June, 2010
TA21-PLAN-00006

Technical Area 21 Decontamination and Demolition Plan

Los Alamos
NATIONAL LABORATORY
EST. 1943

SIGNATURE PAGE

Project Name:	Defense and Non-Defense Environmental Cleanup Projects
Project Numbers:	RA-09-001, RA-09-002, RA-09-003
Site	Los Alamos National Laboratory, TA-21
Date	June 2010
Document Restriction	None
EM Program Office POC	Frazer Lockhart, FPD ARRA, EM 3.1

APPROVALS:

B-G Schappell	7-21-10
Bruce Schappell, ARRA Executive Director, Los Alamos National Security, LLC	Date
Everett Trollinger	7-21-10
Everett A. Trollinger, Federal Project Director, Los Alamos Site Office	Date

TA-21 D&D Plan Revision Log

Revision No.	Date	Revision Description	Pages Changed
0	June 2010	Initial issue	n/a*

***** Not applicable.

EXECUTIVE SUMMARY

A primary U.S. Department of Energy (DOE) mission need is to ensure that Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Project activities associated with the March 1, 2005, Compliance Order on Consent (Consent Order) are executed in a timely, safe, and compliant manner. The presence of inactive process and support buildings at Technical Area 21 (TA-21) precludes the implementation of these Consent Order–driven programs, potentially leading to schedule delays and associated fines and penalties.

This Decontamination and Demolition (D&D) plan is prepared consistent with the guidance provided in DOE Guide 430.1-4, "Decommissioning Implementation Guide" Guide 430.1-4 describes methods for compliance with DOE Order (O) 430.1A, "Life Cycle Asset Management." The purpose of the TA-21 D&D project is to remove and dispose of former process structures, secondary support structures, and related non-process infrastructure and buildings at TA-21. This action is required to allow the Laboratory Environmental Remediation (ER) Project environmental corrective actions to be completed by 2015. This in turn will enable DOE to comply with the requirements of the New Mexico Compliance Order on Consent Order. The Laboratory work force will manage D&D activities, and in some cases, perform D&D activities when this approach provides the best value to the customer. However, in most cases, D&D activities will be subcontracted.

Proposed D&D activities include the following: (1) utility isolation verification, (2) hazardous materials and asbestos abatement, (3) removal of remaining internal process-contaminated systems, (4) decontamination and immobilization, (5) demolition of above-grade structures, (6) optional removal of foundations and sub-grade building components, (7) removal of miscellaneous items outside of buildings within the work boundary, and (8) site restoration activities. D&D activities shall include waste management, transportation, and disposal to appropriate treatment and disposal facilities.

For DP East Structures, the end state for D&D activities will be demolition and removal of the structures and removal of soil, depending upon contamination level, up to 10-feet below grade and 5-feet away from the building footprint.

For DP West structures and non-DP East structures, D&D will encompass demolition down to the building grade only, leaving the slab remaining buried inter-building utilities for future Environmental Restoration activities.

Upon completion of D&D activities at TA-21, and associated Environmental Remediation (ER) activities; up to nine-acres of land will be available for land transfer as a combination of "Greenfield" and "Brownfield" properties.

CONTENTS

Figures

Tables

Appendix

1.0 INTRODUCTION

A primary U.S. Department of Energy (DOE) mission need is to ensure that the Los Alamos National Laboratory (the Laboratory) Environmental Restoration (ER) Project activities associated with the March 1, 2005, Compliance Order on Consent (Consent Order) are executed in a timely, safe, and compliant manner. These activities include field investigations of subsurface soils, disposal areas, and discharge and waste-handling systems identified as solid waste management units (SWMUs); corrective measures evaluations; and Corrective Measures Implementation (CMI) to achieve the desired end state. SWMUs include historical disposal areas identified as material disposal areas (MDAs). The presence of inactive process and support buildings at Technical Area 21 (TA-21) precludes the implementation of these Consent Order–driven programs, potentially leading to schedule delays and associated fines and penalties.

This Decontamination and Demolition (D&D) plan is prepared consistent with the guidance provided in DOE Guide 430.1–4, specifically, Section 4.4, Step 16, "Engineering and Planning—Prepare Decommissioning Project Plan, Including Health and Safety Plan." Guide 430.1–4 describes methods for compliance with DOE Order (O) 430.1A.

Most of the current funding of D&D activities occurring at TA-21 is provided by the American Recovery and Reinvestment Act (ARRA) of 2009, the scope of which is to decontaminate and demolish structures down to grade, with the exception of the DP East structures, which may be excavated up to 10-feet below grade and 5-feet out from the building footprint, depending upon contamination levels. The balance of D&D (below grade utilities in particular) and Environmental Remediation (ER) will be funded by LANL Base Programs.

1.1 D&D Project Purpose

The purpose of the TA-21 D&D plan is to describe the LANL approach to safely and compliantly removing and disposing of former process structures, secondary support structures, and related non-process infrastructure and buildings at TA-21 in a responsible manner. This action is required to allow the Laboratory ER Project environmental Corrective Actions (CAs) to be completed by 2015, including investigation and CAs for Delta Prime (DP) site aggregate SWMUs associated with TA-21 structures. This in turn will enable DOE and the National Nuclear Security Administration (NNSA) to comply with the requirements of the Consent Order. The Laboratory work force will manage D&D activities, and in some cases, perform D&D activities when this approach provides the best value to the customer. However, in most cases, D&D activities will be subcontracted.

Proposed D&D activities include the following: (1) utility isolation verification, (2) hazardous materials and asbestos abatement, (3) removal of remaining internal process-contaminated systems, (4) decontamination and immobilization, (5) demolition of above-grade structures, (6) optional removal of foundations and sub-grade building components, (7) removal of miscellaneous items outside of buildings within the work boundary, and (8) site restoration activities. D&D activities shall include waste management, transportation, and disposal to appropriate treatment and disposal facilities.

1.2 Site Setting

The majority of TA-21 structures within the D&D scope are located in the central area of DP Mesa, which encompasses DP West; and DP East. The entrance to the TA-21 complex is at the eastern end of DP Road, approximately 0.7 km from the easternmost commercial business located on the north side of DP Road. DP Mesa is bordered by DP Canyon to the north and Los Alamos Canyon to the south. The

location of TA-21 within the Los Alamos area is illustrated in Figure 1.2-1. An aerial view of TA-21 is shown in Figure 1.2-2.

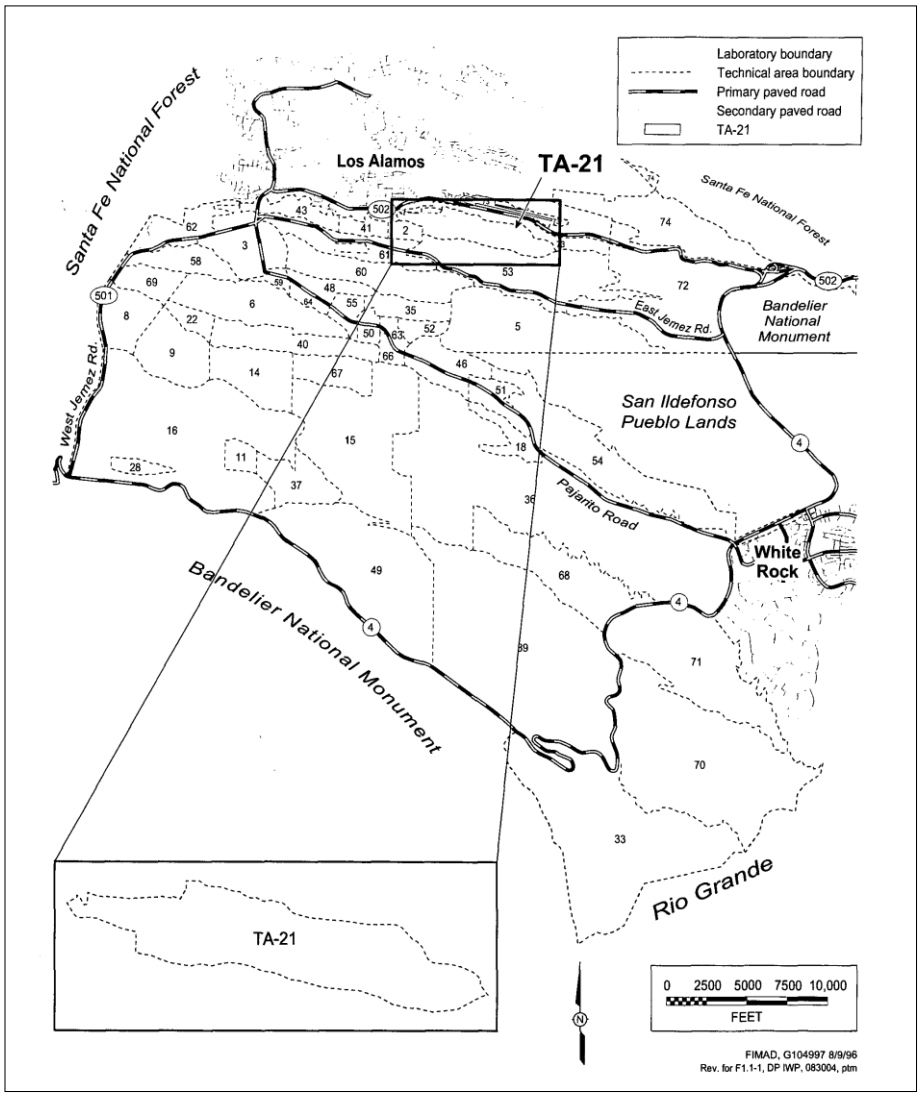


Figure 1.2-1 TA-21 within the Los Alamos area

TA-21 Site (1995)

Figure 1.2-2 Aerial view of TA-21

1.3 Current Site Status

All TA-21 structures are currently administered by the Laboratory's Nuclear and High Hazard Operations (NHHO) TA-21 Facilities Operations Directorate (FOD) with the following exceptions:

- TA-21-031 and TA-21-212: Administered by Institutional Facilities and Central Services
- TA-21-258 (Water Tower), TA-21-342 (Water Tower) & TA-21-357 (Steam Plant): Administered by the LANL Utilities group.
- TA-21-257, Radiological Liquid Waste Facility: Administered by the Environmental Waste Operations (EWMO) group.

In accordance with IFCS Memorandum #07-009, Categorization of Delta Prime (DP) West Buildings per DOE Standard 1027-92; all DP West Structures are categorized as Radiological Facilities, except Building 21-210, which was demolished in 2009. Additionally, per LA-UR-08-4704, Reconnaissance Level Characterization Report for the Tritium System Test Assembly Cluster,

In accordance with document ESA-WOI-FHC-TSFF-003-RO, "Facility Hazard Categorization for the Tritium Systems and Fabrication Facility (TSFF)," the TSFF structure (TA-21-209) is categorized as a Radiological Facility.

The Tritium Systems Test Assembly (TSTA, structure TA-21-155) is categorized as a Radiological Facility per Re-categorization of the Tritium Systems Test Assembly (TSTA) Facility (LANL2003, 099756).

The chemical categorization of all structures is low-hazard. When the D&D Execution Team is authorized to proceed with field activities as a result of the readiness review process, site access and control shall be transferred to TA-21 Closure Project Operations personnel. All previous TA-21 operations related to the overall Laboratory mission were terminated effective September 2006, and personnel not associated with the TA-21 Closure Project have been relocated. Primary utility deactivation for TA-21 structures has been completed. Characterization of DP West structures was completed in October 2006, and the characterization of the TSTA building (TA-21-155) was completed in September 2006. Characterization of DP East structure TA-21-209 is completed and TA-21-152 will be performed by the D&D as part of their scope.

ER projects integral to the overall TA-21 mission will be undertaken by other Laboratory subcontractors during periods overlapping the planned TA-21 D&D project. These projects include DP Site Aggregate area investigations, MDA B investigation, remediation and site restoration, and MDA T and MDA A investigations; they are required per the Consent Order. The Laboratory will coordinate all TA-21 subcontractor activities in a manner to safely and efficiently complete scheduled activities.

2.0 SCOPE

The scope of this project includes the following TA-21 structures and slabs:

DP West TA-21-2/080, TA-21-3, TA-21-4, TA-21-5, TA-21-116, TA-21-149 (not currently ARRA funded), TA-21-150 TA-21-210/328 (demo complete Dec-2009), TA-21-312, TA-21-313, TA-21-314 and TA-21-315,

DP East: TA-21-166 (demo completed Sep-2009), TA-21-167 (demo completed Sep 2009), TA-21-209, TA-21-152, TA-21-370 (demo completed Sep-2009) and TA-21-466.

TSTA: TA-21-155, TA-21-213, TA-21-220, TA-21-388 & TA-21-420.

Balance of Plant (BOP): TA-21-31/212 (Cold Workshop & the Calcium Building), TA-21-357/57/42, (Steam Plant, Oil Tank & Pump House),TA-21-223, TA-21-227229/230/387 (Collectively the Sewage Treatment Plant), TA-21-257 (RLW w/ Tanks TA-21-110/111/112/113)); TA-21-258 (West Water Tower), TA-21-286 (Hot Storage Replacement Warehouse), and TA-21-342 (East Water Tower), , Depending upon future funding allowances, certain BOP structures and slabs may be funded from ARRA monies.

Other lesser structures (such as equipment rooms, support buildings, exterior ventilation systems, exterior steam piping systems, and tanks) associated with the above buildings, structures, or slabs are also included in the work scope. Those structures are TA-21-57, TA-21-160, TA-21-166 (slab), TA-21-167 (slab), TA-21-188, TA-21-259, TA-21-323, TA-21-334,
TA-21-335, TA-21-346, and TA-21-462.

Figure 0.0-1 shows the location of the TA-21 buildings and structures:

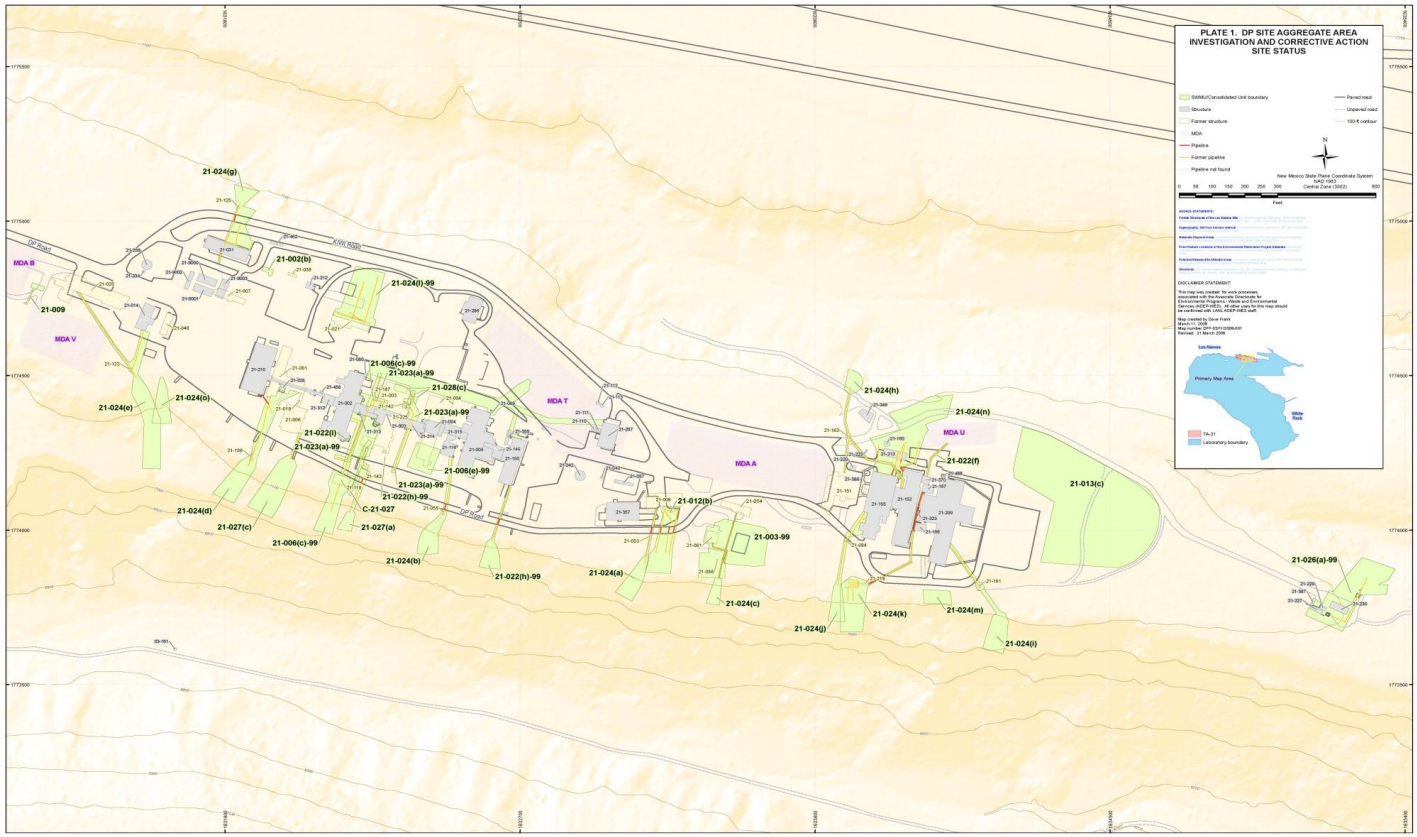


Figure 0.0-1 TA-21 structures and SWMUs

3.0 PROJECT OBJECTIVES AND END STATE

3.1 Project Objectives

The primary objective is to perform D&D of TA-21 structures to ensure that Laboratory Environmental Remediation and surveillance activities are executed in a timely, safe, and compliant manner. Primary D&D objectives include preparation of the site to support full-scale D&D, abatement of hazardous and radioactive materials, removal of equipment and systems, structure demolition; waste management, and site stabilization and restoration. At the close of D&D operations, the following objectives will be achieved.

1. All TA-21 structures and associated waste streams will be decontaminated and demolished to grade with the exception of DP East Structures, those also be excavated up to 10-feet below grade and up to 5-feet out from the slab footprint, dependent upon contamination levels. The ER group will address backfilling as needed per 3.2 below. .

Secondary objectives include the elimination of excess facilities and reduction of the NNSA footprint, the elimination of building degradation leading to potential environmental risk, the reduction and/or elimination of long-term S&M worker health and safety risk, and the reduction of S&M budgets for the deteriorating facilities.

3.2 TA-21 D&D End State

At the conclusion of D&D activities, the TA-21 site shall be left in the following conditions.

Buildings, equipment, foundations, and basements of designated structures shall be removed from the site. Soils exceeding 10-times the background of commonly used field screening instrumentation industrial radionuclide Screening Action Levels (SALs, ER Project, November 2000) located within a zone extending 5 ft out and 10-ft down from the building foundations will have been removed for TSTA only. The balance of structures being demolished will be to grade. Connections to exterior features that may be defined as SWMUs, such as lines, tanks, and sumps, will be isolated and capped to ensure no transfer of contamination from these features will occur. D&D Operations shall not be performed within the boundaries of SWMUs regulated by the New Mexico Environment Department (NMED).

Soil remediation to acceptable regulatory levels is out of the project scope; rather, Operations shall focus on removing near-surface higher-activity soils as defined above. After collection of surface and shallow borehole samples within the building footprints, the site will be restored to ensure that no industrial or occupational safety hazards exist at the surface. All residual contaminated soil will be isolated or otherwise covered to prevent environmental transport and inadvertent exposure. Sample data from footprint-sampling efforts will be used to assess the need and feasibility for future soil removal projects, modified nature and extent of SWMUs, and compliance with desired site end state uses.

All waste generated on the project will have been managed in accordance with approved waste characterization strategy forms (WCSFs; see section 4.5 for a full description), including, but not limited to, low-level radioactive waste (LLW), hazardous wastes (HW), mixed low-level waste (MLLW), New Mexico special waste (NMSW), transuranic (TRU) waste, mixed transuranic (TRU/M) and industrial waste (IW). Currently, there are two (2) WCSFs: one for equipment strip out and the other for building demolition. These WCSFs are expected to cover all anticipated waste categories. For large D&D activities, a project-specific Waste Management Plan (WMP) will be developed.

4.0 REGULATORY FRAMEWORK

Execution of all D&D operations shall be performed in accordance with applicable federal and state regulations, DOE standards and orders, and Laboratory programs and procedures implementing these

requirements. Los Alamos National Laboratory (the Laboratory) and the New Mexico Environment Department (NMED) entered into a Settlement Agreement and Final Order (Settlement Agreement) on April 10, 2007 that contains a number of requirements related to D&D activities at the Laboratory. If the NMED has asked for 30-day notice prior to the initiation of D&D for a particular building at TA-21 under Section III Paragraph 21.f; demolition activities cannot proceed until the 30 days have passed. Any demolition reports prepared by or on behalf of the Laboratory must be provided to NMED within 30 days after the final report is written. These requirements are in effect until the effective date of the final renewed hazardous waste permit.

4.1 Worker Safety

Field operations will be directed and executed in accordance with the project's approved Health and Safety Plan (HSP), which will incorporate health and safety requirements of 29 Code of Federal Regulations (CFR) 1910 OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, DEPARTMENT OF LABOR and 29 CFR 1926 SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION, the Laboratory Industrial Safety and Health Program, and the Laboratory Radiation Protection Program under 10 CFR 835 OCCUPATIONAL RADIATION PROTECTION. Worker Safety will be addressed in the field under to direction of SD-100, Integrated Safety Management System Description with embedded 10-CFR 851 Worker Safety and Health Program which implements DOE Policy P-450, Safety Management System Policy and the revised DOE Acquisition Regulation (DEAR) clause 970.5223-1, Integration of Environment, Safety and Health into Work Planning and Execution.

Radiological Control processes shall be managed in accordance with P121, Radiation Protection which implements the requirements of 10 CFR 835, Occupational Radiation Protection and DOE Order 5400.5 Radiation Protection of the Public and the Environment.

4.2 Quality Assurance

Quality assurance (QA) programs will be executed in accordance with the Environmental Program's quality assurance plan (QAP), EP-DIR-QAP-001, incorporating requirements under DOE Order 414.1, 10 CFR 830, Subpart A, and the Laboratory QAP.

4.3 National Environmental Policy Act

The National Environmental Policy Act requirements for the TA-21 D&D activities are addressed in the Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory DOE/EIS-0380 (DOE 2008, 102731) as implemented at LANL by P405 - National Environmental Policy Act (NEPA), Cultural Resources, and Biological Resources (NCB) Reviews. Additionally, the Permits Review Identification Document (PRID) provides for the successful completion of projects, from conception through closeout and provides a tool to identify potential requirements and project reviews including those pertaining to the NEPA process.

4.4 National Historic Preservation Act

All structures have been categorized with regard to date of construction, property type, theme, integrity status, and national registry eligibility in the Historic Building Assessment for the Department of Energy Conveyance and Transfer Project (McGehee and Garcia 1999, 087442). Final notification and petition for demolition have been made to the New Mexico State Historic Preservation Officer, and no limitations or restrictions are required for D&D activities.

4.5 Waste Management and Transportation

All project wastes will be managed in accordance with approved WCSFs. Waste will be managed under one or more WCSFs prepared under Associate Director, Project Management and Site Services Plan-DD-004, Waste and Materials Characterization for Demolition Projects.

All off-site transportation of wastes associated with the D&D project shall be transported in accordance with 49 CFR 172 DOT HAZMAT and 173 SHIPPERS – General Requirements for Shipping and Handling. On-site transportation of wastes and debris shall be subject to the TA-21 on-site transportation plan and consistent with the LANL Transportation Safety Document, P&T-SA-02. Waste shipped from TA-21 for final treatment and/or disposal shall be reported to DOE in accordance with Laboratory waste services procedures.

4.6 Environmental Compliance

The project will work closely with Environmental Protection Division (ENV) staff during planning, subsequent reviews, and project execution to ensure that the project maintains compliance with applicable regulations.

The D&D project will be limit discharge of liquids associated with D&D operations, and best management practices will be implemented to limit the potential for storm water run-on and runoff from passing through D&D operational zones. All fieldwork shall be performed in compliance with the TA-21 Storm water Pollution Prevention Plan.

The project will work closely with ENV's Ecology and Air Quality group to ensure adequate advance notice to NMED is provided for demolition and to ensure that all asbestos-containing material (ACM) is properly abated. Air emissions will be tracked to ensure compliance with the Laboratory National Emissions Standards for Hazardous Air Pollutants permit, applicable to all Laboratory sources and in accordance with 40 CFR 61, National Emission Standards for Hazardous Air Pollutants (NESHAP). D&D radionuclide emissions will be managed in conjunction with other TA-21 projects contributing to the overall site release limits.

5.0 DP WEST HISTORY AND CURRENT SITE CONDITIONS

5.1 DP West History

DP West was largely constructed in 1945 for second-generation plutonium processing late in the Manhattan Project. Buildings 21-2, 21-3, 21-4, and 21-5 were used for plutonium recovery, precipitation, conversion, purification, reduction, metal casting, and machining. Portions of buildings 21-3 and 21-4 were later converted to allow for uranium hydride and enriched uranium fuel element research activities, including recovery, concentration, conversion, and metal production. The DP West buildings were constructed with 1940s-era liquid waste collection systems of in-floor concrete troughs and trenches that drained to building sumps. These sumps tied into industrial waste lines to MDA T and the liquid waste treatment plant at TA-21-257. Utility tunnel bases were open to the underlying soil. Building 21-150 was constructed in 1961 as a plutonium-fuels service and development facility with a waste line to building 21-257. Buildings 21-2, 21-3, 21-4, 21-5, 21-150, and connecting corridors form a contiguous group, with utilities concentrated through the east-west central corridor. Building 21-210, constructed in 1964 and used predominantly for administration and health and safety support activities, was located at the far western end of the DP West corridor. Building 21-210 was torn down to the slab in December, 2009

From 1978 to 1981, all process equipment was removed from the buildings at DP West as part of D&D activities described in "Los Alamos DP West Plutonium Facility Decontamination Project 1978–1981"

(Garde et al. 1982, 006399). These activities included removing systems; removing surface contamination, where possible; painting to fix surface contamination where removal was not feasible; decontaminating glove boxes, floors, walls, and ceilings; and conducting radiation surveys following decontamination. The accesses to the utility tunnels in building 21-2 were closed as a result of releases from the waste lines. The north and south wings of buildings 21-3 and 21-4 underwent D&D in 1996; only the corridors (21-312 through 21-314, with several 21-3 and 21-4 room sections) and mechanical control rooms remain to date.

5.1.1 Building 21-2 History and Configuration

Building 21-2 is part of the DP West facilities constructed for laboratory operations in 1945. During its operation, 21-2 was the site of plutonium-239/241 processing, americium-241 recovery and storage operations, dissolution and recovery of plutonium wastes, nuclear stockpile, and health and safety operations. Building 21-2 was also the site of a criticality incident in 1958. The structure contained a liquid waste loading area, solvent extraction columns, and a scrap incinerator. The most recent use of the building was for offices, storage, and chemistry laboratories. Building 21-2 includes a north and south wing.

The 21-2 north wing is a pre-engineered, warehouse-type building with corrugated metal exterior siding. The walls are structural steel with gypsum lathe and plaster. Building 21-2 south is a steel and plaster laboratory building with structural steel walls, concrete-stucco and metal siding on the exterior, and gypsum lathe and plaster on the inside. Both structures have an elevated concrete floor that was placed in two layers. The original floor was 6 in. thick, and an additional 4-in. layer of concrete was poured over the original floor at a later date to contain contamination. Both structures are suspected to have some transite panels on the inside. The roofs contain mechanical ducting, and the roofing materials are suspected ACM. A partial mezzanine was used primarily for storage and observation, and basement areas housed electrical equipment. An attic with numerous pipelines and potentially ACM insulation runs down the middle of the structure and extends into the adjacent corridors of buildings 21-312 and 21-313. Many floors appear to be tiled with vinyl-asbestos tiles.

Additionally, drain trenches are embedded within laboratory floors. These trenches received liquid wastes from floor operations and discharged to the industrial and acid waste lines contained in a 4-ft × 4-ft utility tunnel at the perimeter of the building. Trenches were filled with concrete, and primary sections of the industrial and acid waste lines were removed from the utility tunnels as part of 1978–1981 decontamination operations.

5.1.2 Building 21-3 History and Configuration

Building 21-3 is part of the DP West facilities constructed for laboratory operations in 1945. During the early operation of building 21-3, americium research resulted in the isolation of the first gram of americium, and research and development took place associated with plutonium-238/239. In the 1970s, inorganic and structural chemical research took place in 21-3. By use of distillation columns, carbon, nitrogen, oxygen, and sulfur isotopes were separated. In 1994–1995, most of 21-3 was demolished; the remaining sections include the center corridor sections, areas of the foundation, and walls shared with the adjacent corridors 21-312 and 21-313.

Building 21-3 was originally a pre-engineered, warehouse-type building. Under the main building, there were originally trenches and tunnels located under the laboratory floors. There is still evidence of some of these lines in place at the site where the foundation was cut. The contamination history at 21-3 includes plutonium, uranium, technetium, and americium.

5.1.3 Building 21-4 History and Configuration

Building 21-4 is part of the DP West facilities constructed for laboratory operations in 1945. During the early operation of 21-4, plutonium hot cell research, much of the artificial heart research program and research and development associated with Los Alamos Plutonium Reactor Experiment was conducted. In 1994–1995, most of building 21-4 was demolished; the remaining sections include the center corridor sections, areas of the foundation, and any walls shared with the adjacent corridors 21-313 and 21-314.

Building 21-4 was originally a pre-engineered, warehouse-type building. Under the main building, there were originally trenches and troughs under the laboratory floors. The trenches crossed the laboratory rooms and were connected to floor drains to collect any waste or wash waters from the laboratory floors.

The trenches drained to perimeter waste troughs. There is still evidence of some of these lines in place at the site where the foundation was cut. The contamination history at 21-4 includes plutonium, uranium, technetium, and americium.

5.1.4 Building 21-5 History and Configuration

Building 21-5 is part of the DP West facilities constructed for laboratory operations in 1945. During its operation, 21-5 was the site of plutonium fabrication operations. The structure housed operations related to the production of plutonium metal and metal alloys, the fabrication and testing of precision plutonium parts for nuclear devices, and limited research involving plutonium. Fluoride reduction, metal casting and machining, and later uranium operations were conducted in this facility. Between 1978 and 1981, decontamination was performed in this building.

The 21-5 north building is a pre-engineered, warehouse-type building with corrugated metal exterior siding. The walls are structural steel with gypsum lathe and plaster. Building 21-5 south is a steel-and-plaster laboratory building with structural steel walls, concrete-stucco and metal siding on the exterior, and gypsum lathe and plaster on the inside. Both structures have an elevated concrete floor that was placed in two layers. The original floor was 6 in. thick, and an additional 4-in. layer of concrete was poured over the original floor at a later date to contain any contamination. Both structures are suspected to have some ACM transite panels on the inside. The buildings have metal-pitched roofs. The roof contains mechanical equipment, and roofing materials are suspected to be ACM. A partial mezzanine is used primarily for storage and observation, and basement areas housed electrical equipment. An attic with numerous pipelines and ACM insulation runs down the middle of the structure and extends into the adjacent corridors, identified as being part of buildings 21-149 and 21-315. Many floors appear to be tiled with vinyl-asbestos tiles.

Floor and drainage systems are comparable to those described for 21-2.

Additions were made to 21-5. These additions consist of roofing, walls, floors, and structural features, including a solvent shed and two hoists. Modifications have been made to the furnace, exhaust, lighting, heating, wiring, and ventilation systems. A balcony and stairs were installed, and an electro refining laboratory, dry boxes and exhaust stacks, equipment rooms, and an equipment room containing a dehumidifier and compressor were added.

5.1.5 Building 21-312/21-328 History and Configuration

Building 21-312 was constructed in 1971 to replace a portion of 21-18 that was demolished and to permit access from 21-210 (Plutonium Research Support Building) to 21-2. It is primarily a corridor; however, there are equipment rooms and two small offices in 21-312. One of the rooms was given its own structure

number, 21-328. Building 21-312 is constructed of steel and plaster with concrete block walls and floors. Portions of the exterior of the building are constructed of metal panels and some of concrete block.

The roof is constructed of built-up materials that are assumed ACM. Central heating, ventilation, and air conditioning (HVAC) equipment, a bag house, and a high-efficiency particulate air (HEPA) filtration unit are located on the roof, as well as a 20-ft stack. An electrical distribution room contains an energized transformer and electrical distribution equipment inside the building. Piping for utility lines to buildings 21-2 and 21-210 is located in 21-312. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and thermal system insulation (TSI) in 21-312. The contamination history at 21-312 includes plutonium, uranium, technetium, and americium.

No specific information on 21-312 decontamination was identified by Garde et al. (1982, 006399).

5.1.6 Building 21-313 History and Configuration

Building 21-313 was constructed as a replacement corridor for the original 21-15 in 1971 to connect 21-2 to 21-3. Although primarily a corridor, mechanical and electrical equipment rooms are located in 21-313. On the south elevation of the building are a mechanical room, an electrical equipment room, telephone cabinet, janitor's closet, and restroom. An attic with numerous utility lines and potential ACM insulation runs down the middle of the structure and extends into the adjacent structures. Building 21-313 is equipped with HEPA plenums and an exhaust system that were upgraded in 1972.

The building is an industrial steel-framed structure on concrete footings with metal-siding panels, concrete slab, and steel monument frame with a built-up roof containing suspect ACM. Portions of the walls and ceilings in 21-313 were previously sealed with paint, but in some areas this paint is flaking. Areas throughout the building are posted radiological controlled areas (RCAs). Alpha contamination is expected under the paint and in the paint chips. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and TSI in 21-313. The contamination history at 21-313 includes plutonium, uranium, technetium, and americium.

No specific information on 21-313 decontamination was identified in Garde et al. (1982, 006399).

5.1.7 Building 21-314 History and Configuration

Building 21-314 was constructed in 1971 as a replacement corridor for the original 21-16 to connect 21-3 to 21-4. It is primarily a corridor; however, mechanical and electrical equipment rooms also are located in 21-314. On the south elevation of the building are two mechanical rooms, electrical equipment room, air lock, sample room, and battery room. The electrical room contains energized equipment, and a small HVAC room contains a blow off tank insulated with suspect ACM. An attic with numerous utility lines and potential ACM insulation runs down the middle of the structure and extends into the adjacent structures. Building 21-314 is equipped with HEPA plenums and an exhaust system that was upgraded in 1972.

Building 21-314 is an industrial steel moment-framed structure on concrete footings, stem walls, and slab floor. The exterior walls are metal panels with hidden fasteners to the steel post and beam structure. The structure has a built-up roof containing suspect ACM. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and TSI in 21-314. The contamination history at 21-314 includes plutonium, uranium, technetium, and americium.

No specific information on 21-314 decontamination was identified by Garde et al. (1982, 006399).

5.1.8 Building 21-315/21-116 History and Configuration

Building 21-315 was constructed in 1971 as a replacement corridor for the original 21-17 to connect 21-4 to 21-5. It is primarily a corridor; however, mechanical and electrical equipment rooms are laboratories located in 21-315. On the south elevation of the building are rooms that were given the separate building designation of 21-116. TA-21-116 includes portions of a former aircraft hangar and was built in 1950 and 1958. There is also an attic with numerous utility lines and potential ACM insulation running down the middle of the 21-315 and extending into the adjacent structures. Building 21-315 is equipped with HEPA plenums and an exhaust system that was upgraded in 1972. The 1950 portion of 21-116 houses utility equipment, a restroom, and a decontamination shower. The 1958 portion of 21-116 originally served as the TA-21 Plant Services building and originally housed work benches, welding stations, tool crib, janitor equipment area, equipment monitoring area, and other equipment areas. More recent uses of 21-116 include a conference room, office space, and radiation count lab.

Building 21-315 is an industrial steel-framed structure on concrete footings with corrugated iron-siding panels, concrete slab, and pitched corrugated metal roofing with wood framing. Building 21-116 is a pre-engineered steel- or wood-framed structure on concrete footings with insulated metal-siding panels, concrete slab, and built-up roofing. Exterior siding panels in 21-116 have ACM-insulating paper. Portions of the walls and ceilings in 21-315 and 116 were previously sealed with paint, but this paint is flaking. Areas throughout the building have posted RCAs. Alpha contamination is expected under the paint and in the paint chips. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and TSI in 21-315 and 21-116. The contamination history at 21-315 includes plutonium, uranium, technetium, and americium.

No specific information on the 21-315 and 21-116 decontamination was identified by Garde et al. (1982, 006399).

5.1.9 Building 21-149 History and Configuration

Building 21-149 was constructed in 1962 to connect 21-150 to 21-5. It is primarily a corridor; however, there is an equipment room, telephone cabinet, and men's restroom on the first floor and in 21-149. There is also a partial second floor containing two fans and an equipment room. Equipment was currently observed in 21-149, including several hoods. An attic with numerous pipelines and potential ACM insulation runs down the middle of the structure and extends into the adjacent corridors, identified as buildings 21-150 and 21-5.

Building 21-149 is an industrial steel-framed post and beam structure with insulated metal-siding panels and flat built-up roofing that is assumed ACM. Building 21-149 has two HVAC condenser units, a HEPA filtration system, bag house, and two 50-ft stacks on the exterior. The HEPA filters and exhaust system were upgraded in 1972. The HVAC system contains condenser and blower equipment. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and TSI in 21-149. Building 21-149 served as the hub for distribution of utilities, including alarms and public address systems to 21-2, 21-3, 21-4, and 21-5. The contamination history at 21-149 includes plutonium, uranium, technetium, and americium.

No specific information on TA-21-149 decontamination was identified by Garde et al. (1982, 006399).

5.1.10 Building 21-150 History and Configuration

Building 21-150 was built in 1961–1962 to house plutonium fuels development activities. The building contained a laser lab, wet laboratory, other laboratories, offices, a sampling shed, and a janitor's closet. Research performed in 21-150 included work on plutonium fuels, fast-breeder reactor fuel, artificial heart,

space heat sources, and cold fusion work. Equipment was observed currently in 21-150, including several fume hoods.

Building 21-150 is an industrial-style building with cast-in-place concrete beams and columns spanned by concrete masonry units with built-up roofing that is assumed ACM. The interior walls are covered with cement plaster. Building 21-150 has a full basement with electric switchgear and mezzanine space containing three laboratories. The roof has an external piping and conduit system visible, as well as an exhaust stack and blower. Based upon visual observations and the date of construction, it is assumed that there will be ACM transite panels, vinyl asbestos floor tiles, and TSI in 21-150. The contamination history at 21-150 includes plutonium, uranium, and americium.

According to Garde et al. (1982, 006399), building 21-150 underwent significant decontamination efforts where contamination existed at levels exceeding the current cleanup criteria. These efforts included removal of glove boxes, process equipment, process piping, storage tanks, process ventilation ductwork (internal and external), industrial waste lines, chilled circulation water system lines, and areas of contaminated ceilings and walls. In addition, the room air-exhaust system was cleaned to the filter plenum located outside and northeast of the building. The fresh air-supply system for the building was found to exhibit low levels of contamination on internal surfaces, so the system was removed and later replaced. Water lines, compressed airlines, etc., were removed to the basement and capped. Where possible, floor areas were decontaminated. When floors could not be decontaminated, they were capped with a new sheet of linoleum floor covering. Contamination was identified on the roof above room 605A. The area was contaminated from a spill and subsequent release through a hood roof vent. The entire roof surface was removed and replaced with a new tar and gravel roof. Walls and ceilings exhibiting low levels of contamination were painted to fix the contamination in place.

5.2 DP West Building Current Status

Table 5.2-1 describes the current condition of TA-21 structures and estimated square footage of floor space through all levels. Buildings that have not been occupied for long periods of time are suffering from more physical deterioration. Examples include the north and south wings of buildings 21-2 and 21-5. Building 21-210, which was vacated in July 2006, is in good physical condition. All buildings are currently under S&M by the Laboratory.

A comprehensive utility verification program at TA-21 was completed in 2006 and summarized in the April 17, 2006, “TA-21 Utility Verification Deliverable” information package prepared for the Laboratory EP-TA-21 by MOTA Corporation (MOTA 2006). This package of material included updated utility maps, based on current site drawings and field verification of select systems, source Laboratory utility maps, a total drawing database, and background reports.

Table 5.2-1
Current Condition of TA-21 DP West Structures

Structure	Use Definition	Floor Area (ft2)	Current Condition
21-2/080	Process	14,482	Significantly deteriorated sealant covering radiological contamination on interior walls is flaking and friable asbestos is in many rooms. Roof is leaking and extensive water damage is apparent. Roof leaks directly

Structure	Use Definition	Floor Area (ft2)	Current Condition
21-5	Process	28,390	impact a 13-kilovolt (kV) transformer. Potential for spread of interior contamination. A stack blew over at this building and was removed because of overhead safety concerns. Building has wildlife intrusion and hantavirus concerns. Frequent steam/condensate leaks occur. Building shows indications of deterioration of the support columns due to water damage.
21-149	Support	2580	Some deterioration. Sealant covering radiological contamination on interior walls is flaking. Currently part of active utility corridor. Roof leaks have resulted in costly repairs being required regularly. Potential for spread of interior contamination. An unstable discharge stack was removed. 21-150 basement contains radiologically and mixed waste-contaminated equipment. Areas of building have limited or no lighting.
21-150	Process/Lab	14842	
21-312	Support	2072	Some deterioration. Sealant covering radiological contamination on interior walls is flaking. Roof is leaking and extensive water damage is apparent. Currently part of active utility corridor. Potential for spread of interior contamination. Frequent steam/condensate leaks occur. Areas of building have limited or no lighting.
21-313	Support	4275	
21-314	Support	4843	
21-315	Support	4773	
21-210/328	Administrative	21699	Demolished to slab December, 2009.

5.3 DP West Remaining Systems and Equipment in Place

Although DP West structures underwent significant decontamination and system removal from 1978 to 1981, some components associated with ventilation systems, fume hoods and dry boxes, electrical equipment and switchgear, pumps and liquid recirculation equipment, and miscellaneous systems are still present within structures subject to D&D. These systems are contained within rooms of structures that have residual radiological contamination reduced to 1978–1981 release levels and may be internally contaminated with radionuclide's.

Table 5.3-1 presents an approximate listing of larger system and equipment features by structure. Lines, pipes, and conduits connecting components of these systems may still be present. Equipment in structures 21-149 and 21-150, 21-313, and 21-3, 21-314 and 21-4, and 21-315 and 21-116 are combined for planning purposes and because of proximity and interrelation of systems.

5.4 DP West Contamination Levels and Conditions

Plutonium operations at DP West were relocated to a new plutonium facility at TA-55 in 1978. Following this relocation, a major D&D project was performed from 1978 to 1981 and involved removing plutonium-contaminated process systems and inside utility support services; decontaminating exterior concrete pads; and removing exterior concrete, asphalt, and soil in buildings 21-2, 21-3, 21-4, 21-5, and 21-150. Sections of corridor structures 21-312, 21-313, 21-314, and 21-315 were decontaminated if they were adjacent to rooms with process equipment or known to have been used for processing of nuclear materials. Walls and ceilings were painted orange and new sheet linoleum was installed over some floors. The Laboratory's special decontamination crew performed the initial decontamination work to reduce activity levels to a point where there was less of a chance of the material being spread to other areas. Laborers and janitors performed later stages of decontamination under the supervision of Laboratory health physics technicians.

The D&D activities are described in Garde et al. (1982, 006399). Following D&D activities, several final radiological condition reports were prepared for structures that had been impacted. These reports include the "Final Condition Report for Building 2 at TA-21" (Blackwell 1980, 036476), "Final Condition Report for

Building 5 at TA-21" (Blackwell 1980, 090518), "Final Condition Report for Building 150 at TA-21" (Blackwell 1980, 090516), and "Final Condition Report for Building 286, Building 228, Building 116, Electrical, Mechanical and Telephone Equipment Rooms and Hallways, DPW, TA-21" (LANL 1981, 106102). This series of reports is most valuable in identifying potential maximum contamination levels before covering and sealing building features and provides data to assess potential "worst-case" radiological conditions during D&D.

Various characterization and condition surveys relating to building conditions have been performed from 1998 to 2006 and describe asbestos inventory, hazardous chemical inventory, beryllium sampling, and lead paint sampling. The most recent characterization data were collected in 2006 and summarized in "Report on Characterization of Above-Grade Delta Prime West Structures at Technical Area 21" (LANL 2006, 094351) (DP West characterization report). Findings of these studies are summarized below.

5.4.1 DP West Post decontamination Surface Radiological Contamination Levels

The surface activity limits applied to the 1978–1981 D&D activities were 2000 total alpha activity disintegrations per minute (dpm)/100 cm^2 and 400 dpm/100 cm^2 removable (swipeable) alpha activity. Table 5.4-1 shows the range of surface alpha contamination following the 1978–1981 decontamination but before painting or sealing of surfaces.

Table 5.3-1
Remaining DP West Building Equipment and Systems in Place

System Category	21-2	21-5	21-149/21-150	21-312	21-313/3	21-314/4	21-315/116
Ventilation Systems	All—exterior-mounted 3-ft × 3-ft and 3-ft × 6-ft process ventilation All/attic—interior return air ventilation 10 in. × 20 in., 3 ft × 2.5 ft , and 3 ft × 3 ft 206A—air conditioner 2J—exhaust fan/motor Exterior—exhaust fan/motor	All—exterior mounted 3-ft × 3-ft and 3-ft × 6-ft process ventilation All/attic—interior return air ventilation 10 in. × 20 in., 3 ft × 2.5 ft, and 3 ft × 3 ft 5B—1-ft × 3-ft ducting 501—3-ft × 2-ft ducting 533—24-in. ducting	149-PH—filter house, filter house motor and fan, filter plenum, 48-in. stack, 2-ft × 2-ft duct 149-1491—exhaust fan	Interior—Exhaust fan, ducting—2-ft × 8-in., 12-in. outside diameter (O.D.) Exterior—filter house 6-ft × 8 -ft × 8-ft misc. ducts, 24-in. exhaust fan, 48-in. diameter stack	Bldg 3—exhaust fan, various sizes of exhaust and insulated ducts 313 Room 3—exhaust fan 313 Room 4—exhaust fan 313 Room 6—14-in. duct, air compressor w/20-hp motor' 313 PH A&B—exhaust fans, associated motors, filter house 313 exterior—exhaust fans, stack base, fan base, stack, filter house, various size ducts	Bldg 4—1-ft × 2-ft duct 314 Room 3—exhaust fan, 14-in. × 14-in. ducts 314 PH A&B—misc. ducts, filter house, exhaust fan/motor 314 exterior—exhaust fans, stack base, fan base, stack, filter house, various size ducts	315 Room 1A – 14-in.-O.D. ducts 315 Room 3—exhaust fan air compressor 315 PH A&B—misc. ducts, filter house, exhaust fan/motor 315 exterior—exhaust fan/motors, stack base, 48-in. stack, filter house, misc. ducts
Fume Hoods and Dry Boxes	None	None	None	None	Bldg 3—stainless-steel hood	None	315 Room 1A—hood with base cabinet

Table 5.3-1 (continued)

System Category	21-2	21-5	21-149/21-150	21-312	21-313/3	21-314/4	21-315/116
Electrical Equipment and Switchgear	215A—electric box 2-C—electric boxes on cable duct 202—electric box 208—electrical duct bank, electrical boxes on cable tray 201—electric boxes and panels 209/212—electric boxes 213—electric panel, switch boxes on duct bank 218—electric panel 222—electric motor, control panel, switch boxes 2A—electric motor, switchboxes	500A—electric panel 500B—1000/1333 kilovolt-ampere- (kVA-) transformers, 300-kVA transformers 500—electric panels, 4 fire panels 506—electric panel 531—electric boxes, power panel, 80-amp connectors 534—electric boxes	149-PH—electric panel, switch boxes 149-1491—electric boxes	circuit boxes, electric panels, transformers, circuit breakers	Bldg 3—elevator power unit, power panel, electric motors 313 Room 3—transformer, switchgear, switchboards, electric boxes 313 Room 4—switchbox	314 Room 1—electric boxes, transformers, switchgear, switchboards, timer box 314 Room 3—electric boxes	315 Room 1A—electric boxes, panel, switches 315 Room 1—electric boxes, electric panels, steam heater, electric switchboard, transformers, electric junction boxes 315 Room 3—electric switches

Table 5.3-1 (continued)

System Category	21-2	21-5	21-149/21-150	21-312	21-313/3	21-314/4	21-315/116
Pumps and Miscellaneous	215—steam heater 224—roof-mounted heat pump 206/206M—heater 201—water heater 218—steam heater 222—sump, expansion tank, dropout tanks, air compressor, steam heaters 2A—air compressor, cooling tower, expansion tank	Attic—steam-reheat coils 500A—polyvinyl chloride (PVC) sump w/motor 5N—steam heaters 502/502A/504/505—water heater 5B—plastic waste tank 500—water heater 533—water heater, showers 534—ceiling diffuser	149-3A—water heater, steam heater 149-PH—5-hp pumps, pneumatic control panel, pneumatic valves, steam unit heater 149-1491—dryer, steam heater, 30-in. expansion tank, 24-in. expansion tank, vertical dryers with filters, 48-in. jug tank, inline expansion tanks	room heater	Bldg 3 —elevator, vault door, chilled water condenser, vacuum pump, backflow preventer, steam heater 313 Room 3 —steam heater (overhead) 313 Room 4 —pump motor (5-hp), heater, 36-in. insulated expansion tanks, 24-in. noninsulated expansion tanks, steam traps, gate valves, fire sprinkler tree 313 Room 6 —steam heater, sound proof enclosure 313 Room PH A&B— pneumatic control panel 313 exterior— steam radiator	314 Room 1—steam heater, 314 Room 2—electric strip heaters 314 Room 3 —expansion tanks, steam heaters 314 Room PH A&B —pneumatic control panel 314 exterior—steam radiator	315 Room 1—acid line 315 Room 3—steam unit heater, 24-in. expansion tanks, 36-in. expansion tanks, centrifugal vacuum pumps, stem and PRVs, pump motor, steam traps 315 Room 4—steam unit heater 315 Room PH A&B—pneumatic control panel 315 exterior—steam radiator

Table 5.4-1
DP West Total Alpha Surface Contamination Levels Post–1978–1981 DP West D&D

Structure	Feature	Range Total Alpha Contamination (dpm/100 cm^2)	Source or Reference
21-2	Concrete Slab[a]	<200,000[b]	Blackwell (1980a,036476)
	Ceilings, Walls, Doors	<2000	Blackwell (1980a, 036476)
	Floor Trenches[c]	<1,000,000[d]	Blackwell (1980a, 036476)
	Attics	<2000[e]	Blackwell (1980a, 036476)
	Room Air Exhaust Ducts	<4000	Blackwell (1980a, 036476)
21-5	Concrete Slab[a]	<400,000[b]	Blackwell (1980b)
	Ceilings, Walls, Doors	<2000	Blackwell (1980b)
	Floor Trenches[c]	<1,000,000[d]	Blackwell (1980b)
	Attics	<100,000[b]	Blackwell (1980b)
	Room Air Exhaust Ducts	<400,000[b]	Blackwell (1980b)
	Floor Drains	<100,000	Blackwell (1980b)
	Utility Tunnels	<46 nCi/g[f]	Blackwell (1980b)
21-150	Floors	<4000	Blackwell (1980c, 090516)
	Room Air Exhaust	<4000[g]	Blackwell (1980c, 090516)
	Walls and Ceilings	<4000	Blackwell (1980c, 090516)
	Chilled Water System (Interior)	>40,000	Blackwell (1980c, 090516)
21-312	Halls Adjacent to 21-2	<2000	Blackwell (1979)
21-313	Room 3135 Walls and Floors	<2000	Blackwell (1979)
	Room 3136 Walls and Floors	<2000	Blackwell (1979)
21-314	3143A Floor[h]	<2000	Blackwell (1979)
	3141Metal and Concrete Wall	<2000	Blackwell (1979)
21-315	3154 Metal and Concrete Wall	<2000	Blackwell (1979)
21-116	General	<2000	Blackwell (1979)

[a] Values for exposed concrete slab before pouring of concrete cap coat.

[b] Maximum value should be considered sporadic; most surfaces cleaned to 2000 dpm/100 cm^2 limit.

[c] Trenches decontaminated to negligible removable contamination and filled with concrete.

[d] Applicable to north half of attic. South half was painted and sealed and could be expected to be comparable to elevated readings of 21-5 attic spaces.

[e] Highest level of utility tunnel as encountered. Some near-surface high activity soils were removed during D&D.

[f] Values for nearby penetrations from ground floor. Actual basement process bank will have significantly higher contamination.

[g] A contaminated drainline in the room was plugged with concrete and likely has contamination well in excess of 2000 dpm/100 cm^2.

[h] No specific radiological survey data for 21-116 are summarized in report, although it is described as being in the scope of work. Photos are also provided. It is assumed that no readings above 2000 dpm/100 cm^2 are present.

5.4.2 DP West Post-decontamination Gamma Exposure and Neutron Dose Rates

Extensive beta-gamma radiation surveys were performed with portable instrumentation and thermoluminescent dosimeters (TLDs) over all DP West structures subject to decontamination after 1978–1981. All readings were below the exposure threshold of 0.25 milliroentgens per hour. Most TLDs read zero doses (Blackwell 1980, 090516; Blackwell 1980, 090518; Blackwell 1980, 036476; LANL 1981, 106102).

Likewise, extensive neutron surveys were performed with portable instrumentation with no readings above instrument background of 0.5 millirem per hour (LANL 1981, 106102; Blackwell 1980 090516; Blackwell 1980, 090518; Blackwell 1980, 036476).

5.4.3 DP West Recent Radiological Survey and Sampling Data

Recent surface radiological contamination surveys summarized in the DP West characterization report (LANL 2006, 094351) confirmed that decontamination efforts through DP West in 1978–1981 were largely effective in achieving the 2000 dpm/100 cm^2 total alpha contamination limit. Total alpha contamination measurements ranged from minimum detectable activity to 17,581 dpm/100 cm^2, with a mean of 94 dpm/100 cm^2. Removable alpha contamination measurements were predominantly below the average minimum detectable activity of 12 dpm/100 cm^2. Elevated values were noted in areas of 21-2 and 21-5 under areas of peeling paint, vents, and light fixture penetrations.

Total beta-gamma contamination measurements ranged from minimum detectable activity to 135 dpm/100 cm^2, with a mean of –2 dpm/100 cm^2, corrected for instrument background. Removable alpha contamination measurements were predominantly below the average minimum detectable activity of 12 dpm/100 cm^2.

Samples collected for various types of building materials were analyzed and reported in the DP West characterization report (LANL 2006, 094351). Building materials with mean concentrations exceeding 1 pCi/g (nominal concentration of interest) include the following:

- building 21-2, 21-312, and 21-313 filter and duct residue: 211–217 pCi/g Am-241; 2.8–14.3 pCi/g Pu-238; 53.9–233.1 pCi/g Pu-239; and 1.03–11.03 pCi/g U-234
- building 21-2 and 21-5 attics residue: 0.35–4.31 pCi/g Am-241 and 1.6–7.15 pCi/g Pu-239
- building 21-5, 21-314, and 21-315 filter and duct residue: 0.38–8.5 pCi/g Am-241 and 0.13–4.62 pCi/g Pu-239
- building 21-149 filter and duct residue: 0.27–14.33 pCi/g Am-241 and 0.37–27.6 pCi/g Pu-239
- Building 21-2 drain and pipe residue: 5920 pCi/g H-3
- Building 21-5 drain and pipe residue: 7.93–271.4 pCi/g Am-241; 0.07–44.2 pCi/g Pu-238; 0.12–221 pCi/g Pu-239; 1.34–11.4 pCi/g U-234; and 0.25–9.41 pCi/g U-238
- miscellaneous DP West site equipment: 5.63–60.6 pCi/g Am-241; 0.1–5.26 pCi/g Pu-238; and 0.84–28.1 pCi/g Pu-239

Details from all volumetric sampling of building materials are available in the DP West characterization report (LANL 2006, 094351). Sample data may not be representative of inaccessible portions of building systems.

5.4.4 DP West Asbestos

Laboratory health and safety organizations have compiled an inventory of ACM for the Laboratory. ACM may be encountered in any of the TA-21 structures. TA-21 inventories are developed by building based on inspections performed in March 1996, May 1999, July 2001, November–December 2002, and January 2003 and incorporated into a database. ACM is classified as surfacing, TSI, miscellaneous friable and nonfriable asbestos-containing building material, in accordance with categories defined in 40 CFR 763.88. An ACM inventory by structure is available within the Laboratory Asbestos Inventory Building Manager Report.

Recent characterization activities of TA-21 DP West confirmed that the ACM inventories in the Building Manager Reports are essentially complete and accurate (LANL 2006, 094351).

5.4.5 DP West Hazardous Chemicals

A variety of hazardous material characterization activities were undertaken at DP West in 2006 and are summarized in the DP West characterization report (LANL 2006, 094351). No containers of "product" or "byproduct" chemicals are present in DP West. Intrusive sample locations associated with ducts, hoods, pipes, tanks, or process equipment exhibited negative results when screened for the presence of perchlorates.

Building surfaces were screened for PCB concentrations between 10 and 100 µg/cm^2, with all samples falling below this range.

Table 5.4-5 illustrates results of sampling from associated building systems that exceeded threshold values per 40 CFR 261.24. Samples were analyzed for metals, volatile organic compounds, semivolatile organic compounds, PCBs, and pH. The vast majority of above grade building materials exhibited no chemical contamination above threshold values. Many of the drain systems filter media, and equipment residue will likely require processing, treatment, and disposal as MLLW.

Table 5.4-5
Hazardous Chemicals Identified in DP West Systems

Structure	System and Location Description	Analyte	Result (µg/kg)
21-150	Equipment: 10-~~gal.~~gallon steel rectangular tank in room B3, basement	mercury	38,900
	Drain Residue: Acid waste line in room E1 of basement	mercury	35,900
		lead	885,000
		barium	7,320,000
	Filter Media	chromium	219,000
21-2	Drain and Piping Residue: Base of relief valve, condensate return in room 201	lead	225,000
21-5	Filter Media	cadmium	34,200
		selenium	131,000
21-3/21-313	Drain and Piping Residue: Plastic acid storage tank in room 3151	mercury	95,400
		lead	296,000
		barium	11,900,000
		cadmium	20,100
		selenium	307,000
21-3/21-313	Drain and Piping Residue: P trap below sink in room 3132	mercury	1,090,000
21-3/21-313	Filter Media	cadmium	35,700
		selenium	154,000
		chromium	100,000

5.4.6 DP West Beryllium

As part of the scope of site characterization activities at DP West, 20 beryllium smears were collected at various points in undisturbed areas through the DP West structures. One sample in 21-150 and five in 21-210 exceeded the LANL P 101-21, "Chronic Beryllium Disease Prevention Program" housekeeping guideline of 0.2 µg/100 cm^2. All analytical data were qualified as nondetect or estimated (LANL 2006, 094351).

A detailed follow-on beryllium survey was performed at building 21-210 by Laboratory Industrial Hygiene and Protection in response to the findings from the DP West characterization report. Of 115 samples collected, 95% were below the LANL P 101-21 housekeeping limit. An isolated sample result of 0.22 µg/100 cm^2 was attributed to natural background in nearby soils that had blown into the facility.

5.4.7 DP West Lead Paint

Building surface screening for lead was performed on interior and exterior building surfaces at DP West. The threshold for definition of lead-based paint is at or above 1.0 mg/cm^2 by x-ray florescence or 0.5% by weight. Interior painted surfaces that exceed this threshold include the following (LANL 2006, 094351):

- yellow stair railings: greater than 2 mg/cm^2
- blue beams: up to 1.9 mg/cm^2
- orange and yellow doors: greater than 2 mg/cm^2
- grey and white doors (21-210 only): up to 2 mg/cm^2

Exterior painted surfaces exceeding the threshold include the following:

- brown stair railings: 1–1.9 mg/cm^2
- red, yellow, tan, and silver steel columns: greater than 2.0 mg/cm^2
- tan and yellow doors: greater than 2 mg/cm^2
- tan ladders: greater than 2 mg/cm^2
- yellow bollards: greater than 2 mg/cm^2
- brown doors (21-210 only): up to 2 mg/cm^2

5.5 DP West Utilities and Services

5.5.1 Electrical System

An upgrade of the TA-21 electrical system began in 1969 and was completed in the early 1970s. The electrical system at TA-21 had two feeders: one from the TA-03 power plant (preferred) and the other from the Eastern Technical Area substation, which is equipped with automatic transfer capability.

A substation served each of the remaining TA-21 buildings. A 13.2-kV loop with manual transfer capacity feeds the primary (13.2-kV) side of each substation. The secondary side (480 volt [V]) also can be manually transferred to provide backup power. If a backup feeder is used, it is always on the secondary side. Bus ducts primarily serve panel boards, with a bus duct serving the northern and another serving the southern half of each building. MOTA (2006) contains drawings illustrating the former electrical service routing at DP West. The electrical system to DP West buildings has been air-gapped at the 13.2-kV power poles. The normal and alternate electrical system serving DP East has been air-gapped at the Substations SUS-A and SUS-B. Currently, there is a 13.2kV temporary power line serving DP

East, routed to temporary transformers and switched (Spiders or Bangboards) located between 21-209 and 21-155. All power from this service is via temporary, above-ground cabling.

5.5.2 Compressed Air Lines

Air compressors located in equipment rooms at the southeast corners of 21-2 and 21-5 provided compressed air to the DP West buildings at 60 to 80 pounds psi. Lines entered 21-2 along the east exterior wall of both the north and south wings. A connection from former building 21-146 entered on the northeast corner of 21-2. Lines entered 21-5 on the west side of the south wing and on the south end. A compressed line exists to the north of 21-5 and runs eastward to 21-257. It is unclear if this connection enters 21-5. MOTA (2006) contains drawings illustrating the compressed air line routing at DP West.

All compressors are inactive and in disrepair. All compressed air lines appear air-gapped within the facilities.

5.5.3 Steam Distribution System

Steam was provided to DP West from the TA-21 steam distribution system originating at 21-357 (steam plant). The steam line runs above grade along the southern edge of 21-150 and enters DP West along the south side of the corridor between 21-149 and 21-150. The main steam line runs through the attic of corridors 21-315 through 21-312, entering 21-210 while also exiting the corridor of 21-210 and branching to 21-31 and 21-258.

Trunk lines entering 21-2 and 21-5 from the corridor have been disconnected and air-gapped. The TA-21 Steam Plant has been shut down. Steam service to DP West buildings has been terminated. MOTA (2006) contains drawings illustrating former steam service routing at DP West.

5.5.4 Water System

Water from Los Alamos County was supplied to TA-21 through two elevated towers protected by an air gap. Water was then distributed to all buildings at the site through an 8-in. loop. The water towers were isolated in 2007. At each building, the supply was diverted into two separate systems, potable and nonpotable, which were protected from each other by backflow prevention devices.

The main feed lines to DP West buildings have been closed and air-gapped. The only active water supply at TA-21 is to the outer fire hydrate loops around DP West, DP East, and the central corridor buildings. MOTA (2006) contains drawings illustrating the water line routing at DP West.

5.5.5 Sanitary Waste Disposal

Sanitary waste exited DP West structures to the south at a variety of locations, feeding a main line located south of the access road, and traveling east to the inactive sewage treatment plant (STP) located at the east end of DP Mesa. DP West exit points may be noted from the east side of 21-210 slab, south side of 21-313, 21-314, 21-315, 21-116, and 21-149.

Sanitary waste is pumped by truck from the STP and removed from the DP Site. No limitations relating to energy or pressure are expected for removal of these lines. MOTA (2006) contains drawings illustrating the sanitary waste line routing at DP West.

5.5.6 Radioactive Liquid Waste Treatment

Radioactive Liquid waste (also known as RLW, Process Waste and/or Acid Waste) generated during the research and processing, including discard solutions and waste released into stainless-steel sinks, was discharged through a 1.5-in. stainless-steel process waste line and routed to 21-257.

Other liquid waste, including waste from fountains, mop and lavatory sinks, restrooms, showers, were discharged into a 4-in. cast-iron industrial waste line and routed to the Sewage Treatment Plant (STP) facility at 21-227.

Process waste lines located in the utility tunnels of 21-2 and 21-5 were removed during D&D performed in 1978–1981. Portions of the industrial waste lines remain in and under DP West buildings.

5.5.7 Fire Protection Systems

Combustible loadings in DP West Buildings have been reduced to negligible levels, and the Fire Protection System has been drained and deactivated.

The TA-21 Fire Protection piping is in place and available via fire hydrants located about the area and is served by an 8-inch line looping the site.

5.5.8 Chilled Water System

The chilled water system in the DP West buildings has been drained and deactivated.

5.5.9 Underground Utilities

Other underground systems present at DP West include communications, natural gas, and storm drains. Except for the storm drains and the natural gas line running from DP Canyon to TA-21-257, all of these systems have been deactivated. MOTA (2006) contains drawings illustrating the communications, natural gas, and storm drain routing at DP West.

6.0 DP EAST/BOP HISTORY AND CURRENT SITE CONDITIONS

6.1 DP East/BOP History

DP Site was divided into two areas: DP West and DP East. DP West, located in the western area of TA-21, was historically dedicated to plutonium operations. DP East, the smaller easternmost group of buildings, initially focused on polonium initiator research but over time transformed its operation to tritium research.

6.1.1 Building 21-21 History and Configuration

Building 21-21, the vault building, was constructed in 1946 and demolished in 2005. The vault building was used to store and secure uranium and plutonium metal and finished weapons components from operations at DP West. All available material processed into weapons components were housed in building 21-21. Vault operations were discontinued in 1977 when plutonium operations were relocated to TA-55. Only the 4287-ft^2 reinforced concrete slab remains. This project will remove the slab.

6.1.2 Building 21-42 History and Configuration

Building 21-42 was built in 1945 and served as an oil pump house. The oil was pumped to a tank (structure 21-57), which supplied the steam plant, building 21-237, with a reserve/backup supply of fuel if the natural gas supply was interrupted. The building supported the former steam plant, located at the same location, and continued to support the existing steam plant (TA-21-357, to undergo D&D under another project) until operations ceased in 2007.

Building 21-42 is a 65-ft^2 stucco-covered wood frame building with a slightly pitched flat roof that sits on a concrete slab and footings. The building has a pedestrian door on its north side. Two lines of pipe,

approximately 168 linear feet (LF), extend around the perimeter of tank 21-57. The piping is capped at the fenceline.

ACM is expected to be found in the roof of this building.

6.1.3 Structure 21-57 History and Configuration

Structure 21-57 is a 50,500-gallon diesel fuel tank located north of building 21-357. The diesel fuel tank was built in 1945 and was a reserve/backup supply of fuel if the natural gas supply was interrupted. The fuel tank originally supported the former steam plant, located at the same location, and continued to support the existing steam plant until operations were ended in 2007.

The 81-ft^2 tank is a light-gauge steel plate and rests on six concrete saddles, approximately 18 in. thick × 9 ft wide. In 2002, during a routine inspection of the diesel fuel tank, it was discovered that the diesel fuel in the tank was missing. It was determined that an underground tank line leaked the diesel fuel into the soil and tuff below. Further inspection of the pipes showed several pinhole-sized leaks in some sections that were the result of corrosion. Several boreholes were drilled to determine the location and extent of contamination. Remediation work was reported to have occurred and NMED was informed; however, no information of this remediation has been located on the Laboratory potential release site database or in the Laboratory geographic information system.

6.1.4 Structures 21-110/21-111 History and Configuration

Structures 21-110 and 21-111 are two steel-plate 13,200-gallon acid-holding tanks on 450-ft^2 8-in. thick reinforced concrete pads that were associated with building 21-257, the former a radioactive liquid waste disposal facility. The tanks were constructed between 1951 and 1952 and relocated from TA-21-35 (where they served the same function) between 1967 and 1968 to their current location. They are located on the northwest corner of building 21-257. These tanks contained low-level radioactive material from operations at DP Site. Structure 21-110 received acid waste from DP East. Structure 21-111 received acid waste from DP West and from the General's Tanks (two 50,000-gallon tanks used to store highly enriched plutonium solutions that are buried at MDA A).

Pipe railing is located around the top of each tank. Each tank is 19 ft 6 in. high × 12-ft diameter. 21-110 is estimated to be 40% full, with 10% solids totaling 5400-gallon of waste. 21-111 is estimated to be 75% full, with 10% solids totaling 10,125 gallon of waste. Both tanks 21-110 and 21-111 have a total liquid waste volume of 15,525-gallon The contamination history for building 21-257 includes plutonium, uranium, americium, and possibly tritium.

6.1.5 Structures 21-112 and 21-113 History and Configuration

Structures 21-112 and 21-113 are two 12,800-gallon steel-plate acid-holding tanks that supported radiological waste operations at building 21-257. The tanks were constructed between 1951 and 1952. They are located about 50 ft north of building 21-257 along the fenceline. The tanks sit on reinforced concrete pads with pipe railing along the top of each tank. These tanks contained low-level radioactive material from operations at DP Site. The tanks are situated on a 450-ft^2 8-in.-thick reinforced concrete pad. Tanks 21-112 and 21-113 are empty.

Before 1967, the tanks were connected to building 21-35 by underground piping. After 1967, the underground piping was rerouted to building 21-257. Before 1982, the treated effluent was retained in the tanks for 3 to 5 d and discharged to the outfall. After 1982, tank effluent was pumped to TA-50 for disposal. The tanks are plumbed together to allow effluent to be transferred between them to prevent overflows. The contamination history for building 21-257 includes plutonium, uranium, americium, and possibly tritium.

6.1.6 Building 21-152 History and Configuration

Building 21-152, the Initiator Laboratory Building, was constructed in 1945 and used as a high-temperature chemistry laboratory. In 21-152, polonium and actinium initiator research and development were conducted between 1945 and 1955. 21-152 became a high-temperature chemistry laboratory to support Project Rover as a production facility between 1955 and 1974. A material coating of zirconium carbine or niobium carbide was applied to reactor parts and fuel elements as a refractory material for protection against high-temperature hydrogen in this building. These investigations involved the use of welding machines, radio frequency furnaces, direct current arc melters, bead blasters, and mass spectroscopy. After Project Rover was shut down in 1974, cold fusion research was conducted in the south end of this building. Starting in 1977, the TSTA program used the building as a laboratory for tritium research and technology in support of the fusion program. Other nonweapons research was also conducted in 21-152 between 1955 and 1990.

Building 21-152 is a 13,745-ft^2 rectangular pre-engineered metal lathe and plaster (ribbed metal-siding) building on a reinforced concrete slab with pipe tunnels and utility trenches beneath the floor around the perimeter of the building. There is a 13-in.-thick brick fire wall on the south side of the hallway that connects this building to the covered corridor and to building 21-155. 21-152 is connected via a corridor to building 21-209. Most of the roof of 21-152 is a metal-pitched roof with flashing and exhaust ductwork along the roof ridge and sides. A small part of the roof is flat, with built-up gravel. In 1958, an equipment room made from concrete masonry unit (CMU) block was added on the northwest side of the building. In 1960, a corrugated metal-sided and -roofed room to house vacuum pumps was added to the southeast corner of the building. In addition, a change room and other support rooms were added to the north side of the corridor connecting building 21-152 to building 21 155 (TSTA building). These additions are constructed from CMU block.

ACM is contained in pipe insulation and fittings. Contamination found in this building consists of actinium from the initiator research and polonium.

6.1.7 Building 21-155 History and Configuration (TSTA)

Building 21-55 (later renumbered as 21-155; also known as TSTA) was built in 1949 to support polonium and actinium initiator research and production. Beryllium was used to control the release of neutrons from the polonium. Two additional buildings were added to 21-55. Construction on building 21-206 was completed in 1964. Called the “Development Building,” this building supported high-temperature chemistry work on the Rover Project. This building once contained an induction furnace, equipment room, pit area, and restroom. It was connected to 21-55 near completion of its construction. Building 21-207 was completed in 1965 and originally was identified as a “Furnace Facility” that supported the high-temperature chemistry work on Project Rover. The building once contained an induction furnace, mechanical room, battery room, trap room, storage area, and offices. It was joined with 21-206 in 1965. After the three buildings were joined, the building was renumbered as 21-155.

Project Rover’s purpose was to develop nuclear propulsion systems for long-range missiles. The basic Project Rover reactor design involved passing hydrogen gas through a reactor core. During the process, the hydrogen was heated to extremely high temperatures, creating immense pressure. Propulsion occurred when the expanded hydrogen gas exited the reactor core through a nozzle at high velocity. Project Rover operated from 1964 to 1974. In 1977, the TSTA Project was awarded funding to conduct tritium research for the fusion program, and most parts of building 21-155 were used as a tritium production center from 1981 to 2001, when the operation was discontinued.

Building 21-155 is a 15,924-ft^2 two-story structure that is connected to building 21-152 on its east side. The building is composed of metal siding, concrete masonry, and reinforced concrete and sits on reinforced concrete slabs and footings. The TSTA was originally a Category 2 Nonreactor Nuclear Facility that has been downgraded to below Hazard Category 3 and was removed from the nuclear facilities list. Tritium is the only known nuclear material that remains in the TSTA; however, further surveys for other nuclear material will be performed during D&D, including areas that are less accessible, such as confined spaces, sumps, pits, and the roof. The remaining tritium inventory is in the form of surface-contaminated residual holdup in material matrices and has been reduced to less than 0.5 g.

The Laboratory initiated the TSTA Facility Stabilization Project (TFSP) in fiscal year 2000 to achieve a safe and stable condition for the facility and to allow its transition from an operational facility to S&M and eventually to D&D. During the TFSP, many facility components were removed from the facility and disposed of. TFSP was conducted from 2001 to 2003.

At the start of TFSP, the facility inventory included approximately 140 g of tritium and 44.6 kg of depleted uranium, which were used to store hydrogen isotopes as metallic hydrides. All uranium has been removed from the facility. The tritium inventory comprised elemental tritium, mixtures of hydrogen isotopes, tritium oxide (tritiated water), and tritium-contaminated gases. During the stabilization process, tritium was transferred to other locations within the Laboratory and to other sites in the DOE Complex.

In TSTA, components with high-surface areas were used to store and process tritium-containing gas; these were identified as high-inventory components (HICs). All HICs have been characterized and either removed from the facility or left open and vented. Only HICs that contain a very low residual inventory were left in the facility. Tritium-contaminated oil has been drained from all pumps and compressors. Any volume that contained tritium and remains in the facility, including all process piping, has been purged and is vented into the facility or directly to the stack. All systems were opened and vented in April 2003 and remain open.

ACM will be encountered in TSI (on both above- and belowground piping), electrical wiring, flooring materials, window caulking, roofing material, fume hoods, exterior stucco, fire doors, fittings or valves, and piping (steam, potable hot water, potable cold water, condensate, and industrial hot water). At the time of this document's revision, most of the equipment and hazardous materials located in TSTA has been removed.

6.1.8 Structure 21-160 History and Configuration

Structure 21-160 is a 263-ft^2 wood open canopy-type structure that was used to store gas tanks and other equipment. The building was constructed in 1945 and consists of a wood frame and roof (approximately 30% of the roof remains), with concrete footing and no formal foundation or floor. Two 6 ft-long × 6-in. wide × 1-ft high concrete cradles are located under the structure where gas tanks were stored.

6.1.9 Building 21-166 History and Configuration

Building 21-166 is a two-story equipment building built in 1945. It is located on the south wing of building 21-152 and provided the heating and cooling system to the south wing of building 21-152. Equipment in the building included air filters, an air-supply fan, a motor, and heating and cooling system.

The building is 1102 ft^2 and constructed from gypsum board siding and CMU block. The first floor contains a pipe tunnel, a pit, an opening in the foundation for mechanical work, and an open area. A wood staircase on the north side of the building connects to the second floor. The building sits on a concrete slab and is supported by steel beams. The gravel-covered roof has a wood deck. Building 21-166 is connected to building 21-152 by an air-supply duct. In 1949, an air conditioning system was installed. An evaporative cooler was installed in 1960 and a compressed air dryer was installed in 1966.

ACM is contained in pipe insulation.

As of September, 2009, Building 21-166 has been demolished down to the slab

6.1.10 Building 21-167 History and Configuration

Building 21-167 is an equipment building that supported the north wing of building 21-152. It was built in 1945 as a two-story equipment building and is located on the north wing of building 21-152. This building was used to house air filters, an air supply fan, a motor, and heating and cooling system.

Building 21-167 is almost identical to building 21-166, is 1102 ft^2, and is constructed out of gypsum board siding and concrete masonry units. The first floor contains a pit in the northwest corner. A wood staircase along the western interior wall connects to the second floor. The building is on a concrete slab and is supported by steel beams. The roof has a gravel-covered wood deck. Building 21-167 is connected to building 21-152 by means of an air-supply duct. In 1949, an air conditioning system was installed. A compressed air dryer was installed in 1966.

ACM is contained in pipe insulation.

As of September, 2009, Building 21-167 has been demolished down to the slab

6.1.11 Building 21-188 History and Configuration

Building 21-188 is an electrical substation that was installed in 1961. The substation includes a transformer.

6.1.12 Building 21-209 History and Configuration

Building 21-209 was the administration building for Project Rover between 1965 and 1974. The building was originally designated as the high-temperature chemistry facility. When the Laboratory's TSTA Project was awarded funds in 1977, the building became the administrative office facility and laboratories for TSTA.

Building 21-209 was completed in 1965. The building contained offices, restrooms, a library, conference room, vault, lunch room, receiving and storage area, darkroom, film reading room, machine shop, cryogenics laboratory, general chemistry laboratory, high-temperature chemistry laboratories, pyrometry laboratory, x-ray laboratory, microscopy laboratory, metallography laboratory, induction heating laboratory, electron microscopy laboratory, and a furnace room. In 1969 an addition was added along the north side of the western wing and along the west side of the northern wing. The addition was known as the TSFF. The addition contained a laboratory, office, mechanical room, and a dry box train and comprised a majority of the TSFF. TSFF incorporated rooms 103, 107, 109, 109A, 176, 177, 179, 179A, 179B, 179C, and a loading dock along the northwestern elevation. The TSFF was used to develop and demonstrate the tritium fuel cycle and environmental control systems for an experimental power reactor. The TSFF was modified in 1974, and its mission became tritium salt synthesis to support the underground nuclear testing program at the Nevada Test Site (NTS). The salt work was discontinued in 1993.

Building 21-209 is a one-story, 33,429-ft^2 concrete-block structure with a basement. The building is constructed of 8-in. CMU block and sits on 6-in. thick reinforced slabs supported by reinforced concrete beams, columns, and basement walls extending to the tuff below. The roof is composed of steel joists supporting a light-gauge corrugated metal deck, 1-in. rigid insulation, and a layer of tar and gravel roofing on a poured gypsum deck. The roof has an approximate 4-ft overhang on all sides. The building connects to 21-152 on the central west elevation.

In 1982, ductwork and exhaust air-supply conversions were made to laboratory and office spaces. The sprinkler system also was upgraded. In 1983, modifications included removing equipment, floor penetrations were sealed, and doors and walls were relocated. In 1984, an isostatic press was installed, and roof work was done. Between 1992 and 1993, PCB transformers were replaced and new glove boxes were installed.

TSFF operated as a separate facility from the rest of building 21-209. The TSFF area (rooms 103, 107, 109, 109A, 176, 177, 179, 179A, 179B, and 179C) is equipped with a wet-pipe sprinkler system, manual pull boxes, fire extinguishers, and an alarm system separate from the remainder of 21-209. The TSFF fire zone is also separated from the rest of building 21-209 by firewalls and hallways. The TSFF area is constructed with firewalls that completely surround the facility and that are bisected by an internal firewall that forms a fire barrier between rooms 103, 107, 109, 109A, 176, 179, and 179C. The ventilation system for TSFF is separate from the rest of building 21-209. All air from TSFF is exhausted through the stack, structure 21-466, by three exhaust fans. Most systems have been deactivated and vented to the room or stack.

ACM is contained in the bituminous roofing products, fittings, and pipe insulation for this building. Contamination found in this building consists of tritium. As of 2005, only residual contamination was present in most areas, and small quantities of tritium (below the Category 3 Nuclear Facility threshold value of 1.6 g of tritium) were contained in the remaining systems.

6.1.13 Building 21-213 History and Configuration

Building 21-213 is a laboratory supply warehouse used to store materials for buildings 21-155, 21-152, and 21-209. The warehouse was built in 1964 and has always been used as a general warehouse.

The building is 1723 ft^2 and constructed of a pre-engineered rigid metal frame unit. The walls are pre-engineered ribbed metal panels, and the slightly pitched roof is metal with eight rectangular translucent panels for light. The warehouse sits on a concrete slab with steel footings. No modifications have been made to this building since it was constructed.

6.1.14 Structure 21-220 History and Configuration

Structure 21-220 is the cooling tower for TA-21-155. The 288-ft^2 cooling tower, which sits on a concrete slab, was built between 1964 and 1965 and serviced the air-cooling system. ACM is identified as transite-siding material at 21-220 and may be encountered in cooling tower transite cement.

6.1.15 Building 21-223 History and Configuration

Building 21-223 covers a manhole, inside of which is an acid sump. The 48-ft^2 corrugated metal structure has a concrete floor and metal roof. It was built between 1964 and 1965. The acid sump inside is connected to structure 21-346, two 3000-gallon Stainless-steel acid-pumping station tanks, located north and downslope from building 21-223.

6.1.16 Building 21-227 History and Configuration

Building 21-227 was the STP for TA-21. The facility was constructed between 1965 and 1966 and operated until 1990. From 1990 to 1995, TA-21 sanitary waste was collected and stored at 21-227 until it could be trucked to the Laboratory sanitary wastewater system at TA-46. The extended aeration plant was equipped with a control manhole containing a grit chamber and inlet structure, an aeration tank, and settling tanks. This building was always a sewage treatment plant (STP) for sanitary waste and noncontact cooling water from TA-21 facilities. All of the TA-21 buildings with sanitary facilities are connected to the plant by sewer lines.

Building 21-227 is constructed of corrugated aluminum siding. Concrete masonry units were used for the belowground-level basins. The building's south elevation is constructed from translucent lasolitic panels. This building is approximately 600 ft^2. In 1977, existing pipe handrail was removed, and an existing 5-in. cast-iron pipe was relocated from the west end of the aeration area to the east end. In 1990, the triangular portion of the grating over the aeration area and the guardrail in this area were removed, and grating was added to the north side of the aeration section. A reinforced concrete wall was installed in the center of the aeration basin, and concrete fill was added to the base.

ACM is contained in gaskets and packing.

6.1.17 Building 21-228 History and Configuration

Building 21-228 served DP Site as a general storage facility. Building 21-228, built in 1966, was a 6670-ft^2 single-story structure. The building was a low-profile, pre-engineered rigid frame industrial building with a concrete slab, footings, and stem walls. There is no known contamination history for this building. Building 21-288 has been removed from the site and only the concrete slab remains.

6.1.18 Building 21-229 History and Configuration

Building 21-229 is the control building for the DP Site sewage treatment plant (21-227). The building was constructed between 1965 and 1966 and contains two blowers, a spray pump, a low-pressure backflow preventer crane, a froth spray pump, and other small equipment.

Building 21-229 has a footprint of 215 ft^2. It is a metal building with a concrete slab and footings and a sloped metal roof. A concrete sidewalk surrounds the building.

6.1.19 Structure 21-230 History and Configuration

Structure 21-230 is the sludge drying beds for the sewage treatment plant (21-227). The structure consists of a series of four sand filter/sludge drying beds. All four beds were used from the time they were built in 1966 to 1990, when the two westernmost beds were converted to sand filters for effluent from the treatment plant's dosing siphon chamber. Each sand filter and sludge drying bed is 14.5 ft × 23 ft with 4-ft-deep concrete walls. They are constructed of a concrete frame with a layer of drain tiles, roofing paper, compacted earth, crushed rock, pea gravel, and finally sand. When treatment operations stopped, the beds were backfilled with clean sand. The beds connect to a main sanitary sewer manhole.

6.1.20 Building 21-257 History and Configuration

Building 21-257 is the TA-21 Radioactive Liquid Waste Disposal Facility. Construction of the facility finished in 1967. Building 21-257 supported the disposal of liquid waste from plutonium processing at DP West from 1967 to 1977, uranium processing and recovery at DP West from 1950 to 1984, initiator research and development at DP East from 1945 to 1955, and nuclear material stockpile issues from 1945 to 1977. This building also supported the nonnuclear weapons research conducted at TA-21 from 1945 to 1990, which includes americium-241 research, plutonium-238/239 fuels for space heat sources, and high-temperature research for Project Rover.

Building 21-257 contains raw waste storage areas, sludge storage, settling tanks, batch waste storage pumping stations, a flocculator, and a filter sump. The building also contains a stock room, a processing area, pits, lockers, and a custodial closet. There are four acid storage tanks related to this facility (21-110, 21-111, 21-112, and 21-113, described earlier in section 6). This facility always served as a contaminated radioactive liquid waste disposal facility.

Building 21-257 is a 4228-ft^2 single-story CMU building with a flat roof. Its foundation, stem walls, and footings are reinforced concrete. Part of the roof is steel and the remainder is built-up. A metal lean-to, with its metal footings attached to a concrete slab, is attached to the west wall of 21-257. The lean-to housed tanks. In 1969, the jib crane located on the south end of 21-257 was removed so that the west and south walls of the south elevation could be extended outward, making them flush with the east end of the building. Minor window and door modifications were made in 1977. The containment reservoirs and tanks were replaced in 1978. A vacuum filter was installed in 1981.

ACM is contained in the built-up section of the roof and may be contained in fittings and pipe insulation. The contamination history for building 21-257 includes plutonium, uranium, americium, and possibly tritium.

6.1.21 Structure 21-258 History and Configuration

Structure 21-258 (formerly TA-21-258) is an elevated water reservoir (West Water Tower). The reservoir was manufactured in 1941 but was not assembled in Los Alamos until 1948. Originally, it was located at TA-21-258. It was disassembled and moved to its current location at TA-21 in 1966.

Structure 21-258 is a 100,000-gallon steel tank with a spherical bottom and conical removable cover that is elevated 150 ft above the ground surface and sits on one center column leg (stand pipe) and four support legs. The structure footprint is 709 ft^2. The reservoir's legs and center column are mounted on individual concrete slabs. The reservoir is constructed of steel-riveted plates. The conical top is equipped with a lifting bar. There is a flashing beacon located on the top of the steel tank, and aeronautical lights are located halfway to the top of the tank on three of the support legs. The lights are on lanyards that can be lowered to the ground for maintenance. An access ladder is located on the southwest support leg. The steel tank contains an altitude valve and floor drain. All motor breakers, switches, and other electrical equipment are bonded to the building grounding system.

6.1.22 Building 21-259 History and Configuration

Building 21-259 is the pump house for structure 21-258. The 148-ft^2 concrete structure contained piping for 21-258.

6.1.23 Building 21-286 History and Configuration

Building 21-286 is the Hot Storage Replacement Warehouse. The building was constructed in 1968 and abandoned before 1999. It was used as a security vault-style warehouse to store plutonium that was manufactured in DP West facilities. Some areas of the warehouse were also used for equipment and material storage. The building is empty; however, some of the original shelving and vault doors still exist inside the building. The inside of the building was divided into six separate storage areas, with the northwestern corner being designated as the "contaminated storage room."

Building 21-286 is a 4087-ft^2 pre-engineered, rigid steel-frame building, with a pitched galvanized steel roof with galvanized flashing and a concrete masonry addition on the west side. The building sits on a concrete slab, with concrete piers and footings. Roof canopies cover docks on the east and west sides of the building. Exterior walls are steel siding and galvanized wainscoting. Interior walls are blanket insulation covered with gypsum board. A 300-ft^2 addition, which became the air lock for rooms 1 and 5, was added in 1973 on the concrete dock, under the roof canopy. The entrance to the air lock is a set of hollow-metal double pedestrian doors on the south elevation of the addition. In 1973, a series of chain link fence walls inside the building were made into solid permanent walls constructed of metal studs, blanket insulation, and gypsum board. Several other mechanical and fire protection systems were upgraded in 1973.

ACM may be contained in the fittings. Contamination history at building 21-286 includes plutonium, uranium, and americium.

6.1.24 Structure 21-323 History and Configuration

Structure 21-323 is an exhaust stack connected to the midsection of the east side of building 21-152. The exhaust stack releases treated filtered air from building 21-152 into the environment. The stack is 50 ft tall and ranges between 36 in. and 54 in. in diameter. It is mounted on a reinforced concrete pad and is connected to building 21-152 by ductwork.

6.1.25 Building 21-334 History and Configuration

Building 21-334 is a 36-ft^2 corrugated steel utility shed on a concrete slab. The construction date of this building is unknown. The building is located below the elevated west water reservoir (structure 21-258).

6.1.26 Structure 21-335 History and Configuration

Structure 21-335 is a 6000-gallon containment vessel that was designed to receive liquids discharged from the vault building (building 21-21), in the event of an emergency release. Structure 21-335 is made of light-gauge steel and is approximately 9 ft in diameter × 16 ft long. It is mounted on a steel cradle that suspends the vessel above a concrete pad.

6.1.27 Structure 21-342 History and Configuration

Structure 21-342 is an elevated water reservoir (East Water Tower) located on the center east side of TA-21. The water reservoir was constructed in 1975 by the manufacturer but was not assembled at the Laboratory until 1976.

Structure 21-342 is a 100,000-gallon steel tank with a spherical bottom and spherical removable top that is elevated 170 ft above the ground surface and sits on one center column leg (stand pipe) and four support legs. The reservoir's legs and center column are mounted on individual concrete slabs. The reservoir is constructed of steel-riveted plates. The conical top is equipped with a lifting bar. There is a flashing beacon located on the top of the structure, and aeronautical lights are located halfway to the top of the tank on three of the support legs. The lights are lanyard-type and can be lowered to the ground for maintenance and bulb changes. There is an access ladder located on the northeast support leg. The steel tank contains an altitude valve and floor drain. All motor breakers, switches, and other electrical equipment are bonded to the building grounding system.

6.1.28 Structure 21-346 History and Configuration

Structure 21-346 is a set of two 3000-gallon stainless-steel acid-pumping station tanks connected to acid sump 21-223. Each tank is approximately 9 ft in diameter and 9 ft high. Both tanks are mounted on steel legs above the surface of an asphalt-lined beam in which they are situated. The tanks were sited at their current location in 1979. Approximately 100 ft of buried piping connects 21-346 to 21-223.

6.1.29 Building 21-370 History and Configuration

Building 21-370 is a mechanical equipment support building for building 21-152. 21-370 was built in 1985 and houses an evaporative cooler, heat exchanger, and air-filter system that provide heating and cooling to 21-152. The 557-ft^2 building is constructed of stucco CMU and is located on at the northeast corner of 21-152. Building 21-370 was demolished in September, 2009.

6.1.30 Building 21-387 History and Configuration

Building 21-387 is a prefabricated metal storage shed with a gambrel roof that was used for equipment storage at the sewage treatment plant (building 21-227). The shed is approximately 64 ft^2.

6.1.31 Structure 21-388 History and Configuration

Structure 21-388 is an approximately 25-ft^2 X 98-feet high exhaust stack previously connected to the northeast side of building 21-155. The stack was removed and January, 2010.

6.1.32 Structure 21-420 History and Configuration

Structure 21-420 is a cooling tower located on the northwest corner between buildings 21-155 and 21-220. The cooling tower and separator at structure 21-420 discharged blow-down/flush water to the radioactive liquid waste collection system at a rate of approximately 2.8 L/min. Neither of the waste streams contacted radiological material so it was rerouted to the sanitary waste line. The final project included routing of the blow-down/flush water and the cooling tower overflow to permitted National Pollutant Discharge Elimination System (NPDES) Outfall 03A158. The connections were intercepted in the equipment room at building 21-155, room 5513, and were piped through building 21-155 and building 21-152 to a floor drain in building 21-209, room 166, which was connected to the NPDES Outfall. Installation included a 320-ft run of 1-in. copper pipe with appropriate supports, isolation valves, check valves, and three 2-in. wall penetrations. To avoid any large buildup of solids, the filter flush line was equipped with an automatic valve to allow daily flushing of the filter. This outfall was removed from the NPDES permit in 2007. Building 21-420 was demolished in January 2010.

6.1.33 Structure 21-462 History and Configuration

Structure 21-462 is a factory-built transportainer. This transportainer is constructed of heavy-duty steel. Structure 21-462 measures 8 ft × 40 ft, sits on wood beams, and is located northeast of building 21-31.

6.1.34 Structure 21-466 History and Configuration

Structure 21-466 is an exhaust stack (the TSFF Stack) for building 21-209. The exhaust stack is 50 ft tall and ranges between 36 in. and 54 in. in diameter. It sits on a 10-ft × 10-ft reinforced concrete pad and is connected to building 21-209 by ductwork. The stack releases treated filtered air.

6.2 DP East/Balance of Plant Buildings Current Status

Table 6.2-1 describes the current condition of TA-21 DP East/BOP structures and estimated square footage of floor space through all levels. Buildings that have not been occupied for long periods of time are suffering from more physical deterioration. All buildings are currently under surveillance and maintenance by the laboratory.

A comprehensive utility verification program at TA-21 was completed in 2006 and summarized in MOTA (2006). This package of material included updated utility maps, based on current site drawings and field verification of select systems, source Laboratory utility maps, a total drawing database, and background reports.

6.3 DP East/BOP Remaining Systems and Equipment in Place

Table 6.3-1 shows the current condition of TA-21 DP East/BOP structures. Table 6.3-2 presents an approximate listing of larger system and equipment features by structure. Lines, pipes, and conduits connecting components of these systems may still present. Table 6.3-3 presents an approximate listing of larger system and equipment features in the TSTA facility and its support structures.

Table 6.3-1
Current Condition of TA-21 DP East/BOP Structures

Structure	Use Definition	Floor Area (ft^2)	Current Condition
21-21	Support	4287	Slab only
21-42	Support	65	Pump House
21-57	Support	81	50,500-gallon diesel tank
21-110	Support	450	13,000-gallon acid-holding tank
21-111	Support	450	13,000-gallon acid-holding tank
21-112	Support	450	12,800-gallon acid-holding tank
21-113	Support	450	12,800-gallon acid-holding tank
21-152	Process/lab	13,745	Beginning hazardous material abatement
21-155 (TSTA)	Process/lab	15,924	Demolished
21-160	Support	263	Significant deterioration. About 30% of roof remains.
21-166	Support	1102	Slab only
21-167	Support	1102	Slab only
21-188	Support	TBD	TBD
21-209	Administration	33,429	Currently being gutted.
21-212	Process	553	Calcium Building
21-213	Warehouse	1723	Currently being gutted.
21-220	Support	288	Demolished
21-223	Support	48	TBD
21-227	Support	600	Sewage Treatment Plant (STP)
21-228	Support	6670	Slab only
21-229	Support	215	STP
21-230	Support	1334	STP, 4 sludge drying beds

Table 6.3-1 (continued)

Structure	Use Definition	Floor Area (ft^2)	Current Condition
21-257	Support	4228	RLW, in standby
21-258	Support	709	West water tower
21-259	Support	148	TBD
21-286	Support	4087	Warehouse, in use
21-323	Support	150	Exhaust Stack between 152 & 209, removed.
21-334	Support	36	Utility Shed south of West Water Tower
21-335	Support	160	6000-gallon containment vessel
21-342	Support	601	East Water tower
21-346	Support	1079	Two 3000-gallon acid tanks
21-370	Support	557	Mechanical equipment building NE of 152
21-387	Support	64	STP
21-388	Support	200	Exhaust Stack NW of 155, removed.
21-420	Support	6	Cooling Tower, removed.
21-462	Support	320	Transportainer NE of 31

21-466	Support	100	TBD

* To be determined.

Table 6.3-2
Remaining DP East/BOP Building Equipment and Systems in Place

Structure	Ventilation Systems	Fume Hoods and Dry Boxes	Electrical Equipment and Switchgear	Pumps and Miscellaneous	Piping
21-21	n/a*	n/a	n/a	Slab only	n/a
21-42	n/a	n/a	n/a	2 base-mounted fuel oil pumps approx. 2 ft × 2 ft × 3 ft	Approx. 168 LF between 21–57 and tank and around perimeter. Capped at fenceline. Two lines.
21-57	n/a	n/a	n/a	1 diesel tank 50,500 gallon	n/a
21-110/111	n/a	n/a	n/a	2 radioactive liquid waste (RLW) acid tanks 13,000 gallon/ea., 20 ft high	One 3-ft 8-in.-diam. pipe-linking tanks.
21-112/113	n/a	n/a	n/a	2 RLW acid tanks 12,800 gallon/ea, 19.6 in. high × 12-ft diam.	n/a
21-152	Approx. 2677 LF duct	6 hoods	4 motor control centers (MCCs)	1 tank (north outside) 6 benches	Approx. 9050 LF 4-ft diam. pipe
21-160	n/a	n/a	n/a	two 6-ft × 6-ft × 12-in. concrete cradles	n/a

Table 6.3-2 (continued)

Structure	Ventilation Systems	Fume Hoods and Dry Boxes	Electrical Equipment and Switchgear	Pumps and Miscellaneous	Piping
21-188	n/a	n/a	Switchgear Transformer	n/a	n/a
21-209	1 HVAC unit 3 filter plenums 2 fans and housing Approx. 3016 LF duct	10 hoods	2 ctrl. elect. cabinets 1 uninterruptible power supply (UPS) 3 MCCs 1 electrical panel 2 compressor motors 1 high-voltage transformer	4 compressors 3 vac. pumps (2 tanks) 1 tank 8 benches 1 LF glove box on stand 1 manifold system 12 steam valves 1 condensate tank 500 lf cable tray HVAC sheet metal housing	Approx. 35,405 LF × 1.5-in. diam.
21-212	n/a	n/a	n/a	n/a	n/a
21-213	2 roof-mounted units Approx. 54 LF duct	n/a	n/a	n/a	None

Table 6.3-2 (continued)

Structure	Ventilation Systems	Fume Hoods and Dry Boxes	Electrical Equipment and Switchgear	Pumps and Miscellaneous	Piping
21-223	n/a	n/a	n/a	1 shed 6 concrete pit/wall/floors 1 acid sump	n/a
21-227	Note: Duct spreadsheet says this is noted on equip. sheet, but it is not.	n/a	n/a	1 concrete trench 25 ft × 3 ft × 4 ft 1 steel grate 9 ft × 20 ft × 25 ft	200 LF avg. 4-in. diam.
21-228	n/a	n/a	n/a	Slab only	n/a
21-229	n/a	n/a	n/a	n/a	50 LF avg. 4-in. diam.
21-230	n/a	n/a	n/a	Ultraviolet equip. in pit 4 14.5-ft × 23-ft × 4-ft-deep sludge drying beds w/ concrete walls	n/a

Table 6.3-2 (continued)

Structure	Ventilation Systems	Fume Hoods and Dry Boxes	Electrical Equipment and Switchgear	Pumps and Miscellaneous	Piping
21-257	6 exhaust fans 2 supply fans 3 air filters (12 × 15 × 2 in.) 1 air sampler exhaust	2 hoods	n/a	1 gas-fired furnace 1 wet fire sprinkler system 2 hot water boilers 1 backflow preventer 2 air compressors emergency lights 1 monorail crane 1 gas water heater 1 hot water pump 1 safety shower 2 interconnected concrete grit chambers 4 underground concrete influent storage tanks (14,000 gallon ea.) 2 1100-gallon stainless-steel sludge feed tanks 1 5500-gallon concrete sludge storage tank 1 150-gallon steel precoat mixing tank 2 100-gallon tanks (NaOH mixing and Betz polymer mixing) 1 325-gallon steel NaOH neutralization feed tank 4225-gallon in-ground concrete clarifier 16,800 gallon concrete clarifier 5900-gallon in-ground concrete filter sump 5600-ga. In-ground concrete sludge tank 1000-gallon steel NaOH storage tank (outside) 1000-gallon steel acid storage tank Pressure filter two 1X resin columns Rotary vacuum filter	n/a
21-258	n/a	n/a	n/a	n/a	Piping is included in structural removal (total 133 calendar year [CY]).
21-259	n/a	n/a	n/a	Waste total is 5.48 CY.	n/a
21-286	63 LF duct	n/a	n/a	n/a	1914 LF var. diam.

Table 6.3-2 (continued)

Structure	Ventilation Systems	Fume Hoods and Dry Boxes	Electrical Equipment and Switchgear	Pumps and Miscellaneous	Piping
21-323	Ductwork included in 21-152 1 Exhaust stack, 50 ft tall × 36- to 54-in. diam.	n/a	n/a	n/a	n/a
21-334	n/a	n/a	n/a	n/a	n/a
21-335	n/a	n/a	n/a	6000-gallon tank, 9-ft diam × 16 ft long	n/a
21-342	n/a	n/a	n/a	n/a	Piping is included in structural removal (total 224 CY).
21-346	n/a	n/a	n/a	2 3000-gallon stainless-steel holding tanks, 9-ft diam. × 9 ft high 8 skid frame pieces 1 secondary containment	100 LF 4-in. diam.
21-387	n/a	n/a	n/a	trailer	n/a
21-462	n/a	n/a	n/a	transportainer	n/a
21-466	n/a	n/a	n/a	4 gas bottle manifolds 4 concrete posts	n/a

*n/a = Not applicable.

6.4 DP East/BOP Contamination Levels and Conditions

6.4.1 DP East/BOP Radiological Contamination Levels

(TBD Pending Characterization Activities)

6.4.2 DP East/BOP Gamma Exposure and Neutron Dose Rates

(TBD Pending Characterization Activities)

6.4.3 DP East/BOP Recent Radiological Survey and Sampling Data

(TBD Pending Characterization Activities)

6.4.4 DP East/BOP Asbestos

Laboratory health and safety organizations have compiled an inventory of ACM for the Laboratory. ACM may be encountered in any of the TA-21 structures. TA-21 inventories are developed by building based on inspections performed in March 1996, May 1999, July 2001, November–December 2002, and January 2003 and incorporated into a database. ACM is classified as surfacing, TSI, miscellaneous friable, and nonfriable ACBM, in accordance with categories defined in 40 CFR 763.88. An ACM inventory by structure is available within the Laboratory Asbestos Inventory Building Manager Report.

6.4.5 DP East/BOP Hazardous Chemicals

(TBD Pending Characterization Activities)

6.4.6 DP East/BOP Beryllium

(TBD Pending Characterization Activities)

6.4.7 DP East/BOP Lead Paint

(TBD Pending Characterization Activities)

6.5 DP East/BOP Utilities and Services

6.5.1 Electrical System

An upgrade of the TA-21 electrical system began in 1969 and was completed in the early 1970s. The electrical system at TA-21 had two feeders: one from the TA-03 power plant (preferred) and the other from the Eastern Technical Area substation, which is equipped with automatic transfer capability.

A substation served each of the remaining TA-21 buildings. A 13.2-kV loop with manual transfer capacity feeds the primary (13.2-kV) side of each substation. The secondary side (480 V) can also be manually transferred to provide backup power. If a backup feeder is used, it is always on the secondary side. Bus ducts primarily serve panel boards, with a bus duct serving the northern and another serving the southern half of each building. MOTA (2006) contains drawings illustrating the former electrical service routing at DP East and the BOP structures. The electrical system to these structures has been air-gapped at the 13.2-kV power poles.

6.5.2 Compressed Air Lines

The compressed air line system in the DP East buildings has been vented and deactivated.

6.5.3 Steam Distribution System

MOTA (2006) contains drawings illustrating the former steam service distribution at DP East and the BOP structures. The TA-21 Steam Plant has been shut down and steam service to DP East/BOP buildings has been terminated.

6.5.4 Water System

Water from Los Alamos County was supplied to TA-21 through two elevated towers protected by an air gap. Water was then supplied to all buildings at the site through an 8-in. loop. The water towers were isolated in 2007. At each building, the supply was diverted into two separate systems, potable and nonpotable, which were protected from each other by backflow prevention devices.

The only active water supply at TA-21 is to the outer fire hydrate loops around DP West, DP East, and the central corridor buildings. MOTA (2006) contains drawings illustrating the water distribution system at DP East and BOP structures.

6.5.5 Sanitary Waste Disposal

The sanitary waste disposal system in the DP East buildings has been deactivated.

6.5.6 Radioactive Liquid Waste Treatment

Liquid waste generated during the research and processing, including discard solutions and waste released into stainless-steel sinks, was discharged through a 1.5-in. stainless-steel process waste line and routed to 21-257. Other liquid waste, including waste from fountains, mop and lavatory sinks, steam condensate lines, and the vacuum transfer steam jets, was discharged to a 4-in. cast-iron industrial waste line and routed to the waste treatment facility at 21-227.

MOTA (2006) contains drawings illustrating the waste lines at DP East and BOP.

6.5.7 Fire Protection Systems

Combustible loadings in DP East/BOP Buildings have been reduced to negligible levels and the fire protection system has been drained and deactivated.

6.5.8 Chilled Water System

The Chill Waster System in the DP East buildings has been drained and deactivated.

6.5.9 Underground Utilities

Other underground systems present at DP East and BOP include communications, natural gas, and storm drains. Except for the storm drains and the natural gas line running from DP Canyon to TA-21-257, all of these systems have been deactivated. MOTA (2006) contains drawings illustrating the communications, natural gas, and storm drain routing at DP East and BOP.

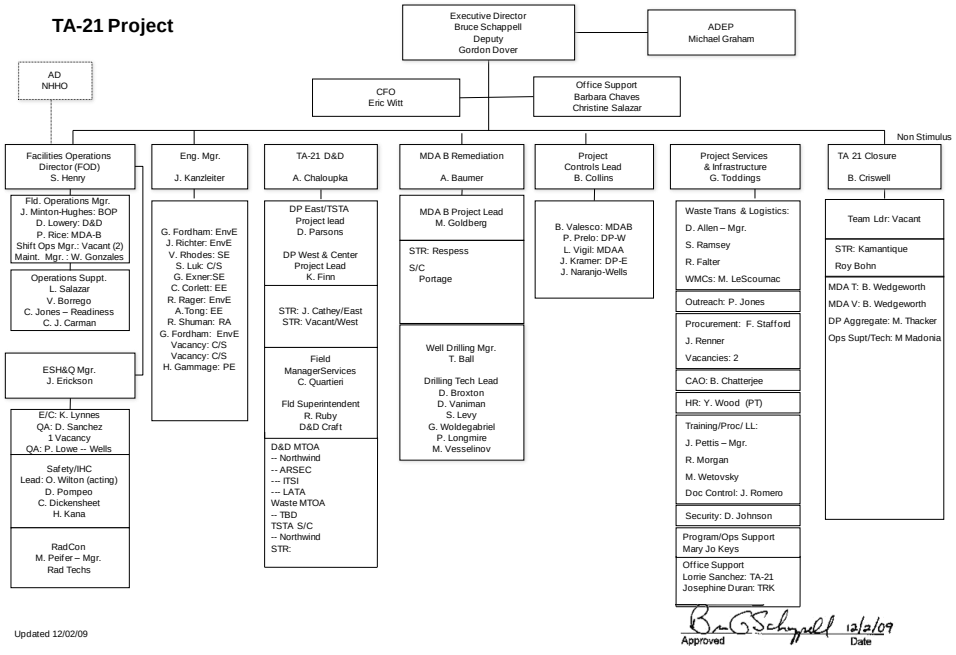
7.0 PROJECT ORGANIZATION, NOTIFICATION, AND AUTHORIZATION REQUIREMENTS

7.1 D&D Execution Team

The following D&D Execution Team is anticipated for the TA-21 D&D project. These resources would mainly come from within the Los Alamos National Security (LANS) team (Project Management and Site Services Division, EP Division, etc.). Positions that could not be filled from within, either because of manpower shortages or lack of expertise will be obtained from LANS parent company reach-back sources or staff augmentation sources. Figure 7.1-1 illustrates the proposed project organization.

Formatted: Font: Bold

Figure 7.1-1 Proposed TA-21 D&D project organization



7.2 Key DOE and Laboratory D&D Staff and Responsibilities

LASO Federal Program Director shall interact with the Laboratory, DOE-Los Alamos Site Office (LASO) and Headquarters Offices, and other stakeholders to ensure the project is adequately funded and executed.

LASO TA-21 Site Representative shall oversee the project for LASO, ensuring that the work is executed safely, compliantly, within budget and schedule, and within appropriate DOE requirements.

TA-21 D&D Project Program Director shall interact with the Laboratory senior management and LASO personnel to ensure the project is adequately funded and executed. Shall ensure the D&D project Execution Team has the necessary resources and management support to execute the work.

TA-21 D&D Project Manager shall interact with the Laboratory and DOE key personnel ensure adherence to all project plans and specifications, execute project management tracking systems, and procure and ensure subcontractor performance.

Site Manager shall coordinate and manage all field operations, labor personnel, and subcontractors; update the subcontractor technical representative regarding schedule and safety performance; and interact with the Laboratory or DOE personnel who are observing, inspecting, or auditing fieldwork. Shall be responsible for determining the need for work shutdown, based on input from other project specialists and key personnel and implementing corrective actions regarding technical approach, quality, and health and safety.

Site Health and Safety Supervisor shall oversee implementation of site-specific health and safety plan and other applicable safety requirements, worker-training programs, execution and revision of work and safety-related procedures; oversee operation of all D&D activities, perform incident/accident tracking, reporting, and corrective action.

Radiological Protection Supervisor shall oversee implementation of the radiological protection program and other applicable radiological requirements, execution of radiological work and procedures, oversight of radiological operations of all D&D activities, supervision of radiation control technicians (RCTs), radiological characterization programs, and exposure and bioassay tracking.

Waste Management Coordinator shall oversee the implementation of the waste management plan, preparation of waste-related documentation, waste processing and packaging, on-site transfer and off-site shipping, and condition and maintenance of waste storage areas and equipment.

Project Controls Analyst shall oversee the development of baseline schedules with project resources and budgets, provide status against baseline schedules, and develop monthly reports to monitor the progress of the project.

Environmental Compliance Coordinator shall oversee the development and implementation of the D&D environmental compliance program in compliance with the Resource Conservation and Recovery Act (RCRA) regulations as applicable.

QA/Quality Control (QC) Coordinator shall interact with the Laboratory and DOE key personnel to ensure adherence to all project compliance documents (i.e., the quality management plan, implementing procedures and plans). Responsible for managing the observation and evaluation of field activities through the implementation of an approved assessment, surveillance, and inspection and acceptance testing processes and/or program. Shall be instrumental in determining stop work and restart activities; reporting Price-Anderson Amendments Act noncompliances, deficiencies, and nonconformances; and

taking corrective actions to resolve them. Shall ensure QA/QC field activities are performed in a teaming effort with health and safety.

D&D Field Engineer shall ensure that all D&D processes and actions meet commonly accepted D&D industry practices, comply with the Laboratory engineering requirements, and that required site engineering drawings are updated as necessary.

D&D Foreman shall direct and supervise the D&D workers.

D&D Workers shall execute the D&D work under the direction of the D&D foreman, per the integrated work document(s) (IWDs), radiation work permits (RWPs), and other work documents,

RCTs shall implement the radiological protection program and other applicable radiological requirements during the execution of radiological work.

7.3 Readiness Review

In accordance with LANL P 117.0, Management Self-Assessment (MSA) Process for Startup and Restart Activities, the D&D of TA-21 structures will require a Type 1 MSA. D&D operations may not proceed until the MSA is complete and all prestart findings have been properly closed.

8.0 PLANNING AND EXECUTION

8.1 Planning and Execution Documents

As part of the planning process, the D&D Execution Team shall prepare the following documents subject to review and approval.

1. IWDs shall include engineering survey of structure, shoring and bracing requirements for selected demolition techniques, management of utility connections, temporary relocation of utilities, and elimination of hazardous materials from demolition zones, and equipment and processes to be used.
2. WCSFs and waste profile forms (WPFs) shall identify volume, type and/or classification of waste to be generated; methods, materials, and equipment to characterize, process, and package waste; storage areas at TA-21; disposal sites; and all necessary reporting forms and procedures. If waste is disposed of at the NTS disposal facility, additional NTS-specific requirements will apply, such as NTS-qualified waste inspections and NTS WPFs.
3. RWPs shall identify key personnel and qualifications, project-specific procedures; equipment systems and calibration, dose monitoring, work area controls, radiation work permit processes, and reporting requirements consistent with 10 CFR 835 and the Laboratory radiological protection plan.

The D&D Execution Team also shall prepare necessary permits relating to field operations, including but not limited to, utility penetrations, excavations, fire, electrical safety, security, and communications. All permits shall be approved and open issues identified by the Laboratory permits and requirements identification process resolved in preparation for readiness review. Upon completion of readiness review process and approval, the D&D Execution Team shall be authorized to execute mobilization activities.

8.2 D&D Execution Activities

The D&D execution period shall include mobilization, hazardous materials abatement, equipment and systems removal, structural demolition, building footprint surveys and sampling, site restoration, and waste management. Some activities may be subcontracted if the D&D Execution Team determines this

provides the best value. For example, asbestos abatement and waste transportation services may be best suited as subcontracted activities.

8.2.1 Mobilization and Site Preparation

The D&D Execution Team will mobilize personnel, equipment, materials, and supplies necessary to execute the project. All workers shall be trained in accordance with job responsibilities, QAPP requirements, and applicable regulations and requirements. As necessary, the site will be paved, graded, and prepared to allow staging and access of heavy equipment, waste containers, and decontamination areas. Site trailers and support facilities will be installed within the execution team control zone, while the demolition zone boundary shall be fenced and controlled by the D&D Execution Team.

Additional site preparation activities will include installation of temporary utilities, verification of isolation and deactivation of site utilities, testing of fire protection hydrant system, survey and marking of SWMU boundaries, installation of air-monitoring stations, setup of communications systems, and execution of a pre-D&D site condition assessment. The following major equipment and supplies are anticipated:

- large, track-mounted excavators, with various attachments (grapples, shears, crushers, pulverizers, hammers, buckets, etc.)
- large front-end loaders
- skid steers
- scissor lifts
- fork lifts
- cranes
- paint/fixative sprayers
- foggers (optional depending on Radiation Protection Group [RP]-1)
- personnel contamination monitors
- double-wide trailers for offices and meeting rooms
- single-wide trailer for a changing room and RCT count room

8.2.2 Hazardous Materials Abatement

Hazardous materials abatement shall be executed before construction-related D&D operations and include asbestos abatement; universal waste removal of PCB light ballasts, fluorescent bulbs, and mercury switches and thermostats; lead and lead paint abatement as necessary; removal of PCB wastes, including transformer and other electrical system components and air conditioning systems containing coolant or other hazardous substances; removal of filter media from ventilation systems; point or volume sources of radioactive material increasing gamma and/or neutron external doses; and areas of elevated surface radiological contamination on building surfaces.

Embedded systems, such as drain lines known to contain hazardous materials, will be secured so that no transfer of contaminants will occur until that system is specifically scheduled for removal. All materials removed will be packaged and disposed of in accordance with associated regulatory waste classification.

8.2.3 Removal of Remaining Process Equipment and Systems

After abatement and before structural demolition, remaining process-contaminated building equipment and systems will be removed. These systems include, but are not limited to, HVAC components, such as

ducting, chases, intakes, blowers, bag houses, and exhaust stacks; process ventilation system components; glove boxes, fume hoods, and process piping systems. Some of these systems may be embedded within building materials, walls, and floors and may have to be decontaminated/stabilized and left in place during demolition. Systems will be decontaminated/stabilized before removal to limit the potential for inadvertent release of contamination.

Other utility equipment and systems that have a low potential for contamination may be subject to release as industrial waste dependent on characterization or left in place during building demolition and disposed with the building debris. These systems include, but are not limited to, steam lines and distribution components, compressed air lines, and potable water systems.

8.2.4 Structural Demolition

Structural demolition shall be executed following abatement of hazardous materials and removal of process contaminated equipment and systems. Demolition shall proceed in a systematic manner, from the top of the structure to the ground or main floor. Demolition work above each tier or floor shall be completed before the supporting members on the lower level are disturbed. Slabs, foundations, basements, and footing associated with a structure will be demolished and removed when all above-grade portions of the building have been removed from the work area. Slabs may be saw-cut or broken in place and then removed. Basements and subsurface features will be isolated and removed through section removal or demolition. Where necessary, safety controls for below-grade work will be implemented. Resulting building wastes will be segregated as necessary, characterized and packaged for off-site disposal in accordance with appropriate waste classification and the receiving site's waste acceptance criteria. Structural steel that has never been in a radiologically controlled area may be recycled.

If sub-slab structures can be shown to not exceed Section 9.2 of LANL Procedure P121, Radiation Protection, or DOE Authorized Release Limit values for surface contamination and we can demonstrate no contamination on the soil facing walls and floors, then the project will free-release those items.

8.2.5 Building Footprint Surveys and Sampling

After all building components and highly contaminated footprint soils have been removed, a grid system will be established on exposed ground surfaces associated with the building footprint(s). Exposed ground surface shall be subject to gamma and neutron dose surveys, and systematic sampling of soils within the 0–6-in/layer, and deeper, will be conducted by another contractor. All work will be performed in accordance with the appropriate work controls as derived from the ISM and IWD processes.

8.2.6 Site Restoration

Site restoration shall include the removal of temporary utilities used for D&D operational support, capping or air gapping of connections to the utility systems, backfilling of open excavations and low areas to match the site contour, and seeding and re-vegetation to prevent erosion.

8.2.7 Waste Management

The dominant waste stream to be generated from D&D operations is solid LLW and Industrial Waste, consisting of building materials, concrete, plaster and wall board, wood, asphalt roofing, soil, and steel. Minor quantities of HW, MLLW, HW/Toxic Substances Control Act (TSCA) and TRU wastes are anticipated and will be managed in accordance with the Laboratory RCRA permit where applicable. Very little liquid waste is anticipated; exceptions include small amounts of water encountered in liquid-bearing systems that have not been completely flushed, decontamination water, and site run-on due to

precipitation events. Liquid LLW will be transported to the TA-50 Radioactive Liquid Waste Treatment Facility for treatment.

Demolition and waste processing techniques will be performed to reduce the amount of LLW generated using processes, including, but not limited to, segregation, compaction, blending, and decontamination. As possible, building areas demonstrated to exhibit surface radiological contamination below acceptable 10 CFR 835 release limits and having no evidence of volumetric contamination of building materials will be considered for IW release. Waste will be stored, prepared, and packaged at the TA-21 site before off-site transport to the selected treatment and/or disposal facility.

Table 8.2-7 presents the estimated primary solid waste types and quantities by structure, and the anticipated disposal path/site. Quantities have been estimated based on engineering drawings and takeoffs, historical usage of area, characterization data from Blackwell (LANL 1981, 106102; Blackwell 1980 090516; Blackwell 1980, 090518; Blackwell 1980, 036476) and the DP West characterization report (LANL 2006, 094351) and engineering judgment of Laboratory cost estimating personnel. Table 8.2.7-1 presents the estimated volume of waste in an “in-place” condition, as well as in a “bulked” or packaged condition. Large bulking factors would be noted with materials that are very dense within a package and do not take up the entire charged disposal volume, or materials that when demolished or processed take up more than 110% of their in-place volume.

Table 8.2-7
DP West Estimated Quantities Primary Solid Waste Streams from D&D

Structure Descriptions	Low-Level RAD (CY) (yd^3)	Mixed-Low Level (CY) (yd^3)	Industrial Waste (CY) (yd^3)	Solid HAZ/TSCA (CY) (yd^3)
DP West Facility Bldg 2 & LS* (80, 458, 81)	2456.4	1.2	117.7	0.0
DP West Facility Bldg 312	481.8	0.0	9.2	0.0
DP West Facility Bldg 210 & LS (328)	3.3	0.4	1837.7	227.9
DP West Facility Bldg 149	850.7	0.1	18.5	0.0
DP West Facility Bldg 315 & LS (116, 144)	1563.1	0.1	35.7	0.0
DP West Facility Bldg 5 & LS (88, 89)	3042.5	9.5	154.7	0.0
DP West Facility Bldg 150	3029.0	17.6	84.4	0.0
DP West Facility Bldg 313 & Remaining 3	1550.9	7.7	38.7	0.0

Table 8.2.7-1 (continued)

Structure Descriptions	Low-Level RAD (CY) (yd^3)	Mixed-Low Level (CY) (yd^3)	Industrial Waste (CY) (yd^3)	Solid HAZ/TSCA (CY) (yd^3)
DP West Facility Bldg 314 & Remaining 4	1569.0	0.2	38.6	0.0
DP West Facility External Equipment	6.6		451.6	31.6
DP West Totals	14,553.2	36.8	2786.7	259.5
DP East BOP Group 1 (209, 466)	6149.9	0.1	217.3	20.5
DP East BOP Group 2 (152, 370, 166, 167, and 323)	4618.7	0.1	141.1	17.6
DP East BOP Group 3 (257, 110, 111, 112,	2708.2	70.5	30.8	2.7

and 113)				
DP East BOP Group 4 (357, 57, and 42)	1546.7	0.0	38.0	1.4
DP East BOP Group 5 (213, 160, and 346)	384.6	0.0	11.5	0.0
DP East BOP Group 6 (258 and 342)	6.3	0.0	627.6	0.1
DP East BOP Group 7 (230, 227, 229, and 387)	363.1	0.0	7.4	0.2
DP East BOP Group 8 (14, 21, 46, 462, 212, 228, 335, and 286)	1720.6	0.1	66.6	1.3
DP East & BOP Totals	17,498.0	70.9	1140.3	43.8
DP East TSTA Bldg 155	3738.5	0.1	104.1	4.7
DP East TSTA LS Bldg 220 and 388	137.6	0.0	6.7	1.2
DP East TSTA Totals	3876.1	0.1	110.9	5.9
Grand Totals	**35,927.4**	**107.7**	**4037.8**	**309.2**

* LS = Lesser structures

Multiple waste profiles will be prepared based on characterization data from the Laboratory (LANL 1981, 106102) and Blackwell (Blackwell 1980, 036476; Blackwell 1980, 090516; Blackwell 1980, 090518) and the DP West characterization report (LANL 2006 094351) and process knowledge. In-process waste characterization samples will be collected during D&D operations to demonstrate consistency with waste profiles and waste acceptance criteria (WAC) for the receiving treatment, storage, and disposal (TSD) facility. Projected receiving TSD facilities include the following:

- Waste Isolation Pilot Project (WIPP): TRU in soils and debris
- Nevada Test Site (NTS): LLW soils, LLW debris, MLLW soils, MLLW debris
- Clive, Utah (Energy Solutions, Inc. (formerly Envirocare of Utah)): LLW soils, LLW debris, MLLW soils, MLLW debris
- Los Alamos National Laboratory TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF): LLW liquids associated with decontamination
- Deer Trail , CO (Clean Harbors), Industrial soil and debris)
- Los Alamos County Landfill: Free Release soil and debris.

The TA-54 Area G LLW disposal facility is not currently planned as a receiving facility for the TA-21 D&D LLW. Small quantities of HW will be managed in accordance with the Laboratory RCRA Permit and treatment and disposal facilities will be determined on a case-by-case basis.

8.3 Closeout Reporting

Closeout reporting shall be initiated by the D&D Execution Team upon completion of field activities, and acceptance of completion by the Laboratory. Reports shall include a Lessons Learned Report and D&D Closeout Report.

8.3.1 Lessons Learned Report

The Lessons Learned Report shall include sections assessing the adequacy of abatement and decontamination, demolition techniques, waste management program (including transportation), health and safety program, and QA/QC program. Health and safety program lessons learned shall include, at a minimum, summaries of occupational “near miss” and lost-time worker-related accidents, root cause analyses, and corrective actions implemented. A summary of chemical and radiological exposures to

workers shall be incorporated describing radiological doses from external and internal exposures, exposures to chemicals for any periods exceeding the time-weighted average threshold-limit values.

Investigation/excavation lessons learned should describe, at a minimum, the nature and distribution of subsurface material encountered, optimal heavy equipment application techniques, and condition of subsurface containers encountered. The Execution Team must produce a table that lists special situation shutdown periods by the date and the reason for shutdown and measures taken to restart the project.

Waste management lessons learned should describe, at a minimum, the range of actions required to process various waste streams and efficiently execute continuous investigation/excavation, common problems regarding handling and assay of wastes, solutions applied, and problems and solutions related to packaging and transportation.

QA/QC program lessons shall include, at a minimum, adequacy of operating procedures and policies, recommended corrective measures, compliance with training requirements, and consistency with the DOE lessons learned standard.

8.3.2 D&D Closeout Report

A D&D Closeout Report shall be prepared at the completion of D&D activities. The report shall consist of a description of the work that was completed, including the following:

- a brief history of the facilities and site
- a description of facility conditions at the start of D&D
- a discussion of D&D activities performed
- a discussion on any deviations from planned activities
- a description of the final site conditions at end of D&D—the final conditions assessment shall include site drawings illustrating removed structures, remaining structures, site contours and elevations, and digital and print copy photographs of the site
- final sampling and analysis reports, including final surface soil radiological conditions as applicable
- a description of the remediation and process wastes produced, including disposal sites utilized, waste types, volumes and weights—waste types should include solid, hazardous, TSCA, asbestos, LLW, LLMW, recycled material, and property disposition, as applicable
- a discussion on environmental releases, if any
- a discussion on the radiological, health, and safety record
- final engineering drawings showing the structures removed and showing the structural elements remaining in place, e.g., foundations, and final utility configurations
- a discussion on the status of any environmental permits (RCRA permits, etc.)
- a cost and schedule summary report, including variances, dates, and durations

9.0 RELEASE AND REUSE OF MATERIALS

9.1 Assumptions Relating to Initial Conditions

During D&D operations, work areas are required to be posted as Radiological Control Areas (RCAs) per 10 CFR 835. Volumetric contamination of building materials is expected in areas where there are

embedded systems that have contained radioactive materials and porous materials that have been exposed to repeated liquid or airborne immersion associated with process releases and spills. The Laboratory uses as a base assumption that the majority of bulk-building materials at TA-21 cannot be decontaminated cost-effectively in a manner to exhibit no radiological content above background as required by the LANL interpretation of the DOE "No-Rad Added" policy. Administrative areas, such as building 21-210 and some utility and electrical service panel rooms, are exceptions to this assumption, given historical usage.

This base assumption results in large percentages of LLW estimated for disposal that contains relatively low concentrations of radionuclides, frequently below the industrial radionuclide SALs used for determining the need for further corrective measures at SWMUs regulated by NMED. The Laboratory will actively seek alternate disposal options for "low activity" or "slightly above-background" bulk waste generated during D&D operations. The Laboratory also seeks the option to return low activity bulk material to the site for backfill of basement excavations and utility tunnels as described in section 9.3 below.

9.2 Surface Radiological Contamination Levels

Materials that can be shown to have negligible radionuclide infiltration into the solid matrix may be released in accordance with surface contamination levels specified in 10 CFR 835, Appendix D, and LANL P-121, "Radiation Protection."

9.3 Reuse of Bulk Material with Above-Background Concentrations

Bulk material for reuse is defined as soils and soil-like material, such as tuff and overburden, and crushed concrete of aggregate size ranging from 1 to 6 in. Bulk material may be stockpiled for potential on-site reuse, given that representative sampling in accordance with indicates radionuclide concentrations do not exceed the industrial radionuclide SALs, and chemical concentrations do not exceed the industrial NMED soil screening levels. In the presence of multiple contaminants, a sum of the fractions calculation approach shall be applied. Acceptable reuse options include:

- backfill of TA-21 excavations associated with building basement and subsurface feature removals,
- stockpile and use for interstitial layers associated with engineered caps mandated for SWMUs as regulated by NMED, and
- fill and stabilizing material for future disposal cells at TA-54, Area G.

Reuse material shall only be used in areas that are designated for industrial use or DOE institutional control.

10.0 BASELINE COST, SCHEDULE, AND PROCUREMENT

10.1 Cost Profile and Funding Status

TA-21 D&D activities as listed in Section 2.0, DP West, DP East and TSTA, is primarily through ARRA funding. This funding is segregated by DOE NNSA to occur through project breakdown structure (PBS) 0040D (DP West and East) and 0040N (TSTA). All planning work to date has been performed in conjunction with DOE Environmental Management–funded environmental restoration activities in PBS 0030. The estimated total project cost, exclusive of management reserve, is approximately $125 million. It is anticipated that many cost elements related to labor, equipment, and transportation/disposal require revision before final project budgeting. Revision and further schedule refinement are dependent on the receipt of PBS funding.

The total project duration is currently estimated at 24-months, assuming availability of a D&D subcontractor to initialize field activities at the beginning of fiscal year 2010. The attached schedule, Figure 10.1-1, illustrates key project activities, with a notice to proceed date of October 1, 2009 and complete by October 01, 2011.

10.2 Procurement Strategy

Original project planning was centered on the procurement of a subcontractor to perform most D&D planning, execution, and waste management activities by issuing a Master Task Order (MTOA) for D&D and a separate MTOA for Waste Transportation and Management in conjunction with contracting-out the D&D activities, LANL will also self-perform activities such as the demolition of TA-21-210 and TA-21-209. The Balance Of Plant (BOP) work will be executed as funds become available and will fall under 0040D PBS.

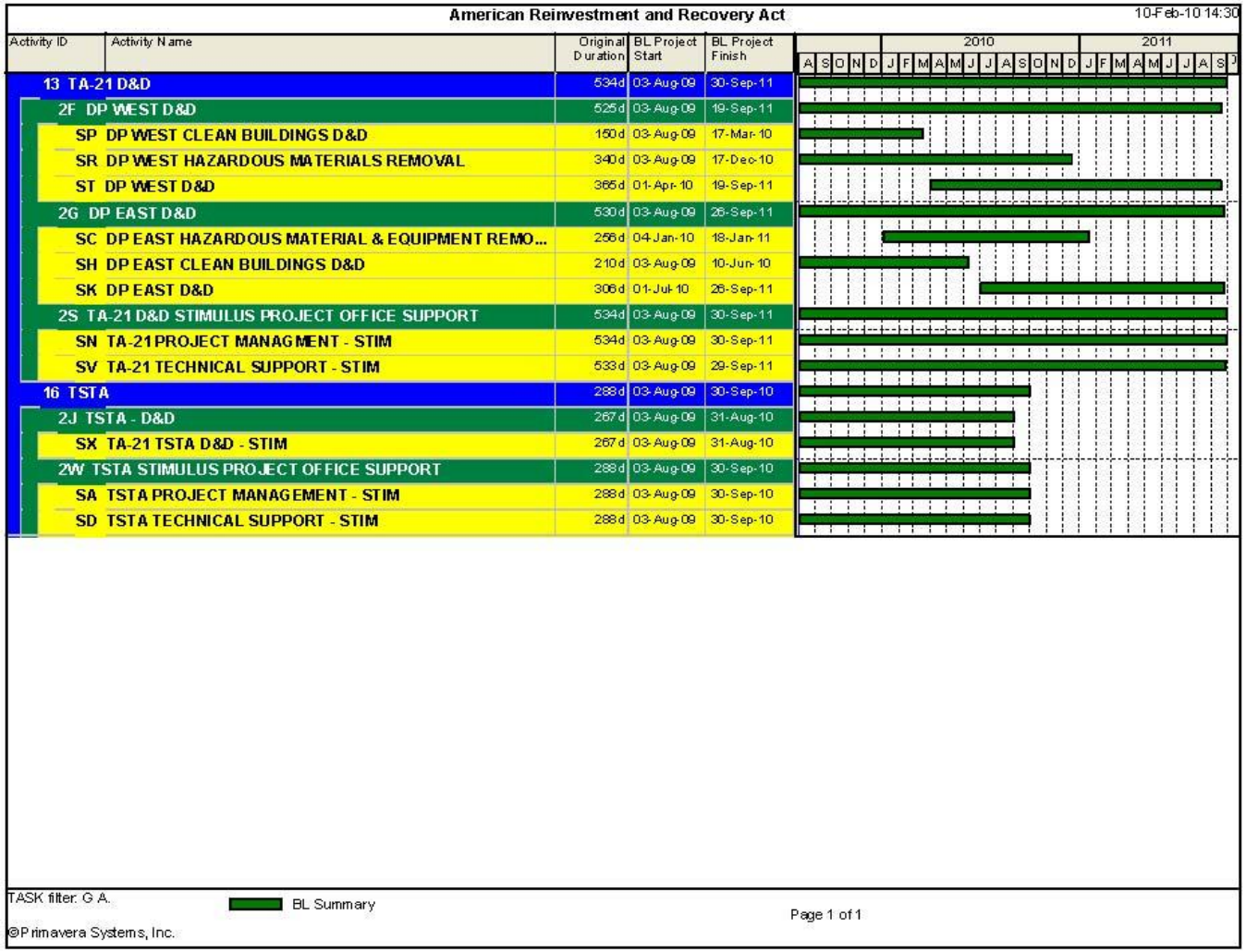


Figure 10.0-1 TA-21 DP site conceptual D&D schedule

Formatted: Font: Bold

11.0 HEALTH, SAFETY AND ENVIRONMENT REQUIREMENTS

D&D operations will be conducted in accordance with the requirements of applicable federal, state, and local health safety and environmental requirements, such as Occupational Safety and Health Administration (OSHA) Standards for General Industry and for the Construction Industry (29 CFR Part 1910 and 1926), DOE O 450.1 Environmental Protection Program, as well as the project site-specific health and safety plans.

11.1 Environmental Protection

Environmental protection issues will be coordinated with the appropriate environmental compliance groups in the Laboratory. The TA-21 D&D project will institute best management practices to protect surface water, storm water runoff, and airborne emissions. Compliance with applicable state and federal regulations is mandatory for all operations at the Laboratory that may produce air contaminants.

To minimize or eliminate airborne emissions, portable HEPA-filtered ventilation systems will be used to collect aerosols that may be dispersed by the removal operations.. To minimize emissions, either, a fixative, fogging or standard dust suppression techniques will be used during structural dismantlement, and misting may occur during excavation. Air-sampling data will be closely monitored during this phase to ensure compliance, and operations will be secured if emissions exceed 10% of the permissible levels or if sustained wind speeds exceed 25 mph and gusts to 30-mph. Lastly, the Rad NESHAP review process and associated fixed Continuous Air Monitoring (CAM) stations' data output will be regularly reviewed to ensure compliance with emission requirements

11.2 Criticality Safety

Total plutonium and enriched uranium quantities are below the amounts at which nuclear criticality safety protocols and procedures apply. No criticality safety requirements are necessary.

11.3 Hazardous Chemical Safety

Based on the site characterization, significant quantities of hazardous chemicals are not present. If hazardous chemicals are encountered, safety precautions and controlled removal will be the basis for safe operations. Wastes will be managed in accordance with the project's approved waste management plan and disposed of in accordance with the requirements of the applicable disposal site's WAC.

Unknown chemicals may be encountered. Disposal regulations and safety requirements make it imperative that all chemicals be properly identified before removal begins. The D&D Execution Team will sample any unknown substance. No flame- or spark-producing devices will be used on exhaust systems. D&D workers will open systems and equipment for sampling using proper personnel protection and spill collection methods.

11.4 Electrical Safety

Building and other utilities (Steam, Communications, etc) have will be disconnected and independently verified in accordance with LANL Operating Instruction 50-2—2010, Secondary Utility Disconnect Verification and Air Gapping for Demolition prior to structure demolition commencement. As needed, equipment will be locked-out and/or tagged-out (LO/TO) prior to D&D activities beginning, in accordance with. Each electrical power disconnect will be independently verified and documented LANL Operating Instruction 50-20-2010, Secondary Utility Disconnect Verification and Air Gapping for Demolition; In the event a Lockout/Ttagout (LO/TO) is needed, work will be performed in accordance with LANL Procedure P 101-3, Lockout/Tagout for Hazardous Energy Control.

TA-21 D&D Plan

July 2009

54

TA-21-PLAN-00006

11.5 Asbestos Safety

Asbestos will be abated according to approved D&D contractor procedures and federal and state regulations. Asbestos will be removed by trained and certified asbestos abatement workers. Asbestos found in poor condition by preliminary walk downs and/or surveys will be encapsulated before the space is occupied for D&D activities. Otherwise, the asbestos will be abated in accordance with approved procedures as it is encountered in the normal course of equipment removal. Asbestos waste will be double-bagged and treated as radioactively contaminated asbestos waste, unless cleared by the RP-1 group.

11.6 Radiation Safety

Radiation safety workers will be monitored in accordance with applicable procedures in accordance with the laboratory Radiation Protection Program. RCT technicians will be on hand full-time during D&D activities. Building air will be sampled, and the samples will be analyzed as determined by air-sampling procedures and RP-1. Continuous air monitors will be in service at the work sites during D&D activities. Optimum continuous air-monitoring sitting locations will be determined to ensure accurate representation of workplace conditions.

All D&D workers will be experienced and trained as radiation workers. Their training will include supplemental instruction on special requirements, such as proper packaging techniques and procedures for stabilizing and removing pipes, ductwork, and equipment. Workers will wear dosimetry badges when necessary. Workers will wear anti-contamination clothing, such as coveralls, gloves, hoods, and booties. Workers will receive full-face respiratory fitting, testing and training. Workers will use full-face respirators equipped with HEPA filters during operations that have the potential for producing airborne radioactive particulates. Workers will use full-face respirators supplied with breathing air from an approved system as required by RP-1, based on as-low-as-reasonably-achievable reviews. Air will be sampled from the working areas in accordance with approved procedures, and work will be controlled through the RWP and the RCTs.

11.7 PCB Safety

PCBs may be present in such locations as light ballasts, and precautions must be taken. Material containing PCBs will be handled and disposed of in accordance with appropriate procedures.

11.8 Mechanical Safety

The buildings will be designated as Level D personal protective equipment areas as a minimum (i.e., hardhat, safety shoes, and safety glasses). Hoisting and rigging will be performed by experienced, qualified workers.

11.9 Transportation Safety

TA-21 D&D and ER transportation activities will be managed by the TA-21 Closure Project Traffic Management Plan and the TA-21 Closure Project On-Site Waste Transportation Plan. These plans will identify potential safety issues resulting from the on-site and off-site transportation of waste and the increase of traffic due to additional project personnel and material deliveries. The plans will provide mitigating measures to reduce the adverse effects due to this increased traffic flow, such as recommended traffic routes and routine surveillance of trucks and traffic routes.

11.10 Limited Egress and Confined Spaces

Confined spaces will be controlled in accordance with the requirements of OSHA Standards for General Industry and for the Construction Industry (29 CFR Parts 1910 and 1926, respectively). Specific limited egress and confined space hazards and controls will be detailed in the project site-specific health and safety plans.

11.11 Solid and Liquid Waste Management

Several different types of solid and liquid wastes will be generated during D&D activities that will need to be properly managed and disposed of. Waste types include radioactive LLW, MLLW, HW, NMSW, IW, sanitary waste, PCB waste, asbestos waste, and possibly TRU waste. All D&D waste streams will be properly managed and disposed of in accordance with applicable federal, state, and local regulations.

11.12 Site Security

The TA-21 site is an administratively controlled area. The site will be controlled with fencing, gates, and a single entry point. The D&D site will be further controlled by the D&D Execution Team with an additional fence and more gates. Gates are locked when personnel are not present.

11.13 Fire Protection

TA-21 D&D activities will comply with the TA-21 D&D Fire Protection Plan, ERD-FIRE-06-095. This plan identifies potential safety issues resulting from D&D activities and mitigating measures to reduce the adverse effects, such as combustible controls, periodic inspections, access controls, and demolition sequencing.

12.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Blackwell, C.D., March 18, 1980. "Final Condition Report of Building 150 at TA-21," Los Alamos Scientific Laboratory memorandum to A. Valentine (H-1 Alternate Group Leader) from C. Blackwell (H-1), Los Alamos, New Mexico. (Blackwell 1980, 090516)

Blackwell, C.D., July 24, 1980. "Final Condition Report on Building 5 at TA-21," Los Alamos Scientific Laboratory memorandum to A. Valentine (H-1 Alternate Group Leader) from C. Blackwell (H-1), Los Alamos, New Mexico. (Blackwell 1980, 090518)

Blackwell, C.D., December 1, 1980. "Final Condition Report of Building 2 at TA-21," Los Alamos Scientific Laboratory memorandum to A. Valentine (H-1 Alternate Group Leader) from C. Blackwell (H-1), Los Alamos, New Mexico. (Blackwell 1980, 036476)

DOE (U.S. Department of Energy), May 2008. "Final Site-Wide Environmental Impact Statement for Continued Operation of Los Alamos National Laboratory, Los Alamos, New Mexico," DOE/EIS-0380, Los Alamos, New Mexico. (DOE 2008, 102731)

Garde, R., E.J. Cox, and A.M. Valentine, September 1982. "Los Alamos DP West Plutonium Facility Decontamination Project 1978–1981," Los Alamos National Laboratory report LA-9513-MS, Los Alamos, New Mexico. (Garde et al. 1982, 006399)

LANL (Los Alamos National Laboratory), 1981. "Final Condition Report, Building 286, Building 228, Building 116, Electrical, Mechanical and Telephone Equipment, Rooms and Hallways, DPW, TA-21," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1981, 106102)

LANL (Los Alamos National Laboratory), May 13, 2003. "Recategorization of the LANL Tritium Systems Test Assembly (TSTA) Facility," Tritium Science and Engineering Group document no. TSTA-PLAN-01, R.0, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2003, 099756)

LANL (Los Alamos National Laboratory), October 2006. "Report on Characterization of Above-Grade Delta Prime West Structures at Technical Area 21," Los Alamos National Laboratory document LA-UR-06-7349, Los Alamos, New Mexico. (LANL 2006, 094351)

McGehee, E.D., and K.L.M. Garcia, December 23, 1999. "Historic Building Assessment for the Department of Energy Conveyance and Transfer Project," Vol. 1, Los Alamos National Laboratory document LA-UR-00-1003, Los Alamos, New Mexico. (McGehee and Garcia 1999, 087442)

Received

JUL 2 8 2010

SAVE PRINT

ATTACHMENT 1: DOCUMENT ACTION REQUEST (DAR) FORM

FOD-9 DCC

Document Action Request (DAR) Form

Los Alamos NATIONAL LABORATORY EST. 1943

Section #1 – Type of Request

Document Number:	Revision:	Title:
TA21-PLAN-00006	0	Technical Area 21 Decontamination and Demolition Plan

Requestor Signature:	Print Name:	Phone:	Z Number:	Date:
Jonathan Richter	Jonathan Richter	303-968-011[illegible]	110223	07/15/2010

Section #2 – Procedure Owner Approval for Processing

☑ New Document ☐ Major Revision ☐ Minor Revision ☐ Deactivation ☐ Cancellation

Periodic Review: ☑ 1 Year ☑ 2 Year ☐ 3 Year ☐ 4 Year ☐ 5 Year

RGH 7/21/10

If new document, describe document type: Information regarding D&D at LANL TA-21

Provide a detailed description of the requested change. (Attach additional sheets if needed. Number all additional sheets.):

N/A as new document.

☑ Approved ☐ Disapproved (Return to originator) | Priority: High

Responsible Line Manager Signature:	Print Name:	Date:
JOSEPH P KANZLEITER	Joseph P Kanzleiter	7-15-10

Section #3 – Review and Concurrence

Review and Concurrence: Obtain concurrence from all review organizations. (Enter N/A for not applicable.) Document all additional review organizations, if needed, on a continuation sheet. Cognizant System Engineer Program (CSE) approval is required for all technical procedures except minor revisions, and non-authorization-basis-related cancellations/ deactivations. CSE approval is always required for changes affecting safety-basis steps.

Reviewer	Print Name	Signature	Date
	N/A		

18-JUL-2010

Validation Required:	Hazard Category:	Is the document authorized to serve as Part I of the Integrated Work Document?
☐ Yes ☑ No	☑ Low ☐ Med ☐ High	☐ Yes ☑ No

CSE USQ Number (as applicable):	Authorized Derivative Classifier: ☒ Unclassified ☐ OUO ☐ UCNI ☐ Classified
N/A GPK 7-15-10	Signature: JOSEPH LOWERY Date: 7/22/2010

Section #4 – Training Review

Training Required: ☐ Yes ☑ No ☐ Classroom/Briefing ☑ Just-in Time ☐ On the Job ☐ Required Reading

Section #5 – Final Approval by Responsible Line Manager

Approval Signature:	Print Name:	Phone:	Z Number:	Date:
Joseph P Kanzleiter	JOSEPH P KANZLEITER	412-3012	231322	7-1[illegible]-10

date