Atomic Energy Act of 1954, as amended, other Federal statutes, Executive orders, and other directives.			Program Management, DOE Order 470 Series Personnel Security, DOE Order 472 Series Protection Operations, DOE Order 5632 and DOE Order 473 Series Materials Control And Accountability, DOE Order 5633 and DOE Order 474 Series Information Security, DOE Order 5639 and DOE Order 471 Series	DOE shall promptly process Contractor security clearances. On average, processing time will be in accordance with DOE Order 472 guidelines which for clear cases will be at or below the following: Q clearance- 75 calendar days L clearance - 75 calendar days AAA clearance - 60 calendar days Processing time begins upon receipt of the case from the Contractor.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
D. Analytical Services The Contractor shall perform and maintain Analytical Services and/or Laboratories. The Contractor shall ensure that any lab samples analyzed by off-site laboratories will be disposed of from the laboratory and not returned to the Rocky Flats Site for disposal unless there is prior contractual agreement for the return of specific samples for which no other disposition is possible.			Analytical Services and laboratories shall be operated in accordance with one or more of the following references: 10 CFR 830.120, DOE Order 414.1, ASME-NQA-1, ANSI/ASQC E4, and/or ISO 9000.	DOE shall maintain a quality National Analytical Management Program or a DOE alternative program which supports the analytical services necessary to close the site.
E. Public Relations & Media Support The Contractor shall provide communication services to include Citizens Advisory Board representation, tours and visits and other stakeholder support.			Communication services shall be provided as needed to maintain stakeholder support for the Rocky Flats Closure Project. Contractor must transport and maintain supporting community documents in the established DOE Reading room(s).	DOE Reading Room(s)

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
F. Litigation Management The Contractor shall maintain a legal function and demonstrate sound litigation management practices to include litigation, arbitration, legal advice on environmental matters, procurement, employment, labor, and the Price-Anderson Act (PAA); review and interpretation of legislation and laws; research and drafting of memorandum, and the management and oversight of outside legal counsel; for both the prime and subcontractors. The Contractor shall provide litigation support to the Government when judged necessary by the Contracting Officer (or Contracting Officer Representative) in cases of actual or threatened litigation, regulatory matters, or third-party claims and subject to applicable rules and regulations. Litigation support includes, but is not limited to: case preparation assistance; document retrieval, review and reproduction; witness preparation and testimony; expert witness testimony; and assisting Government counsel as necessary in response to discovery or other information related activities responsive to any legal proceeding.			Litigation management practices shall be provided in accordance with the RFFO approved Litigation Management Plan. Department of Energy, Office of General Counsel, Legal Services and Litigation Management Policies and Procedures	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
G. Audit Support Services The Contractor shall provide audit support services for GAO, IG, DNFSB, EPA, CDPHE and other external audits that examine and evaluate Site-wide activities.			Audit Support Services shall be provided in accordance with DOE Order 2300.1B, Audit Resolution and Follow-up, DOE Order 2320.1C, Cooperation with the Office of Inspector General, DOE Order 2321.1B, Auditing of Programs and Operations; and, Department of Energy, Office of General Counsel, Legal Services and Litigation Management Policies and Procedures	DOE /OIG Rocky Flats Audit Plan
H. Utilities & Infrastructure The Contractor shall provide and maintain the infrastructure, utilities, etc. necessary to support the closure mission. DOE will provide at a later date a specific definition of which roads and components of the site utility system that will remain after closure.	EA..		Utilities and infrastructure shall be maintained in accordance with DOE Order 430.2 and the Site Safety Analysis Report.	DOE shall provide and pay for site utilities to include raw water, electricity, natural gas and heating oil.
I. Radiological Assistance Program The Contractor shall provide a field unit under the Radiological Assistance Program (RAP) until the RAP program is terminated by DOE.			DOE Order 5530.3 provides the requirements for the Radiological Assistance Program.	DOE shall provide additional funding for the RAP and one member and may provide up to three (3) members for the RAP team.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
J. Health Effects The Contractor shall provide support for health programs/ambulatory care, beryllium and radiation worker health surveillance programs and personnel monitoring program. These services are required to assess, monitor, record data, and provide medical support for current site workers who are or may be exposed to radiological and hazardous materials. This is expected to encompass 6500 (+/-1000) current site workers through the term of this contract. The Contractor shall maintain medical records of former workers and make them available for health effects studies as requested by DOE.			Health effects shall be maintained in accordance with Public Law 102-484, DOE Order 440.1, and will last until the program and documents are turned over to DOE at the end of this contract.	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
K. Occupational Health The Contractor shall provide the following classes of examinations for the purpose of providing initial and continuing assessment of employee health: pre-placement in accordance with the Americans with Disabilities Act (42 United States Code 12101), qualification examinations, fitness for duty, medical surveillance and health monitoring, return to work health evaluations, and termination examinations. The occupational medical department shall be informed of all job transfers and shall determine whether a medical evaluation is necessary. The physician responsible for the delivery of medical services or his/her designee shall inform contractor management of appropriate employee work restrictions.			DOE Order 440.1A provides the requirements for employee health examinations. This applies to all contractor and sub-tier contractor personnel as required by DOE Order 440.1A.	None
L. Emergency Management The Contractor shall provide Site Emergency Management Services to include emergency planning and preparedness as well as response to possible incidents involving nuclear, radiological and hazardous materials on site. The Contractor shall provide a fully equipped and adequately staffed Emergency Operations Center on the site.	EA…		DOE Order 151.1 specifies the performance requirements, capabilities and response times for emergency management services. Emergency management shall be performed at the levels specified until the major nuclear facilities' hazards are removed or ameliorated, or the facilities are demolished. A reduced level of emergency services may be allowed once the major hazards on-site are removed and as they are approved by DOE. DOE Order 225.1A specifies the requirements for conducting accident investigations.	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
M. Nuclear Criticality Safety The Contractor shall maintain a Nuclear Criticality Safety Program which ensures that operations with fissionable materials which pose a criticality accident hazard shall be evaluated and documented to demonstrate that the operation will be subcritical under both normal and credible abnormal conditions. Fissionable material operations shall be conducted in such a manner that consequences to personal and property that result from a criticality accident will be mitigated. No single credible event or failure shall result in a criticality accident having unmitigated consequences.			DOE Order 420.1 provides the requirements and invokes the applicable ANSI/ANS 8 Standards. Sabotage and seismic events that are predicted to result in facility collapse are exempt from the requirement for double contingency. The Criticality Safety Program will be required in each facility until fissile materials inventories are reduced to less than that stipulated in ANSI/ANL8.	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
N. Nuclear Safety The Contractor shall develop and maintain the safety analysis and controls for nuclear facilities, operations, and activities. Readiness determinations for restart of activities and for start-up of new activities will be required to demonstrate readiness to safely start the activity.			DOE Orders 420.1, 425.1, 5480.21, 5480.22, and 5480.23 specify the requirements for nuclear safety.	DOE complies with the following authorization basis review schedule: Justification for Continued Operation – 4 calendar weeks Page Change- 4 calendar weeks New -Authorization Basis- 2 calendar months Authorization Basis revision- 6 calendar weeks Positive unreviewed safety question - 2 calendar weeks DOE will work cooperatively with the Contractor to improve upon this review schedule as a part of the best efforts approach of the Nuclear Licensing Statement of Commitment.
O. Occupational Safety The Contractor shall meet all occupational safety and health requirements (including but not limited to industrial safety, fire protection, construction safety, firearms safety, explosive safety, industrial hygiene, pressure safety and motor vehicle safety) for all site-related operations and conditions.			Occupational safety requirements are as stipulated in DOE Orders 420.1, DOE Order 440.1A.	None
P. Fire Protection The Contractor shall maintain an acceptable fire protection program which supports a level of fire protection and fire suppression capability sufficient to minimize losses from fire and related hazards consistent with the best in class of protected property in private industry.			DOE Order 420.1 provides the requirements and invokes the National Fire Protection Association Standards.	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
Q. Quality Assurance Program The Contractor shall perform all work on site in accordance with applicable quality assurance requirements.			DOE Order 414.1 and 10 CFR 830.120 specify basic requirements that apply to the quality assurance program. For site activities where transuranic waste will be characterized, packaged, or shipped, the DOE Carlsbad Area Office Quality Assurance Program Document, CAO-94-1012 and DOE Carlsbad Area Office Quality Assurance Program Plan, CAO-94-1010 shall apply. The Nevada Test Site Waste Acceptance Criteria shall apply for those activities where Low Level Waste is characterized, certified, packaged, or shipped.	None
R. International Agreements The Contractor shall support 12 inspections per year by the International Atomic Energy Agency (IAEA) as well as maintain material surveillance equipment.			IAEA agreement INFCIRC 288 and DOE Order 1270.2B This requirement will remain in effect until IAEA materials have been permanently removed from the Site.	None

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
S. Records Management and Document Control The Contractor shall provide on an ongoing basis the maintenance, storage, protection, and disposition of active and inactive classified and unclassified records, retrieval from on-site and off-site storage facilities and support in ongoing discovery efforts for litigation. All Government records, regardless of media, in the Contractor's custody must be properly inventoried, indexed, moved to DOE approved off-site storage facilities, and possess a disposition schedule or equivalent thereof pending a schedule being developed, including those records that are required to document closure activities. Those records that are radiologically, beryllium or otherwise contaminated shall be handled and dispositioned in accordance with site procedures including applicable free release levels. The Contractor will provide a complete records inventory list in a hardcopy and electronic format to the post closure records custodian identified by the DOE Contracting Officer.			Records management and document control will be conducted in accordance with DOE Order 200.1, 36 CFR Chapter 12, Subchapter B and the Joint Records Management Strategy for Site Closure.	DOE approved receiver site(s).

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
T. Radiation Protection Program The Contractor shall ensure that all site activities are conducted in compliance with a documented Radiation Protection Program to minimize occupational exposure to internal radiation, direct, external exposure to ionizing radiation as well as to minimize the spread of contamination. The As Low As Reasonably Achievable (ALARA) process will be applied to all site activities.			10 CFR 835 and the Departmental Implementing Guides shall apply.	None.
Environmental Permits The Contractor shall obtain, maintain, and comply with environmental permits as required and allowed by law.	H…	AA, BA, CA, etc.	Contractor's compliance with environmental permits shall be in accordance with the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Clean Air Act; the Clean Water Act; and the Rocky Flats Cleanup Agreement.[6]	None

[6] Requirements will be revised if RFCA is amended to include above stated requirements as ARARs.

VI. DOE Office Accommodations

The Contractor shall provide basic office accommodations for DOE personnel as specified below. A central DOE office will be needed as well as smaller office accommodations in a few critical facilities until they are decommissioned. During the final stages of closure it is expected that DOE will relocate its office off-site.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS INTERFACE WBS		REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
DOE will continue to occupy Building 460 until the facility is scheduled for demolition or until the Contractor provides alternate office space, whichever occurs first. This includes space for up to 250 DOE and support service personnel. Regardless of location, DOE will require that at least 150 of the individual offices must be located in one building until the end of FY04. Up to a maximum total of 10 office spaces (no more than three in each building) must be maintained in or within 150 feet of Buildings 371, 750, 771, and 707 until the Contractor closes the facilities. DOE will require additional space for approximately 10 regulators doing Site inspections. Lunch services must be provided within 500 feet of the single large DOE office on-site until 2005. The Contractor shall provide for movement of DOE furniture property and other materials if offices are moved from the satellite offices, or from B460. Adequate access for DOE personnel is required through closure.			DOE office accommodations will be provided in Building 460, or an alternative. Any central office location besides Building 460 requested to house the DOE offices must be approved by the Manager, RFFO.	None

VII. Tri-Party Agreement

The Contractor shall continue to implement the Three Party Transfer Agreements.

SCOPE	CORRESPONDING WBS ELEMENTS EXECUTION WBS	INTERFACE WBS	REQUIREMENT(S)	GOVERNMENT FURNISHED SERVICES & ITEMS
Tri-Party Agreement The Contractor shall ensure the continued support and assistance to Rockwell and EG&G as prescribed by the RFP Three Party Transfer Agreement dated June 30, 1995.	I…		RFETS Three Party Transfer Agreement with DOE, EG&G Rocky Flats, Inc., and Kaiser-Hill Company, L.L.C., June 30, 1995, and as incorporated by reference, the RFP Three Party Transfer Agreement with DOE, EG&G Rocky Flats, Inc., and Rockwell International Corporation, October 23, 1989.	None

APPENDIX B

Baseline Budget

Burdened Cost ($000)

Project/Cost Account			*F00 Feb-Sep*	*F01*	*F02*	*F03*	*F04*	*F05*	*F06*	*F07*	*Total*
C	**B771/774 Closure Project**										
	CA	**B771/774 Closure**									
		CAA **B771/774 Project Management**	446	1,768	1,838	1,559	374	308	0	0	**6,293**
		CAB **B771/774 Facilities Mtce (Landlord)**	10,434	11,421	10,661	7,672	0	0	0	0	**40,188**
		CAC **B771/774 Deactivation**	5,590	6,227	2,693	451	0	0	0	0	**14,961**
		CAD **B771/774 Decommissioning**	5,207	15,199	25,261	27,598	21,609	0	0	0	**94,874**
		CAE **B771/774 Support Services**	7,766	12,024	9,371	6,684	3,030	0	0	0	**38,876**
		CAF **D&D Program**	7,883	21,626	9,272	3,600	2,443	1,059	1,057	0	**46,939**
		Project C Totals:	**37,327**	**68,265**	**59,095**	**47,564**	**27,457**	**1,367**	**1,057**	**0**	**242,131**

Thursday, June 29, 2000 *rev. 3*

Source: Cost Account Flash Price Spread Report, Kaiser-Hill P&I Reporting System (rpt_fps_ca, Project: BaslDevl_0629a)
FY00 Actuals from P&I Reporting System, FY00 May Database 6/28/00

APPENDIX C

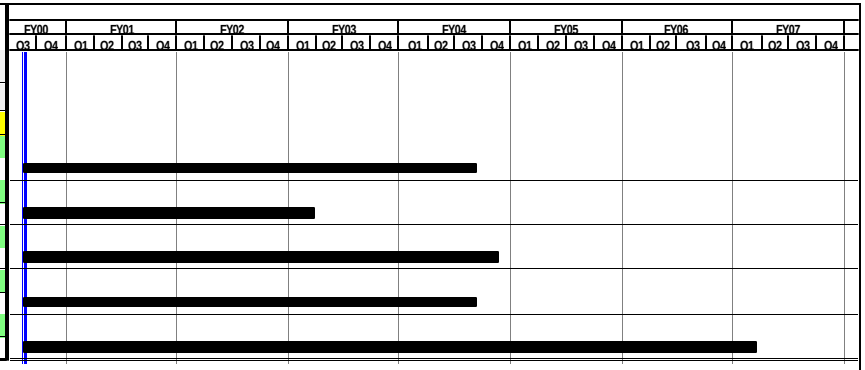
Working Budget

WBS	WBSDesc	Prior Costs 2/1/00 - 5/21/00	FY00	FY01	FY02	FY03	FY04	FY05	FY06	TOTAL
1CAA	B771/774 Project Management		452,689	1,678,804	1,599,518	1,221,533	280,439	0	0	5,232,983
1CAB	B771/774 Facility Maintenance		4,979,634	10,847,169	9,277,575	6,009,828	0	0	0	31,114,206
1CAC	B771/774 Deactivation		2,968,661	6,075,488	2,386,073	0	0	0	0	11,430,222
1CAD	B771/774 Decommissioning		2,553,618	15,759,303	25,429,992	30,721,434	4,800,851	0	0	79,265,198
	Subtotal - Sets		*2,049,728*	*12,507,128*	*20,147,959*	*8,277,716*	*232,416*	*0*	*0*	*43,214,947*
	Subtotal - Areas		*0*	*728,181*	*4,059,263*	*21,481,605*	*4,359,720*	*0*	*0*	*30,628,769*
	Subtotal - Project Support		*503,890*	*2,523,994*	*1,222,770*	*962,113*	*208,715*	*0*	*0*	*5,421,482*
1CAE	B771/774 Support Services		3,739,762	11,477,660	8,152,307	5,233,278	966,619	0	0	29,569,626
1CAF	D&D Program		6,134,128	20,573,966	8,066,398	2,818,349	2,221,535	604,726	0	40,419,102
	D&D Sitewide Integration		*1,151,793*	*2,579,300*	*1,824,570*	*1,573,798*	*919,448*	*604,726*	*0*	*8,653,635*
	*Technical Deployment **		*4,982,335*	*17,994,666*	*6,241,828*	*1,244,551*	*1,302,087*	*0*	*0*	*31,765,467*
	Project Prior Costs (2/1 thru 5/21/00)	16,875,934								16,875,934
	Totals	16,875,934	20,828,492	66,412,390	54,911,863	46,004,422	8,269,444	604,726	0	213,907,271
	Less EM-50 Monies		(4,647,477)	(4,822,900)	(2,281,534)	(1,005,627)	(1,187,366)	0	0	(13,944,904)
	Less Site Matching Funds		(334,857)	(13,171,766)	(3,960,294)	(238,923)	(114,721)	0	0	(17,820,561)
	GRAND TOTAL (Site Funds)		$15,846,158	$48,417,724	$48,670,035	$44,759,872	$6,967,357	$604,726	$0	$182,141,806

APPENDIX D

Baseline Schedule

Activity ID	Activity Description	Orig Dur	Baseline Start	Baseline Finish
1 Rocky Flats Closure Project				
1.C B771/774 Closure Project				
1.C.A B771/774 Closure				
+ 1.C.A.B	B771/774 Facilities Maintenance(Landlord	921	22MAY00	07JUN04
+ 1.C.A.C	B771/774 Deactivation	947	22MAY00	24DEC02
+ 1.C.A.D	B771/774 Decommissioning	1,550	22MAY00	18AUG04
+ 1.C.A.E	B771/774 Support Services	1,478	22MAY00	07JUN04
+ 1.C.A.F	D&D Program	1,495	22MAY00	13DEC06



Start Date 01FEB99
Finish Date 14DEC06
Data Date 22MAY00
Run Date 22JUN00 16:51

CPBB

ROCKY FLATS
CLOSURE PROJECT BASELINE

Cost Account Summary

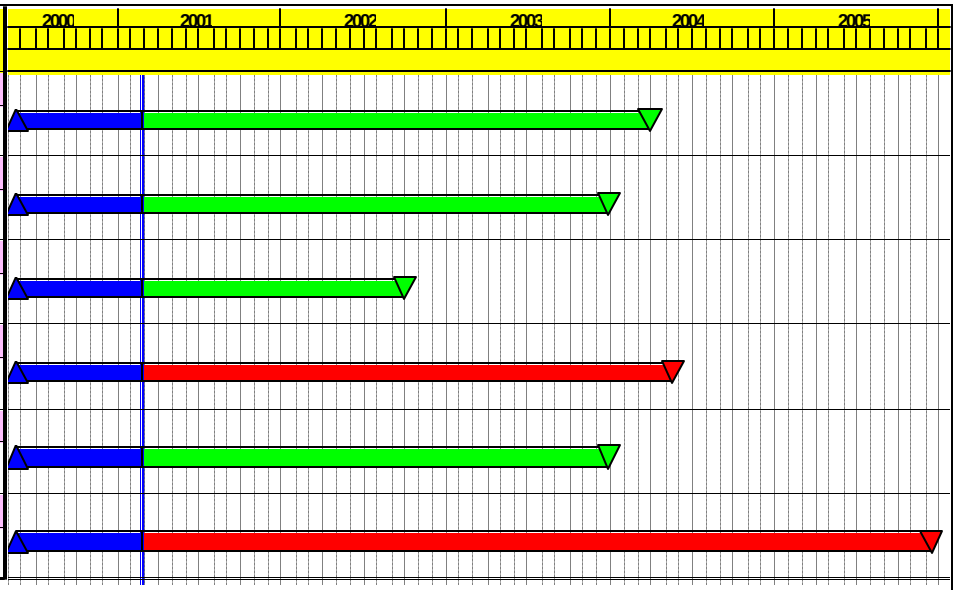
KAISER-HILL COMPANY

CLOSURE KAISER-HILL 2006 ROCKY FLATS CLOSURE PROJECT

APPENDIX E

Working Schedule

Summary by WBS Level 4	Orig Dur	Rem Dur	%	Early Start	Early Finish
+ A					
	879	706	20	22MAY00A	31MAR04
+ B					
	821	648	23	22MAY00A	30DEC03
+ C					
	862	582	36	22MAY00A	30SEP02
+ D					
	1,459	1,179	10	22MAY00A	19MAY04
+ E					
	1,318	1,038	24	22MAY00A	30DEC03
+ F					
	1,269	1,096	21	22MAY00A	15DEC05



Start Date 01FEB99
Finish Date 15DEC05
Data Date 26FEB01
Run Date 12MAR01 14:44

Early Bar
Progress Bar
Critical Activity

CPBA

Cost Account Summary @ WBS Level 4

771 Complex Project

KAISER - HILL COMPANY

CLOSURE KAISER-HILL 2006 ROCKY FLATS CLOSURE PROJECT

Date	Revision	Checked	Approved

APPENDIX F

Waste Management Plan

(not included in this revision, to be included in subsequent revisions)

APPENDIX G

D&D Summit Assumptions and the
771 Closure Project Incorporation Description

D&D Summit Assumptions

Surface Contaminated Objects - Sending waste as SCO/LLW instead of TRU or LSA/LLW saves D&D waste management and size reduction costs. A risk factor will have to be determined for SCO quantities.

Site-wide:

- The intermodal reusable containers will be used for SCO shipments starting the first quarter of FY01
- Lab boxes, chainveyor, and inspection boxes will have a high probability of SCO (some size reduction may be required to meet the SCO requirement)
- Gloveboxes and production equipment will not go SCO
- Zone 1 ventilation is TRU
- Zone 2 is 50% SCO

Project-specific:

- 707 will have 25% SCO
- 771 will have 16% SCO
- 776 will have 25% SCO
- 371 will have 16% SCO

Size Reduction – Currently have ITC 1; ITC 2 is being constructed in Loveland – one for B771 and one for B776; ITC 1 – thermal is in conceptual development

Site-Wide:

- ITC with plasma cutting and ROSRS will increase packing efficiencies for the following:
- TRU - 2,000 lbs per SWB
- Insitu gloveboxes – 1,500 lbs per SWB
- Ventilation – 1,200 lbs per SWB
- ITC using cold size reduction techniques – 1,500 lbs per SWB
- ITC 1 size reduction requires 2 days per glovebox
- There will be a 20% increase in efficiency the first year of implementing thermal size reduction
- There will be an additional 10% increase in efficiency the second year of implementing thermal size reduction
- A twelve (12) hour shift will yield nine (9) hours of work for thermal size reduction outside of premair
- A nine (9) hour shift will yield seven (7) hours of work for thermal size reduction outside of premair

Project-specific:

- B771 will start using plasma in July 2000
- B707 will send gloveboxes to B776 for size reduction
- B371 will need a size reduction station on each floor
- South sides will be able to reuse the arms from one or more of the on-site ITCs

Decontamination
Site-wide:

- 100% of the floor and 25% above the floor will have to be scabble ¼" in process areas.

Building Characterization
Site-wide:

- Dose-based limits will be pursued for release criteria, but dose based limits are not assumed for the baseline
- If the PDSP is approved by the regulators, it will reduce survey costs by 30% - does not apply to Type 1 facilities

Basis for B771/774 Project
Incorporate of D&D Summit Assumptions

The Building 771/774 Baseline was modified to incorporate the D&D Summit Assumptions by applying factors to the relevant entries in BEST. No change to duration of activities was made in the schedule. The factors applied and the rationale behind them is presented below.

Item 1 Substitute Intermodal Containers for SCO Shipments

Changes made to Baseline:

- A factor of 0.25 was applied to all Low Level crates (cost of crate only) in the Project Sets and Areas. This results in deleting the cost for 75% of the crates planned and retaining the cost for 25%.
- A factor of zero was applied to all SCO cargo containers in the Project Sets and Areas. This results in deleting all costs for cargo containers.
- A lease cost was added (A5R) for eight intermodal containers for the duration of the Sets and Areas ($40 per day per container).
- These factors were applied to Sets and Areas that begin after 10/1/00.

Rationale:

- 25% of the estimated crates were retained. Actual data to date indicates about 10% of the low-level waste generated has not met SCO and must be packaged in LSA crates. These early Sets were, however, less complex than the upcoming Sets. The percentage of LSA waste is expected to be higher in the future and estimated at 25%.
- Only the container cost was deleted. The labor to load waste into the crates and cargo containers was retained. Material Stewardship personnel expect the labor needed to load the intermodal containers will be higher than what was required to load crates so Project labor is probably under-estimated.
- Project Control staff judged that eight containers would ensure sufficient for support to the work site and allow for the logistics of container closure and movement.
- The date that intermodal containers will be available has not been estimated by Material Stewardship based on a resource-loaded schedule to accomplish the work. The October 1 date is the target used, per management direction. Since crates on-hand would be used also, the factors were applied only to Set and Area execution activities planned to begin on or after 10/1/00.

Uncertainty:

- The application of the D&D Summit Assumption to Sets is judged to entail Medium Uncertainty since the labor is probably low, but has not yet been estimated.
- The same 25% factor to retain crates was applied to Sets and Areas. Subsequent information suggests this may substantially underestimate the amount of LSA waste that requires crates. Structure characterization is not yet complete, but the D&D Summit Assumption as applied to Areas is judged to be Highly Uncertain.
- Project personnel have no information on the uncertainty level of the implementation date of 10/1/00.

Item 2 Project Specific SCO Conversion

Project Control personnel understand this assumption to mean that 16% of the Project waste estimated to be TRU would be packaged to meet SCO. Further, since part of the Assumption goal is to ship more waste in intermodal containers, the waste must also be low-level in activity (TRU waste that meets SCO II does not improve the Project since there is no disposal path for such waste). The 16% applies to the life of the Project and therefore includes completed work. About 1% of the Project estimated-TRU waste has already been packaged as SCO, but that waste was incorrectly estimated to be TRU and so no conversion of waste forms occurred.

Changes made to Baseline:

- A factor of 9.3 was applied into the stabilization (activity D01) for sets 38, 67, 68, 69, 91, 92, and 93.
- A factor of 24% was applied to the glovebox size reduction activities.
- A factor of 7.7 was applied to the baseline SCO container labor-only.
- A factor of 24% was applied to the relevant TRU waste container cost-only.

Rationale:

- A decontamination method was selected and a 14-step process delineated and estimated. The method is applicable only to gloveboxes. This Basis Of Estimate is available from Building 771 Project Controls. A preliminary sludge removal method has already been incorporated into he baseline for B774 waste tanks, and it was assumed this method would provide the necessary decontamination for those tanks. The amount of TRU waste represented in these calculations are about 21% of the Project total, so only a 76% success rate in decontamination is needed to meet the D&D Summit Assumption. 24% of the relevant size reduction resources were, therefore, retained.
- Several dismantlement Sets were selected to apply the glovebox method. This scope includes sets that will be decommissioned in the near future, so the method can be tested, and sets in B774. (Sets 38, 67, 68, 69, 91, 92, and 93. Set 95 is also included but has no gloveboxes.)
- The labor needed to perform the BOE method in gloveboxes was estimated and compared to an existing baseline stabilization task, the factor for the increased labor calculated and that factor (9.3) applied to the glovebox stabilization activity in each selected set.
- The Project has no information on how to convert TRU waste to low level. Alternatives that involve size reduction (to, for example, fit the pieces into an acid bath) fail to meet the D&D Summit goal to reduce size reduction costs. Also, no new waste streams or speculative facilities were assumed to be available for this effort. The basis used is not expected to achieve substantial success. Mitigation of this issue should be conducted promptly to select a method with a better chance of success.
- No set duration was changed, since it is assumed the time saved by less size reduction is used in the decontamination method.
- The impact on waste is to reduce the TRU waste from the relevant size reduction activities to 24% of the baseline and increase the low level waste. Since the decontaminated gloveboxes are not size reduced, the volume of SCO waste is greater than the TRU waste would have been. The "standing volume" plus the container packing efficiency of 85% were considered in the SCO calculation. No change to the number of containers was made (since the intermodal containers are assumed to be always available). But labor to load them must be considered. The factor applied to the baseline SCO cargo containers was calculated to be 7.7.

Uncertainty:

- Both the glovebox and tank decontamination methods used in this estimate are Highly Uncertain in terms of ability to achieve the required results and in estimated resource and duration.

Item 3 Size Reduction with Plasma Arc

The ITC with Plasma Arc is the portion of this D&D Summit Assumption that applies to the B771/774 Project. The goal for improved packing efficiency is 25% (from Summit analysis of average SWB loading of 1500 pounds and improvement to 2000 pounds). There is no change to packing efficiency of SWBs from other methods such as in-situ size reduction. The duct estimate was being revised as part of re-baselining and already meets the D&D Summit Assumption for that SWB loading.

The D&D Summit Assumption of the duration of ITC-1 size reduction is 67% of the observed duration. To incorporate the D&D Summit Assumption, project personnel would need to create a new bottoms-up estimate for the ITC method. No schedule duration changes are, however, being made as part of the current effort.

The D&D Summit Assumption of seven productive hours per nine hour shift (0.778 productivity) versus nine productive hours per twelve hour shift (0.75) implies a factor of 1.04 should be applied to all overtime labor (code 751). Since about 20% overtime is planned, this would equate to only a 1% increase in labor costs. Since no productivity decrease due to overtime was included in the baseline, no adjustment was made.

Changes made to Baseline:

- A factor of 80% was applied to the glovebox and tank cutting activities (5G06 and 6G06) for sets starting after 10/1/00. This results in a decrease of 20% of resources for these activities.
- A factor of 72% was applied to the glovebox and tank cutting activities (5G06 and 6G06) for sets starting after 10/1/01.
- A factor of 25% was applied to the SWB containers-only for these steps.
- No duration changes were made.

Rationale:

- The intent of the D&D Summit Assumption is to use the faster cutting of plasma arc to allow more efficient packing of SWBs by cutting the gloveboxes and tanks into smaller pieces. Each piece planned in the baseline was assumed to be cut in half. The cutting goes faster but there is more cutting.
- The 20% savings in the first year and 10% additional savings in the second year (10% of the first year costs for a factor of 72%) were applied without further analysis. This scenario combined with the extra cutting appears realistic to Project Subject Matter Experts (SMEs).
- The packing efficiency improvement was added without further analysis.
- These improvements were applied to all sets containing these activities. Plenum sets, which already included in the baseline some decontamination to low level and plenum-specific size reduction estimates, were not included.
- These improvements were applied to some tanks and gloveboxes must be managed in-situ. Further effort would be required to enable the plasma arc cutting outside the ITCs.

Uncertainty:

- The plasma arc efficiency improvement is judged to be low uncertainty for manual plasma arc cutting and Medium Uncertainty for remote cutting (ITC 2-1).
- Application of plasma arc cutting to in-situ size reduction is judged to be Medium Uncertainty since the AB changes to allow it have not been planned.
- The overtime productivity decrease has not been incorporated into the Project baseline and is judged to present a Medium Uncertainty. A productivity loss is inevitable but has not been studied in the Project's setting.

Items 4 & 5 The D&D Summit Assumption that the plasma arc cutting can begin in July is in error. The Project currently expects startup in November. A compromise date of October 1, assumed to be for both plasma arc units, was used. The anticipated drop in cutting rate in ITC 2-1 was neglected since no estimates are available.