

PROJECT MANAGEMENT PLAN EXAMPLES

Development of Detailed End Points - End Point Document Examples

Example 28

7.0 ENDPOINTS

Chapter 7.0 describes the endpoint development principles and methodology, administration, closure, and turnover package for the 324 and 327 Buildings Stabilization/Deactivation Project.

7.1 Background

The endpoint method for the 324 and 327 Buildings Stabilization/Deactivation Project will follow the EM-60 guidance, published in DOE/EM-0318, Rev. 0, *U.S. Department of Energy, Office of Environmental Management Facility Deactivation, Methods and Practice Handbook, Emphasizing End Points (sic) Implementation*. The methods of defining endpoints for facility stabilization and deactivation were proven extremely effective at the PUREX and B-Plant facilities for planning work and interacting with the regulators and environmental restoration contractors responsible for post-stabilization S&M.

The endpoint method is a logical process of determining final conditions for each building, system, and space. The final conditions are based on stated objectives, likely task types, and expected future uses for the systems and spaces.

7.2 Endpoint Development Principles

The following guiding principles form the foundation of the endpoint process:

- The decision to create an endpoint should be driven by, and clearly linked to, top-tier program objectives, not feasibility or capability.
- The endpoint condition of the 324/327 Building Stabilization/Deactivation Project should reflect a fundamental safety approach, involving three layers of protection: elimination of hazards, effective building containment, and building monitoring and control.
- Endpoint decisions are integrally linked to decisions (and constraints) on resources and methods. Cost effectiveness is important.
- Successful endpoint development requires ownership by all affected organizations, including project planners, plan implementation personnel, and the ultimate customers.
- Personnel in the field need clear, quantitative endpoints, and cannot work effectively with vague or functional objectives.
- Endpoint development is an iterative process. Some endpoint decisions may have to be revisited as the stabilization proceeds.

7.3 Endpoint Development Methodology

Every endpoint is driven by a project objective, defined for the 324/327 Buildings Stabilization/Deactivation Project, presented in Chapter 2.0.

7.3.1 Endpoint Development for Stabilization

Task types are the classes of tasks that take the building from an existing state, with hazards and conditions resulting from a lifetime of operation, to a deactivated state. For stabilization, the following task types are used throughout the endpoint development process:

- **Hazards.** Nuclear and nonnuclear activities include removing, repairing, and isolating systems associated with chemical, radiological, or industrial hazards.

Radiation Fields . Activities include removing, shielding, documenting, and ensuring the proper radiological posting of remaining radiation areas.

Contamination . Activities include decontaminating, isolating, fixing, documenting, and ensuring the proper radiological posting of the contamination areas.

Waste . Compliance with regulations and requirements generates activities that include removing, flushing, excessing, and disposing of waste.

Isolation and Containment . Activities include blanking, plugging, covering, removing, screening, and sealing.

Monitoring and Control . Activities required to support the future S&M of the building and minimize the cost, risk, and hazards involved. Examples are instrumentation and providing surveillance lighting.

Refurbishing or Installation . Activities include structural repairs, roof sealing, and modification of the building ventilation system.

Documentation and Labeling. Activities cover the documentation and labeling for the specific space or system.

7.3.2 Endpoint Development for Deactivation

The 324 and 327 Buildings are made up of spaces and systems, for which endpoints need to be established. The spaces and systems are classified by their intended deactivated condition, into the following categories:

- **Internal Spaces, Routine Access Required**. A space inside the building that will require access for surveillance.

Internal Spaces, No Access Expected . A space inside the building that will not require access for surveillance. These spaces, however, can be accessed if the proper precautions are taken.

External Spaces, Including Building Exterior Envelopes . Areas that are assigned to the building and are in direct contact with the environment.

System—Operational . Systems that support the building and will remain operational.

System—Mothballed . Building systems that will be prepared for future reuse by the environmental restoration contractor.

System—Abandoned in Place. Building systems that will be left in place after the assigned end points have been completed.

The endpoint methods are not intended to be prescriptive, but are to be adapted to suit the specific needs of the building being stabilized. Detailed endpoints for the 324 and 327 Buildings are contained in endpoint specification documents for each building (HNF-2119, *324 Building Endpoints*, and HNF-2118, *327 Building Endpoints*). A crosswalk for the project WBS to the endpoints is provided in Appendix H.

7.4 Endpoint Administration

Completion and verification of the 324 and 327 Buildings' endpoints by DOE-HQ's EM-60 contractor (BWHC), and DOE-HQ's Office of Environmental Restoration (EM-40) contractor (Bechtel Hanford, Inc. [BHI]), is required to complete the building transition phase and initiate the S&M phase of the decommissioning process. On BHI acceptance, the building will be in a condition acceptable for the transfer from EM-60 to EM-40. A memorandum of agreement (MOA) will be required to delineate and transfer responsibilities for the future S&M activities associated with the 324 and 327 Buildings. The MOA also will describe the building conditions, including environmental, safety, and outstanding regulatory concerns.

7.5 Endpoint Closure

The endpoint documents have grouped the building spaces and systems into a number of manageable areas. The areas are closely related to the engineering work plans that guide completion of many of the endpoints. Endpoint closure methods and practices are provided in the attachment of this PMP.

On completion of an endpoint, a BWHC field representative will initial complete on the field copy of the endpoint document. A BHI field representative will verify acceptable completion of the applicable activity. Verification may be performed by reviewing documents, letters, photos, work packages, or work plans, or by visual inspection. When all the endpoints for a specific area of the building have been completed and verified, designated BWHC and BHI management will sign for completion and acceptance of that area. A filing system will be utilized for storing the documentation closing endpoints.

7.6 Administrative Endpoints and Turnover Package

Administrative endpoints are a compilation of identified supporting documentation for the transition of the 324 and 327 Buildings into the Surplus Facilities Program. An endpoint has been assigned to the documents for tracking and verification only. The compilation includes those documents that are required by law, the Tri-Party Agreement, or DOE Orders, or have been identified by building management, RL, or BHI.

Additional supporting documentation is included under the requirements of a turnover package. The turnover package activities support the physical 'hands on' documentation required to perform future surveillance entries and audits and to assist disposition planning (e.g., final Radiological Surveys and maps). Turnover package items are addressed in the endpoints for the specific space or system where the requirement applies. A turnover package consists of the following items:

- Essential diagram drawings required to support S&M and D&D
- Certified vendor information
- Chemical and hazardous substance inventory

- Deactivation work plans
- Description/photos of spaces to be routinely surveyed
- Final radiological surveys and maps
- RCT routine
- Industrial space hazards identified
- Operational systems waste accumulation areas identified
- Structural and roof studies
- Fire hazard analysis requirements
- Compliance with the Hazards Communication Program
- Compliance with the Asbestos Control Program
- Compliance with the Confined Space Program
- Waste characterization data for waste that was removed as a part of deactivation.

Example 29

4.0 Deactivation End Points

The Department of Energy (DOE) is proceeding with the formidable task of deactivating those nuclear defense facilities that are no longer used or needed. There are many such facilities at DOE sites around the nation. Ultimately, all facilities will be stabilized, reducing the threat to the public or environment. However, with so many facilities requiring near term attention, DOE has been moving aggressively to assess the condition of the affected facilities, and to deactivate them on a prioritized basis, thus achieving the maximum degree of protection in the shortest possible period.

For each facility, the overall objective of deactivation is to achieve a safe, stable and environmentally sound condition, suitable for an extended period, as quickly and economically as possible. Once stabilized, the facility is kept in this safe and stable condition by means of a methodical and formal surveillance and maintenance program, pending ultimate disposition.

Deactivation involves a range of tasks, such as removal of hazardous material, elimination or shielding of radiation fields, fixing transferable contaminants, partial decontamination to permit access for inspection, installation of remote monitors and alarms, etc. It is important that the end point of each of these tasks be established clearly, and in advance, for the following reasons:

- End points must be capable of being validated such that a safe and stable configuration is unquestionably achieved.
- Much of the deactivation work involves worker exposure to radiation or dangerous materials. Avoiding unnecessary work can minimize this.
- Each task is, in effect, competing for resources with other stabilization tasks and other facilities. By ensuring that each task is appropriately bounded and linked to critical project objectives, DOE's overall resources can be used most fully and effectively.

4.01 Methodology

DOE has defined a formal process (Reference 8) for determining deactivation end points based on meeting pre-determined objectives. End points are verifiable conditions that systems and spaces in excess facilities will reach after completing individual work tasks during the deactivation process. The formal DOE process ensures that activities necessary to accomplish the end points will be tied directly to a deactivation objective, thereby precluding scheduling unnecessary activities and minimizing the cost of deactivation.

FDD reviewed and evaluated the DOE guidance on establishing end points and developed a procedure for how to prepare Deactivation Project Plans for excess facilities on the Savannah River Site. The resultant procedure, 3.01 in the WSRC C2.1 manual, requires the use of a hierarchical method for establishing end points for deactivating excess facilities that have a hazard classification of Nuclear or Radiological. 322-M has been classified as a Radiological Facility (Reference #2) and therefore, it is required that the hierarchical method be used for establishing the deactivation end points.

The desired End State of the facility after deactivation must be agreed upon before beginning the basic process of establishing end points. The post-deactivation End State of 322-M has been established as a passively-safe and stable facility requiring only an annual entry for surveillance and maintenance for at least one decade until final decommissioning is funded.

The first step in developing end points, after agreeing upon the End State of the facility, is to define the objectives of the deactivation project. A set of task types are then defined that will be required to meet the objectives. The spaces, systems and equipment in the facility are then classified into cases based on physical characteristics and the functions needed for long-term S&M when the End State is reached.

The task types frequently help to accomplish more than one objective. To communicate which task types help accomplish which objectives, a functional matrix is developed for each case. Criteria that the end points must reach so that the tasks accomplish the objectives are then defined for each cell in each matrix. Detailed end points that meet the criteria are then developed for the spaces, systems and equipment. End point development is an iterative process. Most end point decisions can be made during the planning stages early in the project; however, some will have to be revisited as the deactivation proceeds.

There are several guiding principles or ground rules which form the foundation of the end point process:

- The End State or condition of the stabilized facility should employ defense-in-depth as a fundamental safety approach. As applied here, defense-in-depth involves three layers of protection: elimination/stabilization of hazards, effective facility containment, and facility monitoring and control.
- To achieve the End State requires ownership - "buy-in"- by all affected organizations including project planners, those who implement the plans, and the ultimate customer (DOE-SR). This should be an explicit part of the end point development process.
- End points are integrally linked to constraints on resources. Cost effectiveness is important. DOE needs to achieve the maximum safety improvement for every dollar spent.
- Work teams in the field need clear, quantitative end points. They cannot work effectively with vague or functional objectives. To be workable, end points must be established up front, clearly stated, quantitative, practical, achievable and verifiable.
- It is not known when or what the ultimate facility disposition will be. Therefore, decommissioning presumptions should not be the primary driver for end point decisions. This does not preclude insightful decisions being made to prevent hindrance during the final decommissioning process.

The decision to create an end point should be driven by, and clearly linked to, top-tier program objectives; not by feasibility or capability. This is the central principle of the logic-based approach. End point determinations, along with allocation of resources and selection of methods, should all stem directly and clearly from program goals and top-tier objectives. Tying end points to objectives clearly communicates the purpose of the end point to everyone involved with the deactivation project, thereby leading to common goals which will result in improved schedule and cost performance.

4.02 Objectives List

The five primary objectives suggested in the DOE end point guidance (Reference #8) are:

- Protect the public, worker and environment
- Facilitate long-term S&M
- Facilitate final decommissioning
- Comply with regulations and requirements
- Follow through on stakeholder commitments

Although all five objectives are important, the first three are of particularly applicable for developing the 322-M end points, and are considered by FDD to be the drivers for 322-M deactivation. The fourth objective is being met with all deactivation activities on the Savannah River Site, since all work is performed to a prescriptive set of requirements, the SRS Standards/Requirements Identification Documents (S/RIDs). The fifth objective, commitments to stakeholders, is not a significant factor since there are no current stakeholder commitments for 322-M. The functional matrices were therefore developed using the first three objectives.

The first objective, **protecting the public, the worker and the environment**, is the objective of paramount importance. 322-M, however, is not a threat to the public due to the small amount of radiological material in the building and its location within the M-Area security fence. The objective then simplifies to protecting the workers involved with S&M and preventing any release of the small amount of radiological material in 322-M to the environment during the interval between deactivation and final decommissioning.

The second objective, **facilitating post-deactivation S&M**, simplifies to minimizing the cost of S&M over the decade or more until the facility is final decommissioned. This can range from removing interior doors for improved visibility during walk-through inspections to installing remote monitoring equipment.

The third objective, **facilitating decommissioning**, is generally more difficult to define than minimizing S&M cost. One example of a task that is commonly cited is mothballing an overhead crane. 322-M, however, has no overhead cranes nor other equipment or systems that would facilitate decommissioning. Accordingly, there is no need to mothball any equipment or systems. Only end points that result in reduced hazards, reduced source terms, or document or label future working conditions are anticipated to facilitate the decommissioning process for 322-M.

FDD has identified one additional objective for deactivating 322-M: **good stewardship**. This is a second tier objective, and basically implies doing things that make good sense or implement good practices. The primary example of a task that would accomplish the good stewardship objective is removal of equipment that is simple and easy to accomplish. The benefit of removing clean equipment, furniture and systems is to prevent possible cross contamination during long-term S&M or decommissioning. The benefit of removing contaminated equipment and systems is that current cost of disposal will likely be less than the cost a decade or more in the future when decommissioning would begin. Early equipment removal can result in reduced life cycle cost for the facility and should be considered if sufficient funding is available.

An additional consideration is that actions taken to reduce post-deactivation S&M cost can sometimes increase the cost of the final decommissioning phase. Careful evaluation is needed during development of the end points to ensure the total life cycle cost is minimized.

4.03 End Points Summary

Once the objectives that will drive deactivation have been defined, a generic set of task types is developed. The DOE guidance (Reference #8) lists a generic set of task types based on what was used for the PUREX facility at the Hanford Site. This guidance also suggests that other facilities may have a different set. FDD has defined the following generic set of task types for 322-M:

- Reducing industrial safety hazards
- Reducing source term (radioactive and/or hazardous)

- Stabilizing or fixing contamination
- Isolating contaminated surfaces
- Ensuring structural integrity
- Documenting and labeling
- Providing access for S&M
- Removing equipment

The next step in the DOE guidance on setting end points is to define the cases or end use areas for the spaces, systems and equipment within a facility. The guidance suggested the following six cases:

- Internal spaces for which access is not expected
- Internal spaces where routine access for S&M will be required
- External spaces including building exterior envelopes
- Systems and equipment to be abandoned in-place
- Systems and equipment to be preserved for later use during decommissioning
- Systems and equipment which must be kept operational during S&M

Only the first four cases apply to 322-M. The fifth case, systems or equipment that would facilitate decommissioning, is not applicable for 322-M since none were identified. The sixth case also does not apply to 322-M since the anticipated long-term S&M plan will not require use any of the existing systems or equipment.

Functional matrices were then developed for each of the four cases defined for 322-M. These matrices are shown on the following pages. Each matrix relates the four objectives to the eight task types. The cells in the functional matrices specify the criteria that the end points are required to meet for that case. Cells marked *Primary* identify task types that are very important to perform in order to meet an objective. Work packages that accomplish end points that fall into a cell of the matrix marked *Primary* must be performed and will receive the highest priority for funding.

End points that fall into a cell marked *Secondary* are not critical to meeting an objective. However, work packages that accomplish those end points will reduce overall life cycle cost and should be considered for funding if additional money is allocated beyond that required to complete the work in cells marked *Primary*. Another advantage to planning the work packages to accomplish end points that meet the *Secondary* criteria is to have planned activities to use for work-arounds, when other FDD work is delayed, or if additional funding becomes unexpectedly available.

The shaded area cells signify that no objective is being met if work packages of that task type are performed for that case. Performing that type of work for that case is not necessary to accomplish the post-deactivation End State for the facility and these tasks would not normally be performed during the deactivation phase.

Case 1: Internal spaces for which access is not expected during S&M								
OBJECTIVE	TASK TYPE							
	Reduci ng hazards	Reduci ng source term	Stabilizing or fixing contaminat ion	Isolating contamina ted surfaces	Ensuri ng structu ral integrit y	Document ing and labeling	Providi ng access for S&M	Removi ng equipm ent
Protect public, worker and environment				<i>Secondary</i>		<i>Secondary</i>		
Facilitate S&M	<i>Second ary</i>	<i>Second ary</i>		<i>Secondary</i>		<i>Secondary</i>		
Facilitate decommissioning	<i>Primary</i>	<i>Second ary</i>				<i>Primary</i>		
Good stewardship								<i>Seconda ry</i>
Case 2: Internal spaces for which access will be required for S&M								

	hazards	source term	contamination	contaminated surfaces	structural integrity	labeling	access for S&M	equipment
Protect public, worker and environment	<i>Primary</i>		<i>Primary</i>	<i>Primary</i>	<i>Primary</i>	<i>Primary</i>		
Facilitate S&M	<i>Secondary</i>			<i>Primary</i>		<i>Primary</i>		
Facilitate decommissioning		<i>Secondary</i>				<i>Primary</i>		
Good stewardship								

After developing the functional matrices and establishing the end point criteria, FDD developed a set of generic end points by task type. These generic end points are listed below.

Task Type 1 Reducing industrial safety hazards

- Terminate all electrical connections at a location external to the building and to the support systems (e.g., at the 13.8 KVA substation, 352-4M)
- Remove and dispose of excess equipment that is a personnel hazard (e.g., a tripping hazard)

Task Type 2 Reducing source term (radioactive and hazardous)

- Remove contained radioactive sources
- Remove highly contaminated equipment
- Decontaminate surfaces

Task Type 3 Isolating internal surfaces

- Verify, and re-seal if necessary, all openings in glove boxes and hoods
- Verify, and reseal if necessary, all hot cell openings
- Verify, and reseal if necessary, all openings into the building including connections to the process sewer, sanitary sewer, and the process waste lines
- Verify that the locks on all doors leading into RBAs are operable
- Blank off all utilities at the building external surface
- Verify seals on ducts, blowers, and HEPA filter housings
- Verify the integrity between duct sections and duct to equipment joints

Task Type 4 Stabilizing or fixing contamination

- Verify integrity of coatings on contaminated external surfaces
- Verify integrity of coatings on contaminated internal surfaces

Task Type 5 Ensuring structural integrity of building and external equipment and systems

- Inspect roof system and estimate remaining life of roof
- Verify structural integrity of building walls and coverings
- Verify structural integrity of external duct and exhaust systems

Task Type 6 Documenting and labeling

- Videotape and/or photograph building surfaces after deactivation
- Provide an updated radiation survey after removal of material and equipment
- Provide an updated contamination survey after removal of material and equipment

Task Type 7 Providing access for S&M

- Remove or block open all doors except those leading into RBAs
- Remove all ceiling tiles and insulation to gain visual access to roof
- Remove any equipment that blocks access to areas where visibility is needed

Task Type 8 Removing Equipment

- Removal and disposal of non-contaminated equipment or property
- Removal and disposal of contaminated equipment

4.04 Physical Spaces and Systems

The major portion of the 322-M facility is arranged into numbered rooms providing a convenient definition of most of the physical spaces. The balance of the facility has been subdivided into several areas or spaces based on similar physical characteristics or ease of deactivation for S&M. These areas or spaces are the attics over the rooms, the external surfaces of the structure including the roof, the open storage area off the southwest corner of the building, and 322-1M, a small, non-connected out-building southwest of 322-M. Table 4-1 lists the spaces defined for the 322-M deactivation project.

Space (room # or area)	Description	Radiological Condition
01	Entry foyer	Non-contaminated
02	Reception Area	Non-contaminated
03	Office	Non-contaminated
04	Office	Non-contaminated
05	Office	Non-contaminated
06	Office	Non-contaminated
07	Office	Non-contaminated
08	Storage Closet	Non-contaminated
09	Conference Room	Non-contaminated
10	Lunchroom	Non-contaminated
11	Storage Closet	Non-contaminated
100	Office	Non-contaminated
101	Darkroom	Non-contaminated
101A	Film Storage	Non-contaminated
102	Print Process	Non-contaminated
104	Photomicroscopy	Non-contaminated
105	Photography	Non-contaminated
106	Microscopy	Non-contaminated
107	Metal Grinding Lab	RBA
108	Metal Polishing Lab	RBA
109	Metals Preparation	RBA & CA
110	Corridor	Non-contaminated
111	Mechanical Test Lab	Non-contaminated

112	Special Test Development Lab	Non-contaminated
113	Janitor Closet	Non-contaminated
114	Women's Wash Area	Non-contaminated
115	Women's Toilets	Non-contaminated
116	Women's Change Room	Non-contaminated
117	Men's Toilets	Non-contaminated
118	Corridor	Non-contaminated
120	Office	Non-contaminated
121	Equipment Room	Non-contaminated
122	Office	Non-contaminated
123	Finish & Inspection Area	RBA
124	Entrance Area	RBA
125	Contaminated Metal Preparation	RBA
125-HC	Hot cell	HCA
126	Storage Area	Non-contaminated
127	Chemical Milling & Macro Etching	Non-contaminated
128	X-ray Lab	Non-contaminated
129	Unknown Lab	Non-contaminated
129A	Storage Area	Non-contaminated
130	Utility Closet	Non-contaminated
131	Enriched Uranium Metal Preparation	RBA & CA
132	Enriched Uranium Storage Vault	RBA
134	Storage Room	RBA
135	Airlock	Non-contaminated
136	Enriched Uranium Grinding Room	RBA
137	Enriched Uranium Polishing Room	RBA
138	Enriched Uranium Exam Room	Non-contaminated
141	Photography & Tension Testing	Non-contaminated
142	Office	Non-contaminated
143	Office	Non-contaminated
144A	Scanning Electron Room	Non-contaminated
144B	Microscopy Room	Non-contaminated
145A	Image Analysis	Non-contaminated
145B	Telephone Room	Non-contaminated
146	Computer Room	Non-contaminated
147	Motor Control Center	Non-contaminated
150	Janitor Room	Non-contaminated

151	Air Lock	Non-contaminated
152	Men's Change Room	Non-contaminated
Attic A	Attic over 1952 & 1961 structures	Non-contaminated
Attic B	Attic over 1982 addition	Non-contaminated
Attic C	Attic over 1986 addition	Non-contaminated
Building Exterior	Exterior walls	Non-contaminated
Building Roofs	Roofs over original bldg. & additions	Non-contaminated
Open Storage	Area adjacent to southwest corner	Non-contaminated

The spaces contain the systems and equipment that enabled the facility to accomplish its missions. From review of existing documentation and facility walk-downs, the systems and equipment within or supporting 322-M have been identified. The systems and equipment, along with their space location and expected condition, are listed in Appendix A.

Appendix B lists the case or end use category of each of the spaces defined in Table 4-1 and most of the equipment or systems listed in Appendix A.

Using the generic list of end points listed in Section 4.03 as a guide, specific end points for each area, space, system or piece of equipment were developed. This detailed list of specific end points is presented in Appendix C. Work plans will be developed to specify and control the fieldwork necessary to attain the end points.

4.05 Validation/Verification Method

All end points need to be verified to complete the deactivation project. The method of verification will be accomplished utilizing the existing SRS Work Management System delineated in the WSRC Manual 1Y, *Conduct of Maintenance*. Work packages will be written to perform the work needed to attain the majority of the end points. Each work package will identify which end point(s) will be attained, using the end point tracking numbers listed in Appendix C. The FDD Engineering representative will verify attainment of the end point by review of the completed work package.

Some end points will not require a work package; e.g., the approved long-term S&M Plan. For these end points, the FDD Engineering representative will verify completion by reviewing the document or other media and acknowledge the same by his/her signature on the document, or a memorandum addressed to the 322-M Deactivation Project Manager. A listing of each end point, who verified its attainment, and the verification date will be recorded in the Deactivation Project Completion Report.

4.06 Evaluation of End Points vs. HBD

The 322-M facility has been shutdown, unoccupied and non-operational for several years, and has no current or future mission. The inventory of enriched uranium and contained radioactive sources was completed in 1995 eliminating the requirement for an accident analysis for the facility. There are no S&M activities that are driven by the current M-Area authorization basis nor are there any actions required for emergency preparedness (Reference #3). Due to its non-occupied, non-operational status with no current or future mission, there is no Fire Hazard Analysis for 322-M.

The M-Area Justification for Continued Operation (Reference #2) incorporated the current status of 322-M when the JCO was updated and issued in April 1997. The JCO identified the 322-M Metallurgical Laboratory as a Radiological Facility in accordance with WSRC Manual 11Q, *Administrative and Procedural Controls System for SRS Reactor and Non-Reactor Nuclear Facilities*. This hazard category was selected for 322-M based on the small quantities, locations and forms of radiological and hazardous materials that are present in the facility.

Since 322-M meets the requirements for a Radiological Facility, future deactivation activities will not present a significant hazard, although the work planning must still consider the presence of minimal amounts of radioactive and hazardous materials. Also, since the deactivation strategy is to isolate and immobilize the contaminants in-place, there is no opportunity to further reduce the hazard category. For these reasons, no changes to the Hazard Baseline Documentation (HBD) are anticipated during deactivation.

4.07 Prioritization of SSCs for Isolation, Shutdown, Stabilization, and Deinventory

Procedure FD 3.10 requires that structures, systems and components be prioritized for isolation and shutdown. The 322-M facility, however, was shut down and deinventoried in 1995. Prioritization of SSCs for isolation, shutdown, stabilization and deinventory is therefore not necessary for final deactivation since there no facility systems or components currently operating.

Most of the personal property and all of the spare parts and extra machinery have already been removed and dispositioned in accordance with Manual 3B, *Property Management Manual*. Contaminated equipment with no identified function in support of deactivation or decommissioning of 322-M remains in the three RBAs. This equipment will be abandoned in-place and would likely require decontamination prior to re-use, re-sale, or donation. A listing of existing equipment and personal property in 322-M is provided in Appendix A.

Appendix B: End Use of Spaces, Systems and Equipment

Spaces, systems and equipment are classified, in terms of their intended deactivated condition, into four (4) cases, in the following order:

▪ **Case 1: Internal spaces for which access is not required for S&M**

Spaces in this category are generally outside an RBA, have an open doorway, do not have equipment or furniture blocking the view of the floor, and have good visibility to the roof, windows and wall penetrations.

Case 2: Internal spaces for which access will be required for S&M

Spaces in this category are generally larger rooms, inside an RBA, have locked doors, have interior walls, equipment or furniture blocking the view of the floor, or have poor visibility to the roof, windows and wall penetrations.

Case 3: External spaces for which inspection is required for S&M

Spaces in this category need to be inspected during the S&M process. Activities include assessing the structural integrity of the building walls and roof, and the integrity of the external systems such as ventilation ducts and stack covers.

Case 4: Systems and equipment to be abandoned in place

This case covers equipment and systems for which there are no known uses such as re-use at another location, during long-term S&M or during decommissioning. This equipment and these systems can be either contaminated or non-contaminated. They may also be removed from 322-M for disposal should sufficient funding be available.

The following table provides this classification for the 322-M facility.

Space	End Use Case			
	1	2	3	4
01 - Entry foyer		X		
02 - Reception Area		X		
03 - Office	X			
04 - Office	X			
05 - Office	X			
06 - Office	X			
07 - Office	X			
08 - Storage Closet	X			
09 - Conference Room		X		
10 - Lunchroom		X		
11 - Storage Closet	X			
100 - Office	X			
101 - Darkroom	X			
101A - Film Storage		X		
102 - Print Process		X		
103 - Alcove		X		
104 - Photomicroscopy		X		
105 - Photography	X			
106 - Microscopy	X			
107 - Metal Grinding Lab		X		
108 - Metal Polishing Lab		X		
109 - Metals Preparation		X		
110 - Corridor		X		

111 - Mechanical Test Lab		X		
112 - Special Test Development Lab		X		
113 - Janitor Closet	X			
114 - Women's Wash Area		X		
115 - Women's Toilets	X			
116 - Women's Change Room		X		
117 - Men's Toilets		X		
118 - Corridor		X		
120 - Office	X			
121 - Equipment Room	X			
122 - Office	X			
123 - Finish & Inspection Area		X		
124 - Entrance Area		X		
125 - Contaminated Metal Preparation		X		
125A - Hot cell	X			
126 - Storage Area	X			
127 - Chemical Milling & Macro Etching		X		
128 - X-ray Lab		X		
129 - Unknown Use Lab		X		
129A - Storage Area	X			
130 - Utility Closet	X			
131 - Enriched Uranium Metal Preparation		X		
132 - Enriched Uranium Storage Vault	X			
133 - Corridor		X		
134 - Storage Room	X			
135 - Airlock	X			
136 - Enriched Uranium Grinding Room		X		
137 - Enriched Uranium Polishing Room		X		
138 - Enriched Uranium Exam Room		X		
139 - Air Lock		X		
140 - Corridor		X		
141 - Photography & Tension Testing	X			
142 - Office	X			
143 - Office	X			
144A - Scanning Electron Room		X		
144B - Microscopy Room	X			
145A - Image Analysis "A"		X		

145B - Image Analysis "B"		X		
Telephone Room (North of 145B)	X			
146 - Computer Room	X			
147 - Motor Control Center	X			
150 - Janitor Room	X			
151 - Air Lock		X		
152 - Men's Change Room		X		
Attic A - Attic over original structure		X		
Attic B - Attic over 1982 addition	X			
Attic C - Attic over 1986 addition	X			
Building Exterior - Walls			X	
Building Exterior - Roofs			X	
Building Exterior- Covered area, SW corner	X			

EQUIPMENT	End Use Case			
	1	2	3	4
Equipment in labs not within a RBA				X
Equipment within a RBA				X
Equipment within a CA				X
Equipment within a HCA				X
Furniture in non-lab rooms				X
Furniture in labs not within a RBA				X
Furniture within a RBA				X
Furniture within a CA				X
Attic ventilation system				X
HVAC in enriched uranium rooms (i.e., 1982 addition)				X
HVAC in depleted uranium rooms (i.e., 1952 & 1961 construction)				X
HVAC in 1985 addition				X
Process ventilation from enriched uranium rooms				X
Process ventilation from depleted uranium rooms				X
Process ventilation from Hot Cell				X
Chilled water system				X
Domestic water system				X
Fire protection system				X
Electrical system				X
Plant & Instrument air systems				X
Process water system				X
Process drain lines				X

Sanitary drain lines				X
Steam system				X
Security system				X
Public address system				X

APPENDIX C: 322-M deactivation ENDPOINTS

End Point Tracking Number	End Point Description	Objective	Task Type	Case	Criteria
322M-EP-01	Suspended ceiling tiles removed from all rooms and disposed	Facilitate S&M	Provide access for S&M	2	Primary
322M-EP-02	Insulation above suspended ceilings removed and disposed	Facilitate S&M	Provide access for S&M	2	Primary
322M-EP-03	Hot cell openings adequately sealed	Protect workers	Isolate contaminated surfaces	4	Primary
322M-EP-04	Openings into 22 contaminated fume hoods adequately sealed	Protect workers	Isolate contaminated surfaces	4	Primary
322M-EP-05	Openings into 2 glove boxes adequately sealed	Protect workers	Isolate contaminated surfaces	4	Primary
322M-EP-06	All existing openings into building adequately sealed and roof intact	Protect environment	Isolate contaminated surfaces	1, 2	Primary
322M-EP-07	All ventilation stacks penetrating roof adequately sealed	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-08	All exhaust ventilation stacks adequately sealed	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-09	External areas with fixed contamination adequately sealed (including removal of degraded equipment)	Protect environment	Stabilize or fix contamination	3	Primary
322M-EP-10	External ducts structurally intact and adequately sealed	Protect environment	Isolate contaminated surfaces Ensure structural integrity	4	Primary
322M-EP-11	Carpet tiles removed from Rooms 02, 03, 04, 05, 06, 07, 11, 100, 122 & 120	Good stewardship	Reduce hazards	1	Secondary
322M-EP-12	Doors removed or blocked open leading into all rooms except at RBA boundaries	Facilitate S&M	Provide access for S&M	1, 2	Primary

322M-EP-13	Electrical service disconnected at 13.8 KVA transformer	Protect workers	Reduce hazards	4	Primary
322M-EP-14	Electrical service to sanitary lift station relocated out of 322-M	Protect workers	Reduce hazards	4	Primary
322M-EP-15	Process drain line plugged or capped at manhole 6A	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-16	Domestic water line capped below grade external to building	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-17	Process water line capped below grade external to building	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-18	Two steam lines isolated external to building	Protect workers	Isolate contaminated surfaces	4	Primary
322M-EP-19	Fire main capped below grade external to building	Protect environment	Isolate contaminated surfaces	4	Primary
322M-EP-20	All useable, non-contaminated office/lab furniture removed & excessed or salvaged	Good stewardship	Remove equipment	4	Good stewardship
322M-EP-21	All tritium containing exit signs removed and disposed	Facilitate decommissioning	Reduce source term	4	Secondary
322M-EP-22	All fluorescent light tubes removed and disposed	Facilitate decommissioning	Reduce source term	4	Secondary
322M-EP-23	All mercury vapor lamps removed and disposed	Facilitate decommissioning	Reduce source term	4	Secondary
322M-EP-24	All fluorescent light ballasts removed and disposed	Facilitate decommissioning	Reduce source term	4	Secondary
322M-EP-25	Wall mounted AC units removed and disposed	Protect environment	Reduce source term	4	Secondary
322M-EP-26	Openings through walls closed off after removal of AC units	Protect environment	Isolate contaminated surfaces	1	Primary
322M-EP-27	Post-deactivation contamination labeled & mapped	Facilitate S&M	Document and label	2	Primary
322M-EP-28	RBA conditions videotaped	Facilitate S&M	Document and label	2	Primary
322M-EP-29	Long-term S&M Plan approved	Facilitate S&M	Document and label	2	Primary
322M-EP-30	Deactivation Project Completion Report issued	Facilitate decommissioning and S&M	Document and label	NA	NA

Example 30

4.3 Determining Project End Points

With the worksets selected and prioritized, specific end points were developed for each set. The individual sets and associated end points can be found in Appendix 9.

4.7 Building Cleanup Criteria

The purpose of this section is to identify the cleanup criteria (acceptable level) which will be used to release the 7711774 Cluster facilities.

Radiological Release Criteria

The purpose of this section is to provide the radiological contamination cleanup criteria for the 771/774 Cluster. Section 4.4 Facility Characterization, Appendix 9, Set Description End Points and Hazard Matrix, and the RLCR for this project, identify the contaminants which are expected to be present at the start of decommissioning. The characterization information is used to ensure that workers are protected from the hazards in the work area, contamination is contained to protect the environs and the waste generated is properly and safely handled, packaged, labeled and moved.

In accordance with RFCA, the residual radiological contamination levels present on building structures, equipment and building debris remaining after decommissioning will meet an effective dose equivalent (EDE) of 15/85 mrem from the Site in any single year above background. Accepted industry standards for the release of materials are identified in "Radiation Protection of the Public and Environment", DOE Order 5400.5 as referenced in RFCA and *Termination of Operating Licenses for Nuclear Reactors*, NRC Regulatory Guide (RG)1.86, as referenced in *the Health and Safety Practice Transfer and Unrestricted Release of Property and Waste*, P73-HSP-1810 Appendix 1.

4.7.2 Equipment Unconditional Radiological Release Criteria

The unrestricted release of equipment to be removed from the site will comply with the RFETS Radiological Control Manual, the Health and Safety Plan (1-P73-HSP-1810, Appendix 1), DOE Order 5400.5, 'Radiation Protection of the Public and the Environment' (Figure IV-1), NRC RG 1.86 and applicable radiation protection implementing procedures. (For information, NRC RG 1.86 specifies the release criteria as less than 100 dpm/100 cm² . If 10CFR Part 834 is approved, all applicable practices and procedures will be reviewed and modified accordingly to ensure compliance. The RFETS Radiological Control Manual currently contains the most comprehensive table and includes all of the applicable RFETS radiological limits for the release of materials and equipment.

4.7.3 Beryllium Release Criteria

The beryllium release criteria and survey methods will conform to current RFETS policies and procedures. Building surfaces and equipment suspected of being contaminated with beryllium will be surveyed to assess the level of contamination. The surface contamination housekeeping limit for beryllium is 2µg/100 cm². Current RFETS practice for protecting personnel from beryllium is to utilize the ALARA (As Low As Reasonably Achievable) principle. This includes the use of engineering controls to minimize exposure, medical screening of personnel, and the reduction of limits and the proposed establishment of lower action levels. The limit for beryllium is currently being reviewed and a lower action level is being considered. The airborne action level for beryllium is 0.5 µg/m³ . All personnel are trained in beryllium awareness and qualified industrial hygiene personnel perform all sampling for beryllium.

4.7.4 Asbestos Containing Materials (ACM) Release Criteria

Prior to and during the course of the closure project a comprehensive assessment and abatement program will be implemented in accordance with the OSHA Standard 1926.1101 and the site specific Health and Safety Practices Manual. OSHA-qualified personnel will perform characterization, sampling/survey and abatement. An airborne room clearance level will be used for all areas in which asbestos abatement is conducted. The levels are as follows:

- 0.01fibers/cc utilizing the phase contrast microscope means of analytical technique
- 70 structures/mm utilizing the transmission electron microscopy technique

4.7.5 Polychlorinated Biphenyls (PCBs) Release Criteria

The 771/774 Cluster's building surfaces will be below the release limit for PCB contamination. The limit for release of PCB containing material is less than 50 parts per million (ppm).

**Appendix 9
Set Description, End Points and Hazards Matrix**

"Work sets" in this table represent physically grouped logic sets of work. The following is a group of examples have been culled from the original document and selected for diversity. The original end points document for this facility contained 82 sets.

SET DESCRIPTION	MAJOR ENDPOINTS	ADDITIONAL CHARACTERIZATION NEEDED	UNIQUE HAZARD ANALYSIS	HAZARD CONTROL	WASTE STREAM
<p>Corridor B Office Area- This set includes all of Corridor B and Offices 116, 117, 117A, 118, 119, 119A, 119B, 119C, 119D, 124, 125, 125A, 125B, 125C, 125D, 125E, 126, 126A, and 126B. Room 116 contains the connection point to the plant fiber optics system. Asbestos containing materials are expected to exist in building components such as wall board, thermal systems insulation and solid surfacing components.</p>	<p>* Ensure sanitary drains in rooms 124 and hallways are isolated.</p> <p>Remove/dispose 771B office areas HVAC supply and recirculation ducting</p> <p>Remove/dispose HVAC supply fan S-11 in room 124.</p> <p>Remove/dispose steam heating coils for HVAC supply S-11..</p>	<p>Asbestos sampling.</p>	<p>None</p>	<p>PPE</p>	<p>Free Release</p>
<p>Corridor F Office Area- This set includes Room 103, 104, 105, 105A, 105B, 107, 109, 110, 110A and 110B, Corridor F, Criticality Panel and walls. Asbestos containing materials are expected to exist in building components such as wall board, thermal systems insulation and solid surfacing components. CFC's exist in window air-conditioners.</p>	<p>* Ensure sanitary drains in room 110A are isolated.</p> <p>* Remove/dispose freon from roof mounted A/C unit for HVAC supply S-10.</p> <p>* Remove/dispose steam heating coils for HVAC supply S-10.</p> <p>* Remove/dispose corridor F office areas HVAC supply and recirculation ducting.</p> <p>* Remove/dispose roof mounted A/C</p>	<p>Asbestos sampling</p> <p>Sampling cooling system for CFC's.</p>	<p>None</p>	<p>PPE</p>	<p>Free Release</p>

	<p>unit for HVAC supply S-10.</p> <p>* Remove/dispose HVAC supply fan S-10 in room 110.</p> <p>* Remove/dispose HVAC exhaust fan and associated ducting in room 110.</p>				
<p>Locker Room Area- This set includes both the Men's and Woman'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.</p> <p>Asbestos containing materials are expected to exist in building components such as wall board, thermal systems insulation and solid surfacing components.</p>	<p>* Ensure sanitary drains (sinks, showers and toilets) are isolated.</p>	<p>Asbestos sampling.</p>	<p>None</p>	<p>PPE</p>	<p>Free Release</p>
<p>120 Maintenance Area – this set includes Room 129, 129A, 129B, 129C, 129D, 129F, 130, 131, 132 and 132A; Dock 2; machine tools; wall; and roof. Asbestos containing materials are expected to exist in building components such as wall board, transite, stems insulation and solid surfacing components. Lead shielding was machined and formed in the maintenance area. CFC's such as freon</p>	<p>* Ensure sanitary drains in room 129 are isolated.</p> <p>* Remove/dispose freon from A/C unit located on a platform in room 129.</p> <p>* Remove/dispose compressed gas cylinders and associated piping.</p> <p>* Remove spare parts, stock items and hand tools.</p> <p>* Remove/dispose steam heating coils for HVAC supply S-</p>	<p>Asbestos sampling.</p> <p>Radiological surveys.</p> <p>Sample oil lubricants for radioactive.</p> <p>Sample for CFC's and PCB's.</p> <p>Sample for lead.</p>	<p>None</p>	<p>PPE</p>	<p>Free Release, LLW</p>

<p>was used for refrigerant in Air conditioners and was stored in the Maintenance area. PCB's may exist as a result of historical storage of electrical components.</p>	<p>12.</p> <ul style="list-style-type: none"> * Remove/dispose A/C unit for HVAC supply S-12. * Remove/dispose HVAC supply fan S-12 in room 129. * Remove/dispose HVAC supply ducting. * Remove/dispose ventilation hoods(4) in rooms 129 and 131. * Remove/dispose fabrication equipment. * Remove/dispose HVAC exhaust fans and ducting associated with ventilation hoods (4) in rooms 129 and 131. 				
<p>Room 141 – This set includes Room 141, concrete pedestals, concrete walls and presents a significant Pu contamination problem Room 141 was an SNM storage vault and then a pump room. Operational problems with the pumping operation on Room 141 resulted in radionuclide bearing acidic solution spills that contaminated the concrete floor and pedestal. The contamination occurrences were so great that the operation was eventually phased out. Subsequent remediation actions to remove the</p>	<ul style="list-style-type: none"> * Remove material from Infinity room (141) to minimize waste and costs associated with packaging and management of those high level wastes. * Remove fiber pacs from the room. * Remove radioactive and hazardous materials to preclude additional exposure during forth coming phases. 	<p>Radiological surveys for Pu and U.</p> <p>Sample for lead and acid.</p> <p>SNM hold-up evaluation.</p>	<p>Potential high radiation.</p>	<p>PPE, Additional radiological controls ALARA principles.</p>	<p>LLW, TRU, TRM</p>

<p>contaminated concrete resulted in high airborne concentrations of Pu and the room was eventually sealed. Lead shielding existed during the pump operation period. It is expected that acid spills may have deposited lead contamination in concrete structures. It is estimated that several grams of SNM hold-up are present in the room and structures.</p>					
<p>Room 114 Glovebox 1 – This set includes glovebox 1, Tanks D-705, D-706, D-713, D-714, D-716, D-764 and D-765, piping and valves. Glovebox 1 was used to precipitate Am for solution and is highly contaminated. Am is a contaminant of the Pu process. Glovebox 1 was used to purify the Am stripped from the Pu processes. Pu and Am contamination exists as a result of the processing and several grams of SNM hold-up exists in this system. Lead shielding such as plate, gloves and leaded glass windows are present. Asbestos in the form of thermal systems insulation is expected to be present on process equipment and steam heat feed lines to the process. Oxalic acid was used in the</p>	<ul style="list-style-type: none"> * Drain/dispose of cold solutions in piping. * Remove/dispose stored containerized chemicals. * Remove/dispose of loose SNM from glovebox and equipment. * Disconnect/isolate electrical feeds. * Disconnect/isolate piping. * Remove/dispose of equipment in glovebox. Remove/dispose of glovebox. Remove/dispose of tanks, air mover and pump. 	<p>Sampling for Asbestos and lead.</p> <p>Radiological surveys for Pu and Am.</p> <p>SNM hold up evaluation.</p> <p>Chemical sampling for ammonium thiocyanate, acids and basics.</p>	<p>Potential high radiation.</p>	<p>PPE</p> <p>Additional radiological controls ALARA principles.</p>	<p>LLW, TRU, TRM</p>

precipitate process. Additionally, ammonium thiocyanate was used as a reagent chemical in the process. Residual quantities of these chemicals may exist.					
Elevator Area – This set includes Room 142, 145 and 242; electrical control panel; elevator cage and hydraulic unit. The presence of oils is expected in equipment reservoirs and as a lubricant on machine parts.	<ul style="list-style-type: none"> * Drain/dispose cold solutions in pumps and associated piping. * Drain/dispose process solutions in pumps and associated piping. Remove/dispose pumps and associated piping. * Remove/dispose material from sump (raschig rings) underneath elevator. 	Sample oil lubricants for radioactive contamination.	None	PPE	LLW
Annex Area – This set includes Rooms 301, 302, 303, 304, 305, 306. Drum counters and scales; exhaust fans and motors; interior walls and doors. Oils in the form of lubricants on equipment and other machinery exist. Fixed radionuclide contamination is present as a result of past operations. Lead shielding is present in the material storage areas.	<ul style="list-style-type: none"> * Remove/dispose tools and unattached equipment. * Remove/dispose HVAC fan HV-1 in room 303. * Remove/dispose HVAC filters. Remove/dispose of drum counters (3). Remove/dispose HVAC fans and motors F-5, F-6, F-8 and F-9 on the annex roof. 	<p>Radiological surveys for Pu, U and Am.</p> <p>Sampling of Lead.</p> <p>Sample oil lubricants for radioactive contamination.</p>	None	PPE	LLW, LLMW
Room 149 Process Room and C-Cell – This set includes the Contamination Control Cell and Air Handling Unit. Radionuclide	<ul style="list-style-type: none"> * Remove/dispose storage bins in room 149. * Remove/dispose ethylene glycol from dual 	Radiological surveys for PU, U and Am.	None	<p>PPE</p> <p>Additional radiological controls</p>	LLW, TRU

<p>contamination exists on exposed surfaces of the contamination control cell as a result of past operations.</p>	<p>refrigeration unit in room 149.</p> <p>* Remove/dispose freon from dual refrigeration unit in room 149.</p> <p>* Drain/dispose process solutions in pumps and associated piping.</p> <p>* Disconnect/isolate HVAC ducting to C-Cell located in room 149.</p> <p>Remove/dispose pumps and associated piping.</p> <p>Remove/dispose dual refrigeration unit.</p> <p>Remove/dispose C-Cell HVAC off-gas and ventilation ducting legs.</p>			<p>ALARA principles.</p>	
<p>Room 149 Tank Farm – This set includes Tanks D-931, D-932, D-933, D-934 and the shielding walls around the tanks, piping and valves. This tank farm was used for storage of Pu nitrate solutions. The tank farm is surrounded by a Benelex, Plexiglas and lead shielded walls. SNM hold-up is expected in these tanks, however it has not yet been measured.</p>	<p>* Drain/dispose of process solutions in tanks.</p> <p>* Remove/dispose SNM in vessels and associated piping.</p> <p>* Disconnect/isolate electrical systems to vessels.</p> <p>* Disconnect/isolate piping connections to/from vessels.</p> <p>Remove/dispose of vessels and associated piping.</p>	<p>Radiological surveys for Pu.</p> <p>Sampling for Lead.</p> <p>SNM hold up evaluation.</p> <p>Chemical sampling for Acids.</p>	<p>None</p>	<p>PPE</p> <p>Additional radiological controls</p> <p>ALARA principles</p>	<p>LLW, TRU, TRM</p>
<p>Room 146 Process Area – This set includes Rooms 146, 146A, 146C,</p>	<p>* Drain/dispose of cold solutions in piping.</p>	<p>Radiological surveys for Pu, Am, U and additional Mixed Fission Products.</p>	<p>Potential High Radiation.</p>	<p>PPE</p> <p>Additional</p>	<p>LLW, TRU, TRM</p>

<p>Gloveboxes MT1, MT2, MT3, MT4, MT5, MT6, MT7, MT8, SR11 and SR12, Tanks D-1001, D-1002, D-1003, D-1004, D-1005, D-1006, D-1007, D-1008, D-1009, D-1010, D-1011, D-1012, D-1013, D-1014, D-1019, D-1020, D-1022, D-1023, D-1024, D-1032, D-1033, D-1044, D-1050, D-1051, D-1053, D-1054, D-1062, D-1063, D-1064, D-1065, D-1066, D-1067 and D-1069. These gloveboxes, tanks, pipes and vaults were used for a process called Special Recovery. Special Recovery was a set of processes to recover Pu from materials containing other contaminants. This area also contained a fluidbed flourination system and a vault type storage room. The special recovery operations consisted of Pu stripping from unique radionuclide bearing solutions. The variety of process feed included waste lab samples, solvents and specially made up chemical formulations. Asbestos containing insulation is present on steam heat feeds and surrounding various equipment. Benelex shielding is present around the tank farms, lead</p>	<ul style="list-style-type: none"> * Drain/dispose of process solutions in vessels and glovebox. * Remove/dispose of loose SNM material * Disconnect/isolate piping. * Disconnect/isolate electrical feeds. * Remove/dispose vessels in glovebox. Remove/dispose process piping. Remove/dispose off-gas and ventilation ducting legs. Remove/dispose glovebox. * Draining/dispose water water wall in room 146A. * Remove/dispose SNM storage bins in room 146. * Drain/dispose ethylene glycol from refrigeration unit in room 146. * Check for Mercury in drain system prior to dismantlement. * Drain/dispose of process solutions in pumps and associated piping. Remove/dispose material from sump 	<p>Sampling for Asbestos, Lead and Mercury.</p> <p>SNM hold up evaluation.</p> <p>Sample oil lubricants for radioactive contamination.</p> <p>Sample water for Chromates.</p> <p>Chemical sampling for Acids and Base.</p> <p>Sample cooling system for CFC's.</p> <p>Sampling for Beryllium.</p> <p>Sampling for RCRA listed chemicals possible.</p>		<p>radiological controls</p> <p>ALARA principles.</p>	
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<p>shielding is present on the gloveboxes. CFC's and Chromates are expected to be present in the cooling systems. Several hundred grams of SNM hold-up is present in the gloveboxes and transfer piping. Lubricating oils are present on components and equipment reservoirs. Room 146A contains gloveboxes SR11 and SR12 that are pilot plant designed fluidbed hydrofluorination process. This project supported the onsite prove in of additional process facilities. The fluidbed hydrofluorinator has no organic lubricants. The SR11 glovebox is shielded with both Benelex and lead, a water wall surrounds the glovebox. Multiple kilograms of SNM hold-up is present in SR11, SR12, and sassociated equipment.</p> <p>Room 146C is a former vault area used to store low level residues. The vault is surrounded by both Benelex and lead shielding. Minor residual radionuclide contamination is expected.</p>	<p>(Raschig rings) in room 146.</p> <p>Remove/dispose pumps and associated piping.</p> <p>*</p> <p>Disconnect/isolate electrical systems to vessels.</p> <p>Remove/dispose of vessels.</p>				
<p>164 Lab Area – This set includes Room 154, 155, 155A, 156, 156A, 161, 162, 163 and 164;</p>	<p>* Drain/dispose of cold solutions in piping.</p> <p>* Drain/dispose of</p>	<p>Radiological surveys for Pu, Am, U and additional Mixed Fission Products.</p>	<p>Potential high radiation.</p>	<p>PPE Additional radiological</p>	<p>LLW, TRU, TRM</p>

<p>Gloveboxes 49, 50, 13, 12, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 72, 73, 74, 79A, 79B, 80A, 80B, 81A, 81B, 82A, 82B, 83A, 83B, 98, 99, 100, 101, 102, 103, Flame Hood System; piping and valves.</p> <p>Laboratories typically receive samples from all other areas of the facility. Therefore many types of materials and contaminants are present. Many of the gloveboxes contain mercury filled instruments, asbestos insulation, lubricants, solvents, lead shielding, acids and caustics. Additional equipment including refrigeration units, calciner furnaces, propane gas burners and general laboratory fixtures are present.</p>	<p>process solutions in vessels and glovebox.</p> <p>* Remove/dispose of loose SNM material.</p> <p>* Disconnect/isolate piping.</p> <p>* Disconnect/isolate electrical feeds.</p> <p>* Remove/dispose vessels in glovebox.</p> <p>Remove/dipose process piping.</p> <p>Remove/dispose off-gas and ventilation ducting legs.</p> <p>Remove/dispose glovebox.</p> <p>* Remove/dispose equipment internal to glovebox.</p> <p>* Remove/dispose storage cabinets.</p> <p>Remove/dispose pumps and associated piping.</p> <p>* Disconnect/isolate electrical system to tanks.</p> <p>Remove/dispose vessels and associated piping.</p> <p>* Ensure sanitary drains (sinks and showers) are isolated.</p> <p>* Remove/dispose miscellaneous lab</p>	<p>Sampling for Asbestos, Lead and Mercury.</p> <p>SNM hold up evaluation.</p> <p>Sample oil lubricants for radioactive contamination.</p> <p>Chemical sampling for Acids and Base.</p> <p>Sample cooling system for CFC's.</p> <p>Sampling for Beryllium.</p> <p>Sampling for RCRA listed chemicals possible.</p>		<p>controls</p> <p>ALARA principles.</p>	
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	<p>equipment.</p> <p>* Remove/dispose material from sump (Raschig rings) in room 161.</p> <p>Remove/dispose pumps and associated piping.</p> <p>Remove/dispose of associated gas piping in room 164.</p>				
<p>151 Radiation Control Area – This set consists of Rooms 135A, 135B, 151, 151A, 151B, 151C, 151E, 151F and 152. This includes the RCT areas, selective alpha air monitor (SAAM) alarm panel, Radcon support lab, doffing area and decontamination showers. Room 152 has many lead bricks. The partition walls are expected to contain asbestos fibers.</p>	<p>* Ensure sanitary drains (sinks and showers) are isolated in room 151E and F.</p>	<p>Sampling for Asbestos and Lead.</p>	<p>None</p>	<p>PPE</p>	<p>LLW</p>
<p>149 Utilities Support Area – This set includes Room 149A, 149B, 149C, 149D and 149E, plumbing fixtures, condensate tanks pumps and piping.</p> <p>Room 149A contains the steam condensate collection tanks for the utilities condensate system. Water is collected then pumped to cooling towers. These tanks are insulated and asbestos is expected.</p>	<p>* Ensure sanitary sewer drains in rooms 149B and 149C (toilets and sinks) are isolated.</p> <p>* Drain/dispose of process solutions in pumps and associated piping.</p> <p>Remove/dispose material from sump (Raschig rings) in room 149E.</p> <p>Remove/dispose pumps and associated piping.</p> <p>* Drain/dispose cold solutions in</p>	<p>Sample for Asbestos.</p> <p>Sample oil lubricants for radioactive contamination.</p>	<p>None</p>	<p>PPE</p>	<p>LLW, Free Release</p>

<p>Room 149B and 149C are currently used as a storage rooms. Vinyl asbestos floor tile and asbestos containing mastic are expected.</p> <p>Room 149D is the new condensate collection system which was never put into service.</p> <p>Room 149A and 149D have pumps that contain lubricating oils.</p> <p>Room 149E is a maintenance storage closet. A sump is also located here.</p>	<p>vessels and associated piping.</p> <p>* Disconnect/isolate electrical systems to vessels.</p> <p>Remove/dispose vessels and associated piping.</p>				
<p>249 HVAC Exhaust and Utilities Area – This set includes Rooms 229, 230, 231, 241, 245, 246, 246A, 247, 248, 249; Zone 1 Filter Plenums, fans, motors and ductwork; Chem Make Up tanks; piping and valves. These are the reagent chemical supply tanks for building operations. The filter plenums are contaminated and have the potential to contain any thing that was exhausted from the gloveboxes.</p> <p>Room 245 was a instrubment repair shop that may contain residual mercury contamination.</p> <p>Room 247 is the wet chemical make-up system. Acids,</p>	<p>* Drain/dispose of cold solutions in vessels and associated piping.</p> <p>* Disconnect/isolate electrical systems to vessels.</p> <p>Remove/dispose vessels and associated piping.</p> <p>* Ensure sanitary sewer drains in rooms 231, 239 and 249 (toilets and sinks) are isolated.</p> <p>Remove/dispose HVAC fans and motors E-7 east.</p> <p>Remove/dispose HVAC fans and motors FN-1A and FN-1B associated with FU-1.</p> <p>Remove/dispose</p>	<p>Radiological surveys for Pu, AM, U and additional Mixed Fission Products.</p> <p>Sampling for Asbestos, Lead and Mercury.</p> <p>SNM hold up evaluation.</p> <p>Sample oil lubricants for radioactive contamination.</p> <p>Chemical sampling for Acids and Base.</p> <p>Sample cooling system for CFC's.</p> <p>Sampling for RCRA listed chemicals possible.</p>	<p>None</p>	<p>PPE</p> <p>Additional radiological controls</p> <p>ALARA principles.</p>	<p>LLW, TRU, TRM</p>

<p>Bases and other process chemical feeds were formulated.</p> <p>Multiple kilograms of SNM hold-up is present in the plenum. Cooling water systems in this set are suspected of containing regulated levels of chromium. Asbestos pipe insulation is likely to be present on steam heat lines.</p>	<p>HVAC filters.</p> <p>Remove/dispose HVAC fans and motors F-1, F-3, FN-4 and F-4 associated with FU-2.</p> <p>* Remove/dispose bottle racks.</p> <p>Remove/dispose HVAC fans and motors FN-1 and FN-2 associated with FU-1E.</p> <p>* Check for Mercury in drain system prior to dismantlement.</p> <p>* Drain/dispose of cold solutions in pumps and associated piping.</p> <p>* Drain/dispose of process solutions in pumps and associated piping.</p> <p>Remove/dispose pumps and associated piping.</p> <p>Remove/dispose HVAC contamination C-Cell blower and motor.</p> <p>Remove/dispose HVAC ducting to 180 hood exhaust and motor.</p> <p>Remove/dispose H/P vacuum electric motor and air pump (2).</p> <p>* Remove/dispose hydraulic motor and pump in corridor J.</p> <p>Remove/dispose</p>				
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	<p>HVAC filters FU-1, FN-1A, FN-1B, FU-1E, FN-1, FN-2, FU-2A, FU-2B, FN-3 and FN-4.</p> <p>Remove/dispose HVAC east general exhaust fan.</p> <p>Remove/dispose HVAC incinerator fans (F-1, F-2 and F-3), incinerator blower and plenum with 48 filters.</p>				
<p>Corridors A, D, E, G, H, Stairwell 1,2,3, 127 Utility Room and Tunnel Area – This set includes Corridors A, D, E, G and H; stairwells 1,2 and 3; Room 127; Tunnel (only to south outer wall of Bldg. 771); security electronics equipment, lockers, doors and piping. Residual contamination from the 1969 fire and the Building 776 water main break is expected. Radionuclide bearing acidic and basic chemicals have been transferred in pipe lines above the drop ceilings. Asbestos in the form of steam line insulation, solid surfacing materials and floor tile exist.</p>	<p>* Drain/dispose of cold solutions in associated piping.</p> <p>Remove/dispose piping in the overhead.</p> <p>* Remove/dispose security systems.</p> <p>* Remove/dispose bottle rack.</p> <p>* Remove/dispose drum counter in floor.</p>	<p>Radiological surveys for Pu and U.</p> <p>Sampling for Asbestos.</p> <p>Chemical sampling for Acids and Base.</p>	None	PPE	LLW
<p>774 Room 200 Dock Area – This set includes Room 209 and 220; Tanks T-3, T-102 and T-103. This area is located on the second floor ground level and is the shipping and receiving area of</p>	<p>* Drain/dispose of cold solutions in vessels and associated piping.</p> <p>* Drain/dispose of process solutions in vessels and associated piping.</p> <p>*</p>	<p>Radiological surveys for Pu and U.</p> <p>Sampling for Asbestos.</p> <p>Sample oil lubricants for radioactive contamination.</p> <p>Sampling for RCRA listed chemicals</p>	None	PPE	LLW

<p>drums and crates for B774. There are two large waste oil storage tanks in Room 220. Approximately 10,000 gallons of radionuclide bearing waste machining oils are presently stored. These oils are known to contain PCB's, Transite siding is present on the outer walls.</p>	<p>Disconnect/isolate electrical systems to vessels.</p> <p>Remove/dispose vessels and associated piping.</p>	<p>possible.</p> <p>Sample for PCB's.</p>			
<p>771/774 Cluster Facilities, 771 and 774 Structures and Cap – This set includes demolition of Buildings 771 and 774 and the concrete exhaust stack and connecting tunnel. This is the demolition of the remaining structure. Residual contamination in the building structure is expected. Additionally, transite siding will be included in this set.</p>	<p>* Decontaminate 771, reducing levels to meet established dispersion limits during demolition.</p> <p>* Decontaminate 774, reducing levels to meet established dispersion limits during demolition.</p> <p>Demolish 771 building and seal 771/774 tunnel.</p> <p>Demolish 774 building and seal 774/771 tunnel.</p> <p>Cap 771 foundation to minimize the potential of migration of hazardous materials.</p> <p>Cap 774 foundation to minimize the potential of migration of hazardous materials.</p> <p>Establish environmental monitoring to quantify environmental impacts.</p>	<p>Radiological surveys for Pu, Am, U and Mixed Fission Products.</p> <p>Sampling for Asbestos and Lead.</p> <p>Sample oil lubricants for radioactive contamination.</p> <p>Sampling for RCRA listed chemicals possible.</p> <p>Sample for PCB's.</p>	<p>None</p>	<p>PPE</p>	<p>LLW, Free Release</p>

	Complete and maintain site monitoring procedures including preventive maintenance requirements and data collection frequency				
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