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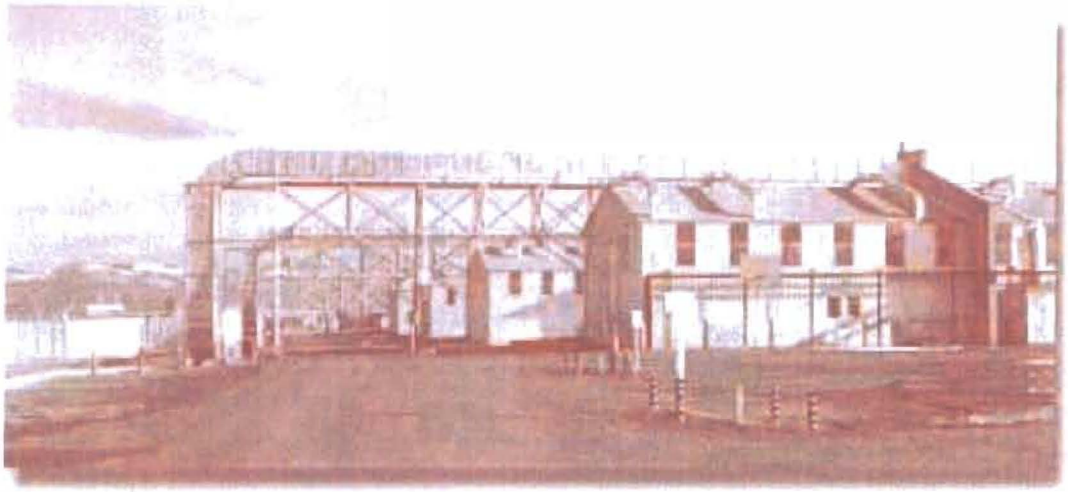
Historic Building Assessment

for the Department of Energy Conveyance and Transfer Project



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NATIONAL LABORATORY

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Historic Building Assessment for the Department of Energy Conveyance and Transfer Project

Volume 1

Historic Building Survey Report No. 178

Los Alamos National Laboratory

December 23, 1999
Survey No. 742

Prepared for the Department of Energy
Los Alamos Area Office

prepared by

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Los Alamos, New Mexico

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HISTORIC BUILDING ASSESSMENT FOR THE DEPARTMENT OF ENERGY

CONVEYANCE AND TRANSFER PROJECT

VOLUME 1

December 23, 1999

LA-UR-00-1003

CONTENTS

ACRONYMS ..... **X**
ACKNOWLEDGMENTS ..... **XI**
ABSTRACT **1**
1.0 INTRODUCTION **2**
1.1 Project Descriptions 2
1.2 Legal Requirements 2
1.3 Methodology 5

PART 1: TA-21 Site

1.0 INTRODUCTION 7
1.1 TA-21 Provenience and Environmental Setting 7
1.2 Brief Overview of TA-21 Facilities 9
1.3 Multiple Property Documentation Format 9
2.0 HISTORICAL BACKGROUND 11
2.1 Historical Overview, Los Alamos National Laboratory 11
2.2 Plutonium and Uranium Research during the Manhattan Project 16
2.3 DP Site Origins 20
3.0 HISTORICAL CONTEXT FOR THE TA-21 SITE **22**
3.1 Themes 22
3.2 Summary of Themes 70
3.3 Associated Property Types 78
3.4 Integrity and Eligibility Criteria 83
4.0 ELIGIBILITY RECOMMENDATIONS AND LISTING OF EXEMPT PROPERTIES **84**
4.1. Overview 84
4.2. Eligibility Summary 84
4.3. Buildings and Structures Exempt from Review 86
5.0 SUMMARY TABLE **98**

PART 2: The Remaining Nine Tracts

1.0 INTRODUCTION **101**
2.0 DP ROAD TRACT **102**
2.1 Provenience and Environmental Setting 102
2.2 DP Road Tract Historical Background 102
2.3 Description of Properties 102
3.0 DOE LOS ALAMOS AREA OFFICE SITE **105**
3.1 Provenience and Environmental Setting 105
3.2 DOE Los Alamos Area Office Site Historical Background 106
3.3 Description of Properties 106
4.0 AIRPORT TRACT **108**
4.1 Provenience and Environmental Setting 108

4.2 Airport Tract Historical Background 108
4.3 Description of Properties 108
5.0 WHITE ROCK SITE 109
5.1 Provenience and Environmental Setting 109
5.2 White Rock Site Historical Background 109
5.3 Description of Properties 109
6.0 RENDIJA CANYON SITE 110
6.1 Provenience and Environmental Setting 110
6.2 Rendija Canyon Site Historical Background 110
6.3 Description of Properties 110
7.0 WHITE ROCK Y SITE 111
7.1 Provenience and Environmental Setting 111
7.2 White Rock Y Site Historical Background 111
7.3 Description of Properties 111
8.0 SITE 22 112
8.1 Provenience and Environmental Setting 112
8.2 Site 22 Historical Background 112
8.3 Description of Properties 112
9.0 MANHATTAN MONUMENT TRACT 112
9.1 Provenience and Environmental Setting 112
9.2 Manhattan Monument Tract Historical Background 113
9.3 Description of Properties 113
10.0 TA-74 TRACT 113
10.1 Provenience and Environmental Setting 113
10.2 TA-74 Tract Historical Background 114
10.3 Description of Properties 114
11.0 ELIGIBILITY RECOMMENDATIONS AND LISTING OF EXEMPT PROPERTIES 114
11.1 Overview 114
11.2 Eligibility Summary 115
11.3 Buildings and Structures Exempt from Review 117
12.0 SUMMARY TABLE FOR THE REMAINING NINE TRACTS 126

RECOMMENDATIONS FOR PART 1 AND PART 2 127
BIBLIOGRAPHY 127
APPENDIX A Property Descriptions 135

LIST OF FIGURES FOR GENERAL INTRODUCTION

Figure 1. Location of Los Alamos National Laboratory 3
Figure 2. Communities, LANL TAs, and subject tracts 4

LIST OF FIGURES FOR PART 1

Figure 3. Aerial view of TA-21, DP Site, circa 1979 8
Figure 4. Plan of DP Site, circa 1955 10
Figure 5. Aerial view of Project Y, Los Alamos, 1947 13

Figure 6. Aerial view of early Los Alamos: TA-1 buildings around Ashley Pond, circa 1958 14
Figure 7. TA-1 map 18
Figure 8. Aerial view of D Building in foreground, 1946 18
Figure 9. D Building at TA-1, circa 1943 (under construction) 19
Figure 10. D Building at TA-1, circa 1947 19
Figure 11. Aerial view of DP Site, December 1946 (looking south; DP West is building cluster at upper right, DP East is at upper left) 21
Figure 12. View of DP West, showing Buildings 2, 3, 4, and 5, circa 1947 21
Figure 13. A plutonium worker from the metal fabrication section removes a rod of plutonium from a mold 24
Figure 14. Workers from the plutonium recovery section work at the glovebox line 24
Figure 15. A worker operates a control panel of the metal production facility where plutonium nitrate solution is being converted into plutonium metal 24
Figure 16. A worker from the plutonium recovery section logs the contents of storage tanks containing plutonium solutions 25
Figure 17. Workers on the plutonium metal production line. Worker at ground level is adding calcium and iodine, part of the final metal production process 25
Figure 18. General layout of DP West 26
Figure 19. Recovery facilities at Building 2, DP West 27
Figure 20. Aerial view of DP West facilities, 1946 28
Figure 21. Aerial view of portions of DP West shown in foreground, 1947 28
Figure 22. Aerial view of DP West including main plutonium processing buildings, administration building, and filter building, 1946 29
Figure 23. Hoods used in uranium recovery operations. In the foreground are the "ever-safe" glass storage tanks. TA-21-3 South, circa 1957 30
Figure 24. Aerial view of DP East, looking north, 1946 32
Figure 25. Aerial view of DP East, looking south, November 1946 32
Figure 26. Building TA-21-21 33
Figure 27. Tower structure, at right, used to house ICONS distillation columns, Building TA-21-3 North 35
Figure 28. Plutonium hot cell construction, January 1959 37
Figure 29. Workers remove a plutonium-238 heat source from a "target" 38
Figure 30. A heat source (a mix of plutonium dioxide fuel and a binder) is removed from a press 38
Figure 31. A plutonium-238 heat source is positioned on a target for dosimetry measurements 39
Figure 32. University of California Regents tour plutonium-238 facilities at DP Site 39
Figure 33. TA-21-152, Bay 5208 – "California Hood" 40
Figure 34. TA-21-152, Bay 5208 – "California Hood" 41
Figure 35. TA-21-152, Room 5209, mass spectrometer 41
Figure 36. TA-21-152, Room 5209, mass spectrometer 42
Figure 37. TA-21-152, Bay 5205, arc melter 42
Figure 38. TA-21-12, Bay 5205, arc melter 42

Figure 39. A Los Alamos Kiwi reactor at the Nuclear Rocket Development Station in Nevada. 44
Figure 40. The Phoebus-1B reactor in Nevada before a 1967 full power run 44
Figure 41. Relative sizes of the Project Rover reactor series, from Kiwi to Phoebus 45
Figure 42. Kiwi A, left, and Kiwi B, right, reactor vessels at TA-21, LANL....45
Figure 43. Workers at DP East operate the vapor deposition device constructed, in part, with components from the defunct Project Rover. 46
Figure 44. An early plutonium worker performs a purification operation in an open chemical hood. 47
Figure 45. DP West under construction, 1945 49
Figure 46. DP West view with evacuation busses in foreground, circa 1947....49
Figure 47. Map showing location of Cecil Kelley accident....51
Figure 48 Layout of accident location....52
Figure 49. Solvent-treating tank, center 53
Figure 50. Diagram of solvent-treating tank, showing levels of aqueous and organic phases before stirrer was activated 54
Figure 51. TA-43-39, former police barracks and AEC administration office building, constructed during 1948 and 1949....56
Figure 52. View of DP West, with guard tower in left background....58
Figure 53. Structure location plan of TA-21 showing guard tower and guard house locations, 1950 59
Figure 54. Old-style security lights at TA-21....60
Figure 55. Close up of old-style lights at TA-21....60
Figure 56. Close up of old-style lights at TA-21....60
Figure 57. The "checkerboard" tank at its original TA-1 location, circa 1955....61
Figure 58. The "checkerboard" tank, TA-21-258, at TA-1 (far right), circa 1958 61
Figure 59. Structure location plan of TA-1 showing the original location of the "checkerboard" water tank (TA-21-258, formerly TA-1-132)....62
Figure 60. The water tank before its relocation, circa 1966....63
Figure 61. The dismantling of the tank, 1966 64
Figure 62. Dismantling the tower....64
Figure 63. Workers dismantling the tower structure....64
Figure 64. View of MDA-A, circa 1948 66
Figure 65. Craftsmen remove contaminated lines from a section of floor....67
Figure 66. Glovebox sections waiting packaging before being sent to retrievable storage. 68
Figure 67. A glovebox section is being loaded into a retrievable storage container...68
Figure 68. Two glovebox sections are packaged together for retrievable storage....69
Figure 69. View of TA-21-155, TSTA....70
Figure 70. View of TA-21-155, TSTA, west elevation....70

LIST OF FIGURES FOR PART 2

Figure 1. Aerial view of TA-21-1001 and TA-21-1002 under construction, 1946 103
Figure 2. LANL Records Repository, 1950 104
Figure 3. LANL Records Repository, 1950 104
Figure 4. TA-21-1002, Zia Company Maintenance Shop, 1951 105
Figure 5. TA-43-39, former police barracks and Atomic Energy Commission Administration Office Building, built 1948–1949 107
Figure 6. TA-43-39, Atomic Energy Commission, late 1960s 107

ACRONYMS

AEC	U.S. Atomic Energy Commission
CIC-9	The Imaging Services Group of the Computing, Information, and Communications Division at Los Alamos National Laboratory
DOE	U.S. Department of Energy
ER	Environmental Restoration (Project)
ERDA	Energy Research and Development Administration
ESH-20	The Ecology Group of the Environment, Safety and Health Division at Los Alamos National Laboratory
FWO-FDS	The Facility Data Services Group of the Facility and Waste Operations Division at Los Alamos National Laboratory
HEPA	high-efficiency particulate air (filters)
HRL	Health Research Laboratory
ICONS	isotopes of carbon, oxygen, nitrogen, and sulfur
LAAO	Los Alamos Area Office
LAMPRE	Los Alamos Molten Plutonium Reactor Experiment
LANL	Los Alamos National Laboratory
LMFBR	Liquid Metal Fast Breeder Reactor
MDA	Material Disposal Area
MPD	Multiple Property Documentation
NASA	National Aeronautics and Space Administration
NTS	Nevada Test Site
PCB	polychlorinated biphenyl
PNM	Public Service Company of New Mexico
SNAP	Systems for Nuclear Auxiliary Power
SWMU	Solid Waste Management Unit
TA	Technical Area
TSTA	Tritium Systems Test Assembly
USGS	United States Geologic Survey

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HISTORICAL BUILDING ASSESSMENT FOR THE DEPARTMENT OF ENERGY CONVEYANCE AND TRANSFER PROJECT

by
Ellen D. McGehee and Kari L. M. Garcia

ABSTRACT

From September 1998 through January 1999, a historic building survey was conducted in 10 tracts of Department of Energy (DOE) land to be conveyed or transferred as directed by Public Law 105-119. These tracts are located on DOE-managed land in Rendija Canyon and at various Los Alamos National Laboratory (LANL) technical areas: 0, 21, 41, 43, 54, 72, 73, and 74.

This report documents 153 properties that were identified in eight of the tracts. Buildings and structures located in these tracts were built during the years 1943 to 1996. Historic building assessments for 50 properties are included in this report. The 103 remaining buildings or structures were exempted from further consideration due to their clear lack of historical significance. Exempt property types documented during this survey played a minor support role in the history of LANL. Exempted types include fuel tanks, acid tanks, condensate tanks, electrical and telephone substations, manholes, steam pits, sludge drying beds, exhaust stacks, containment vessels, portable trailers, transportainers, gas manifolds, and a variety of small sheds including metal sheds, concrete sheds, portable sheds, and Morgan™ sheds.

Through documentation and research, it has been determined that 24 properties are eligible for the National Register of Historic Places. Thirteen properties are 50 years old or older and are eligible under Criterion A because of their association with significant historical events during the Manhattan Project and early Cold War years at Los Alamos. Six properties, although less than 50 years old, are also eligible under Criterion A. This determination was made because of their association with events of exceptional importance during the Cold War years at Los Alamos (Criterion Consideration G: properties that have achieved significance within the last 50 years) (U.S. DOI 1991). Five properties are eligible for the National Register under both Criteria A and C. In order to be eligible under Criterion C, a property should be distinctive for artistic or architectural reasons. Twenty-five buildings and structures, although documented in this report, are not eligible for the National Register because they lack the qualities necessary for historical significance. One laboratory building, TA-21-61, is of undetermined eligibility pending additional research.

The New Mexico State Historic Preservation Officer is requested to comment on the eligibility recommendations contained in this report. As a result of this survey, this project complies with the National Historic Preservation Act of 1966 (as amended).

1.0 INTRODUCTION

Los Alamos National Laboratory (LANL) is a Department of Energy (DOE) managed facility in north-central New Mexico (Figure 1). A historic building survey was conducted in 10 tracts of DOE-managed land in Rendija Canyon and at various LANL technical areas (TAs): 0, 21, 41, 43, 54, 72, 73, and 74 (Figure 2).

1.1 Project Descriptions

Two interrelated actions are proposed that will impact many, if not all, of the buildings and structures within 10 tracts of DOE land located near Los Alamos, New Mexico. Possible impacts include renovation, reuse, or demolition.

Conveyance and Transfer of Land in the Vicinity of LANL

In 1997, Congress passed Public Law 105-119. This law directs the DOE to convey or transfer tracts of DOE land to the County of Los Alamos and to the Secretary of the Interior. Any parcels of DOE land transferred to the Secretary of the Interior will be held in trust for the Pueblo of San Ildefonso. The DOE has defined 10 suitable tracts of land (U.S. DOE 1999).

Environmental Restoration and Decontamination and Decommissioning

Public Law 105-119 also directs the DOE to identify, in a parallel process, any environmental restoration and remediation tasks that will need to be completed before the conveyance and transfer of the tracts. Furthermore, these tasks must be completed by November of 2007 (10 years after the enactment of the law) (U.S. DOE 1999).

Due to the hazardous nature of the activities conducted at LANL and the age of the properties, many of the buildings and structures have already been identified as candidates for decontamination and decommissioning as part of LANL's Environmental Restoration (ER) Program. The end result of the decontamination and decommissioning work will be the complete demolition of most of the World War II era laboratory facilities.

1.2 Legal Requirements

In compliance with the National Historic Preservation Act of 1966 (as amended), this report documents a historic building survey conducted by LANL personnel for DOE's Conveyance and Transfer Project. The purpose of this report is to evaluate all identified buildings and structures for historical significance and to make eligibility recommendations for inclusion on the National Register of Historic Places.

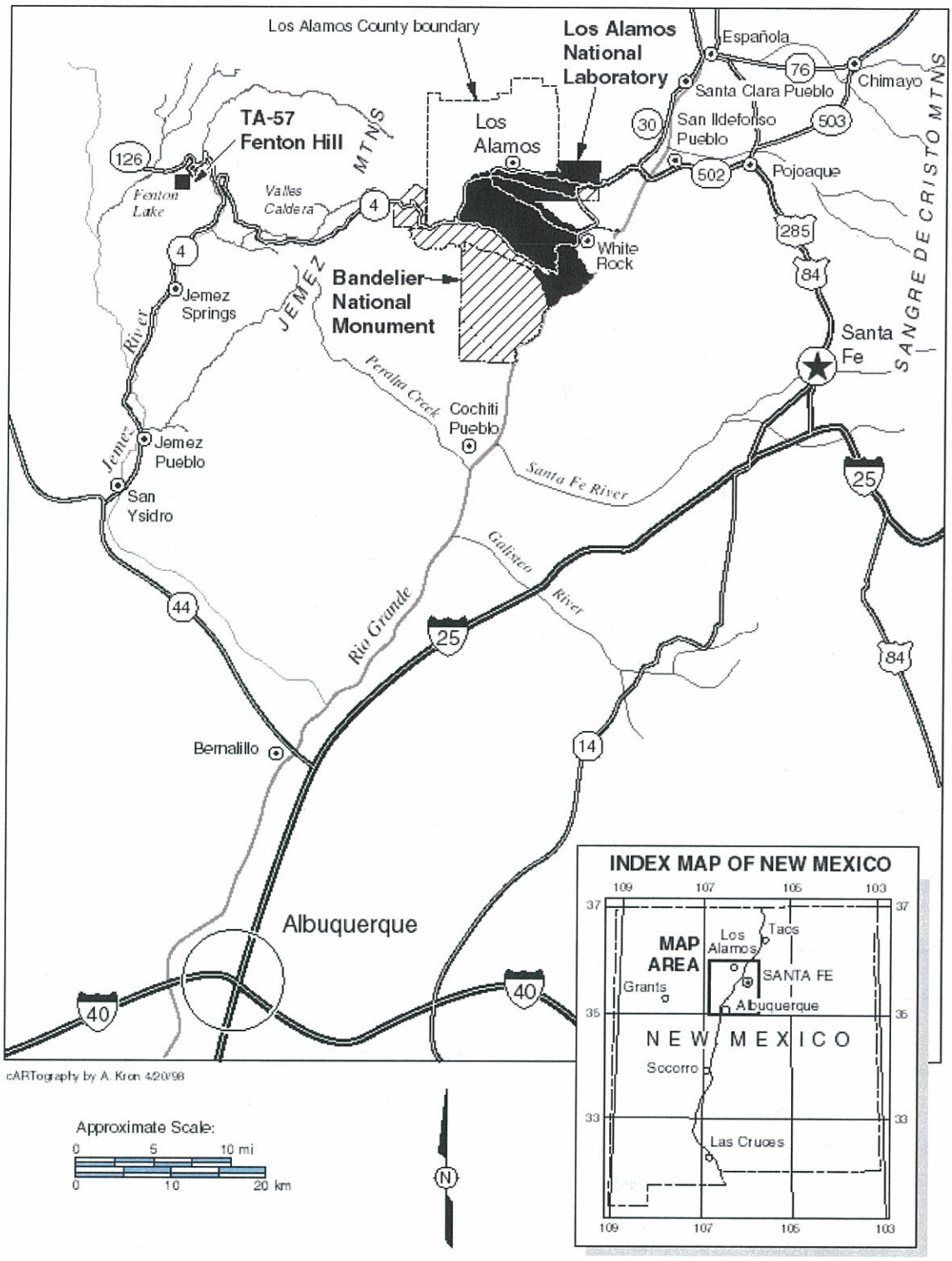


Figure 1. Location of Los Alamos National Laboratory.

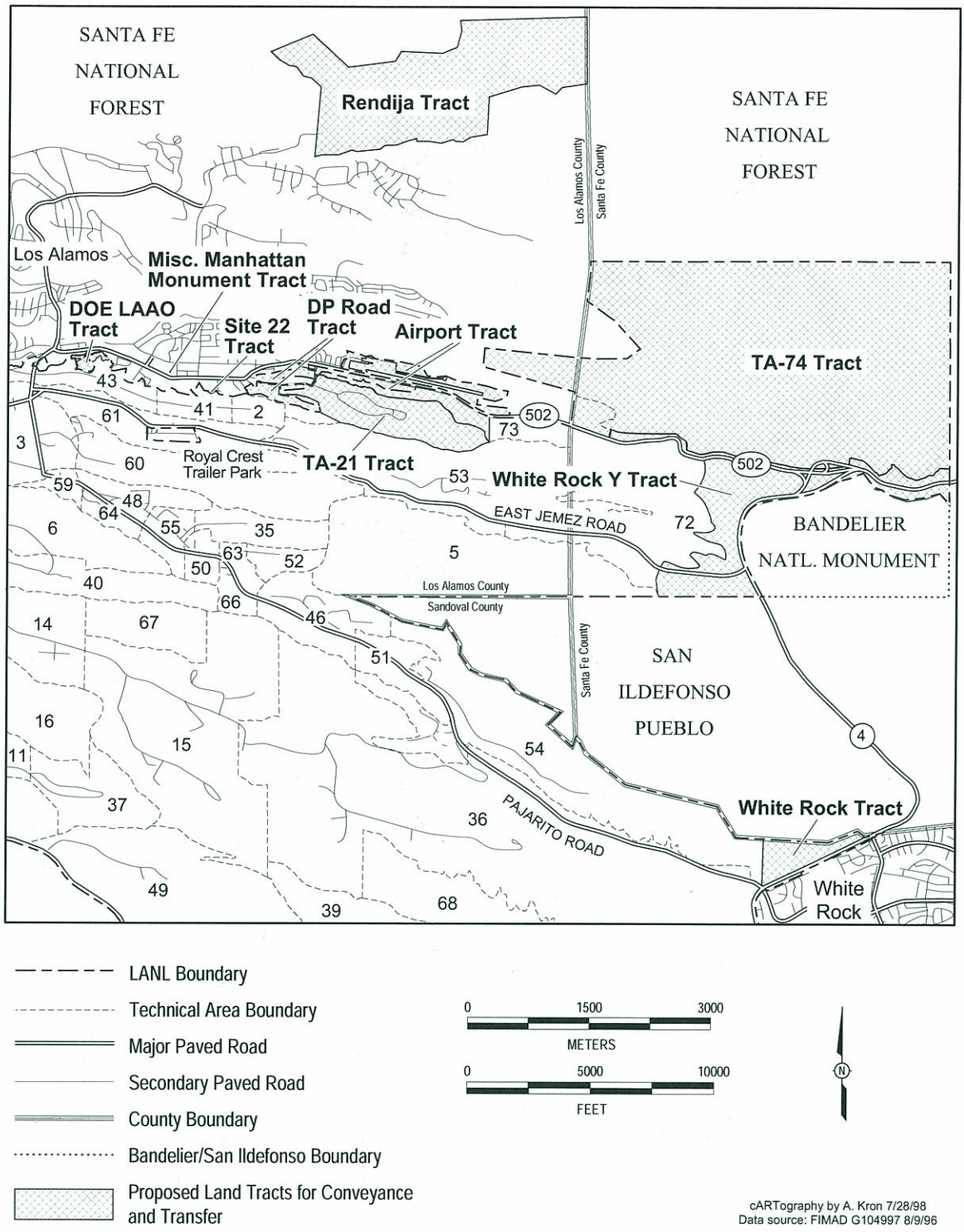


Figure 2. Communities, LANL TAs, and subject tracts.

In general, buildings and structures must be 50 years old or older and meet at least one of the four criteria of eligibility to be eligible for inclusion on the National Register: Criterion A, properties associated with historically significant events; Criterion B, properties associated with a historically significant person; Criterion C, properties that are distinctive for architectural or artistic reasons or that are part of a distinguishable entity such as a historic district; and Criterion D, properties that are significant for their potential to yield historically important information (U.S. DOI 1991). Occasionally, a property, although less than 50 years old, is associated with an event of exceptional significance and can be eligible for the Register under Criterion Consideration G, "exceptionally important properties that have achieved significance within the last fifty years" (U.S. DOI 1991:41). All properties, regardless of age, must also retain integrity of location, design, setting, materials, workmanship, feeling, and association. The National Park Service has written several publications that list the criteria for eligibility and provide guidance for the assessment of historic properties. *National Register Bulletin 15* explains how to apply the National Register Criteria for Evaluation (U.S. DOI 1991). Selection criteria for recent properties are given in *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties that Have Achieved Significance Within the Last Fifty Years* (U.S. DOI N.D.). The Advisory Council on Historic Preservation has written a publication of special relevance to LANL: *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities* (1991).

Historical significance can be determined on a local, national, and international scale. The development of historical contexts and associated themes is crucial in determining significance, especially when recent properties are being evaluated. All evaluated properties from TA-21 (DP Site) were grouped under one main historical context and were evaluated using the National Park Service's Multiple Property Documentation format. A discussion of this format can be found in Part 1, Section 1.3.

1.3 Methodology

Volume 1 of this report is divided into two parts. Part 1 contains a multiple property documentation assessment of the TA-21 Site tract. Part 2 contains discussions of the properties located in the remaining nine tracts. Unlike the multiple property documentation in Part 1, the property descriptions and evaluations contained in Part 2 are in the format of earlier LANL historic building survey reports produced by the Environment, Safety, and Health Division's Ecology Group (ESH-20). Historic building evaluations were conducted by Kari L. M. Garcia, ESH-20 cultural resource manager, with the assistance of Alysia McLain, Carolyn Hedrick, and Teresa Hiteman of ESH-20, and Ken Towery, John Ronquillo, Tom Karl, Jay Moore, and Curtis Hoffer of IT Corporation. The TA-21 historical background and context sections in Part 1 were researched and written by Ellen D. McGehee, ESH-20 cultural resource manager.

Historic building evaluations were accomplished by conducting research and field visits to determine the number and types of buildings and structures in each tract. Construction dates were also identified for each property. With the exception of the exempted property types mentioned above in the abstract, all properties were recorded on New Mexico Historic Building Inventory Forms and photographs were taken. Existing drawings for each evaluated building or structure were compiled from records on file at the LANL Facility and Waste Operations Division's Facility Data Services Group (FWO-FDS). Historical research was carried out using

LANL records from the Decontamination and Decommissioning and ER Program Offices, the Oppenheimer Study Center, and the LANL Archives. Materials were also reviewed at the Los Alamos Historical Museum Archives and at the Mesa Public Library in Los Alamos. Copies of historic photographs were obtained from the LANL photo archives, the Imaging Services group (CIC-9) of the Computing, Information, and Communications Division, and the Los Alamos Historical Museum.

Exempted property types were also recorded and photographed, although not in the same detail as the non-exempt properties.

PART 1: TA-21 Site

1.0 INTRODUCTION

DP Site at TA-21 is one of LANL's earliest nuclear chemistry research areas (Figure 3). With its origins during the wartime "Manhattan Project," this distinct complex of laboratory and support facilities was the location of research and development activities directly related to the production and testing of the earliest Cold War atomic devices. The purpose of Part 1 of this report is to establish an historical context to evaluate the historical resources at TA-21.

1.1 TA-21 Provenience and Environmental Setting

TA-21 is located to the east of downtown Los Alamos, New Mexico, on a spur of "Townsite Mesa" known as DP Mesa (LANL 1991). DP Canyon is located to the north of TA-21, and Los Alamos Canyon is located to the south. The Los Alamos Airport is also located to the north of TA-21, on the main part of "Townsite Mesa." This TA's distinctive industrial buildings and water towers can be seen clearly from State Highway 502, which parallels the airport's runway.

Location: TA-21, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Buildings are located in:
Section 14
NW ¼, SE ¼, NW ¼
SW ¼, SE ¼, NW ¼
SE ¼, SE ¼, NW ¼
NW ¼, NE ¼, SW ¼
NE ¼, NE ¼, SW ¼
SE ¼, NE ¼, SW ¼
NW ¼, NW ¼, SE ¼
SW ¼, NW ¼, SE ¼
SE ¼, NW ¼, SE ¼
NE ¼, NW ¼, SE ¼
NW ¼, NE ¼, SE ¼
SW ¼, NE ¼, SE ¼
SE ¼, NE ¼, SE ¼
NE ¼, NE ¼, SE ¼

Maps: U.S. Geologic Survey (USGS) Guaje Mountain 7.5 Minute Series (Appendix B, Map 1)

LANL# CIC-9:CN79-2907

Figure 3. Aerial view of TA-21, DP Site, circa 1979.

Topography: DP Mesa, "Townsite Mesa"

Nearest Drainage: DP Canyon to the north and Los Alamos Canyon to the south

Elevation: approximately 2176 meters (7140 feet)

Current Land Use: Developed portion of TA-21

1.2 Brief Overview of TA-21 Facilities

The original facilities at TA-21 were constructed in 1945. The TA, known as "DP Site," has changed over the years, but the basic site plan remains. DP Site is divided into two separate areas (Figure 4). The western area, historically dedicated to plutonium operations, is known as DP West. The smaller, easternmost grouping of buildings is known as DP East. Work at DP East originally focused on polonium initiator research. The origins of the name "DP" are discussed below in Part 1, Section 2.3.

1.3 Multiple Property Documentation Format

TA-21's buildings and structures were evaluated using the National Register of Historic Places Multiple Property Documentation (MPD) format. The MPD form (NPS 10-900-b) is typically used to document and nominate groups of thematically related historic properties. In this report, LANL is not nominating any properties to the National Register; rather, this thematic approach is being used in Part 1 as an evaluation tool to determine the historical significance of a large group of related properties. The MPD format allows researchers to systematically evaluate properties on a comparative basis within a given historical context. This format is a departure from case-by-case evaluations that look at properties in a historical vacuum (Hanford 1999a and U.S. NPS 1999).

A key element of the MPD format is context. Contexts provide information about historical patterns and trends and have clearly defined themes, geographical areas, and chronological periods (U.S. NPS 1999). At TA-21, the properties are linked to one or more themes underlying the main context: "DP Site: Manhattan Project and Cold War Chemistry and Metallurgy." The buildings and structures are located within a geographically distinct, fenced laboratory area and date to the Manhattan Project and Cold War time periods at Los Alamos (1945–1990). Nine technological themes were defined and ultimately evaluated for significance. These themes were based on specific events and activities that support the main context at TA-21. Following the MPD format, property types associated with the main context were identified. Eligibility and integrity requirements for the property types were also defined. Decisions relating to final eligibility recommendations were based on the type of property, the level of physical integrity, and associations with significant themes.

Approximately half of the properties at TA-21 are 50 years old or older. The remaining properties are associated with the late Cold War years at Los Alamos and are less than 50 years old, having been constructed in the 1950s, 1960s, 1970s, and 1980s. Assessing historical

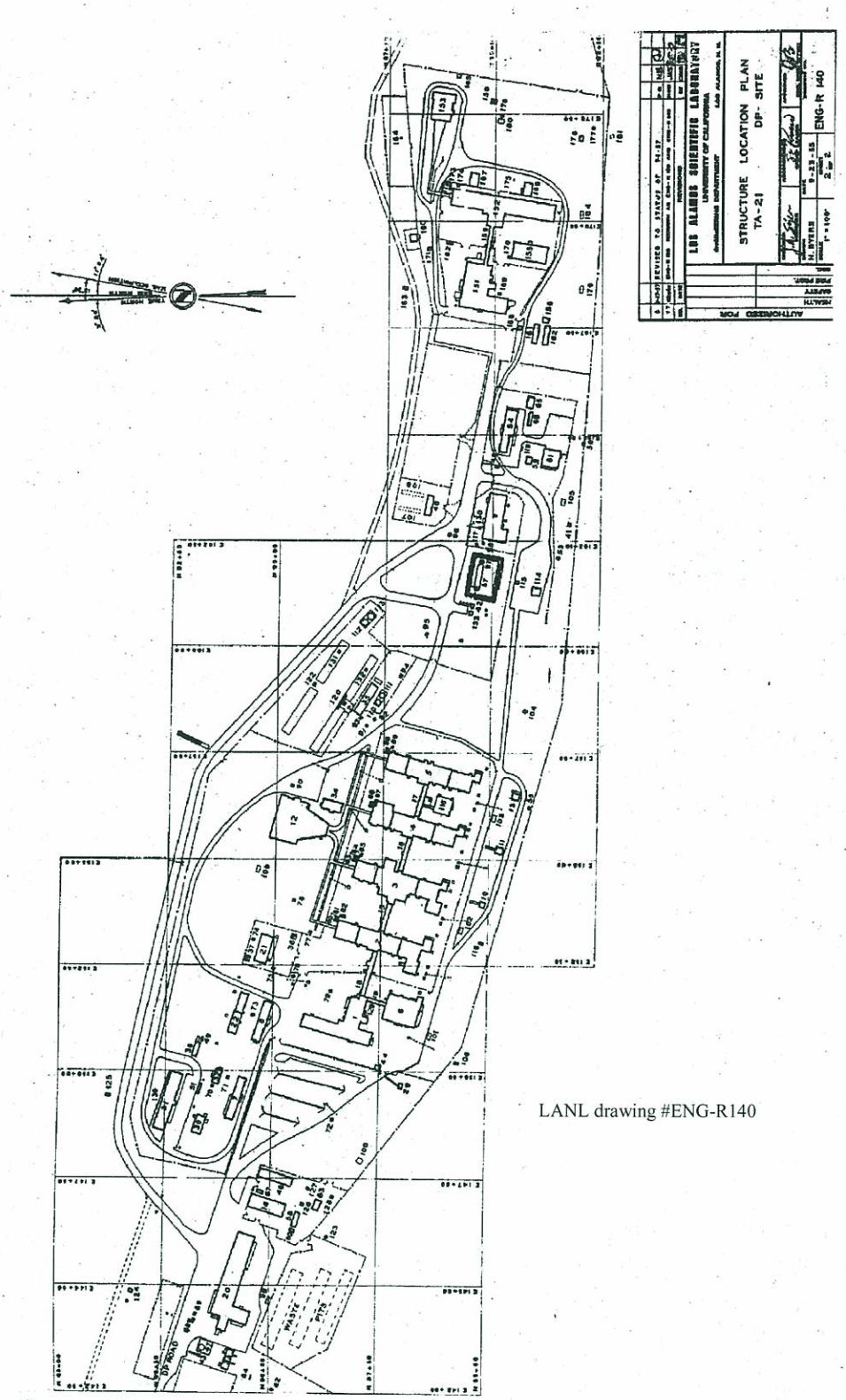


Figure 4: Plan of DP Site, circa 1955.

significance is often difficult for properties that are less than 50 years old because of a lack of historical perspective that can only come with the passage of time. The MPD format is an even more important evaluation tool when a determination of "exceptional significance" is being considered for a property potentially eligible for the Register under Criterion Consideration G (properties built in the last 50 years) (Hanford 1999a).

The TA-21 portion of this report has four main sections in addition to the Introduction: Historical Background (Section 2.0), Historical Context (Section 3.0), Eligibility Recommendations (Section 4.0), and Summary Table (Section 5.0). For ease of review, the TA-21 property descriptions are included at the beginning of Appendix A.

Historical Background (Part 1, Section 2.0) provides the reader with the background history needed to relate specific activities at DP Site to the broader patterns of Laboratory history. A general discussion of Los Alamos' role during the Manhattan Project, early Cold War, and late Cold War is presented. More specific background information on early Manhattan Project plutonium and uranium research is then provided, including a discussion of the plutonium operations at D Building in TA-1, the precursor facility to the plutonium operations at DP West. This section brings the reader from the earliest nuclear chemistry research at TA-1 to the relocation of plutonium, uranium, and polonium operations from TA-1 to TA-21 in 1945, setting the stage for the DP Site historical context.

Historical Context (Part 1, Section 3.0) discusses the nine themes that make up the main context at TA-21. At the end of this section, the themes are summarized and significant themes are identified. Associated property types are defined along with integrity and eligibility criteria.

Section 4.0 of Part 1 of the report contains eligibility recommendations and a list of exempted properties that were not evaluated for National Register significance. Associated themes and property types for each eligible property will be identified in this section.

The Summary Table (Part 1, Section 5.0) lists all evaluated properties along with the following information: construction date, property type, time period, associated theme(s), integrity status, and National Register eligibility.

Appendix A includes a detailed description of all evaluated properties. The buildings and structures located at TA-21 are described in property number order.

Volume 2 of the report includes two of the appendices referenced in the text: maps and site forms with photos and drawings (Appendices B and C).

2.0 HISTORICAL BACKGROUND

2.1 Historical Overview, Los Alamos National Laboratory

This section contains general background information and is intended to provide the reader with a brief overview of LANL's history. LANL has three periods of significance associated with weapons development: the World War II years (1943–1946), the early Cold War years,

including the development of the first deliverable thermonuclear devices (1946–1956), and the late Cold War years, including the events surrounding the end of the Cold War (1957–1990). With additional research, sub periods of the three main periods of significance may be identified. At LANL, the three time periods correspond to the following general historic contexts: Manhattan Project, early Cold War, and late Cold War. Broad historical themes associated with LANL's three periods of significance are included in this section; however, not all of the themes are relevant to the history of TA-21. Site-wide themes associated with TA-21 will be marked in this section with an asterisk and will be discussed in Part 1, Section 3.0 below.

Manhattan Project (1943–1946)

In 1939, Albert Einstein sent a letter to President Franklin Roosevelt advising him that fission made atomic bombs possible and that Germany may have started work on developing the atomic bomb (Rothman 1992). In the same year, a University of California physicist, J. Robert Oppenheimer, organized a study conference that concluded that a fission bomb was feasible (LANL 1995a). However, problems existed: the research efforts of universities and industry needed to be coordinated, and a process to produce sufficient fissionable material needed to be developed (Rothman 1992). In 1941, President Roosevelt gave approval to pursue the development of an atomic bomb. Brigadier General Leslie Groves ultimately came to head the "Manhattan Project." Groves, in turn, chose Robert Oppenheimer to coordinate the design of the bomb.

A single research and design facility, isolated and secret, was proposed. This would enable top scientists and engineers from all over the country to work together to complete this daunting task. A site had to be chosen. General Groves had several criteria: security, isolation, a good water supply, an adequate transportation network, a suitable climate, an available labor force, and a locale west of the Mississippi (Rothman 1992). Oppenheimer, who had visited the Pajarito Plateau as a young man, suggested Los Alamos, site of the Los Alamos Ranch School (Rhodes 1986).

The school's setting was indeed remote and afforded natural physical barriers for security, i.e., numerous canyons and cliffs. The ranch school had been in operation since 1918 and the 27 school buildings with numerous outbuildings could very easily support the small-scale facility Oppenheimer originally had in mind (LANL 1995a; LANL 1993a).

On November 25, 1942, the War Department approved the appropriation of the Ranch School and on December 7, 1942, the school was officially notified (LANL 1995a). Additional lands were acquired from nearby Government agencies, mostly Forest Service lands, and from the predominantly Hispanic homesteaders (Rothman 1992). With the graduation of the last class of the Los Alamos Ranch School in 1943, the Pajarito Plateau was balancing on the brink of change; a scientific revolution was in the making.

A suitable site selected, Oppenheimer and his staff moved to Los Alamos to begin work. The recruitment of some of the country's "best scientific talent" and the construction of technical buildings were top priorities (LANL 1995a:8). The University of California agreed to operate the site, code name "Project Y," under contract with the government (an arrangement that has continued to this day) (Figures 5 and 6). Although the fission bomb was conceptually attainable, many difficulties still stood in the way of producing a usable weapon. Technical problems

included assembling fissionable material into a supercritical mass, the timing of the release of energy from fissionable material, and the engineering challenges of having the device fit into a "deliverable" bomb casing. Nuclear material and high explosive studies were of immediate importance (LANL 1995a).

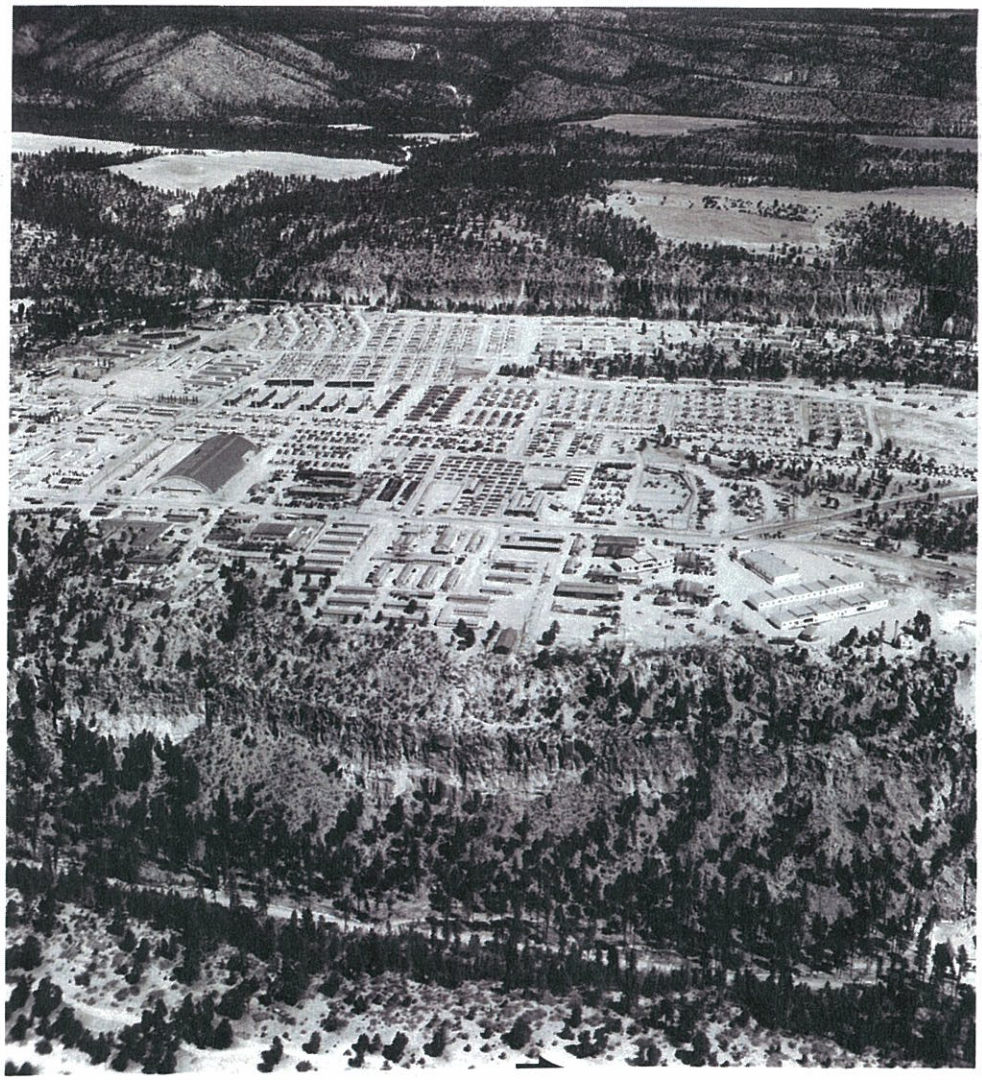


Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3113

Figure 5. Aerial view of Project Y, Los Alamos, 1947.

Two bomb designs appeared to be the most promising: a uranium "gun" device and a plutonium "implosion" device. The gun device was conceptually simple and involved shooting one subcritical mass of uranium-235 into another at sufficient speed to avoid pre-detonation. Together, the two subcritical masses form a supercritical mass that releases a tremendous amount of nuclear energy (Hoddeson *et al.* 1997). This method led to the development of the "Little Boy" device. Because it was conceptually simple, "Little Boy" was never tested before its use at

LANL#CIC-9:58-4257

Figure 6. Aerial view of early Los Alamos: TA-1 buildings around Ashley Pond, circa 1958.

Hiroshima. Scientists were less confident about the implosion design, which used shaped high explosives to compress a subcritical mass of plutonium-239. The symmetrical compression would increase the density of the fissionable material and cause a critical reaction. [A critical reaction is a sustained nuclear fission chain reaction (McGraw-Hill 1989 and LANL 1998).] This approach was much more difficult to perfect (LANL 1995a).

In 1944, the uncertainties surrounding the second design necessitated a search for an appropriate test site for the implosion method, later used in the "Fat Man" device. The Alamogordo

Bombing Range in south-central New Mexico was selected. A trial run involving 100 tons of TNT was conducted at "Trinity Site" on May 7, 1945. This dress rehearsal provided measurement data and simulated the dispersal of radioactive products (LANL 1995a). The Trinity test was planned for July and its objectives were "to characterize the nature of the implosion, measure the release of nuclear energy, and assess the damage" (LANL 1995a:11). The world's first atomic bomb was successfully detonated in the early morning of July 16, 1945. "Little Boy," the untested uranium gun device, was exploded over the Japanese city of Hiroshima on August 6, 1945. "Fat Man" was exploded over Nagasaki three days later on August 9, 1945. The war with Japan was essentially over.

Early Cold War Era (1946–1956)

Work for the Manhattan Project started slowing down with the end of World War II and many Los Alamos scientists and site workers went back to their pre-war existences. The future of Los Alamos was in question. With the beginning of the Cold War, weapons research once again became a national priority. Norris Bradbury had been appointed director of the Laboratory following Oppenheimer's return to his pre-World War II duties (LANL 1993a). Bradbury felt that the nation needed "a laboratory for research into military applications of nuclear energy" (LANL 1993a:62). In 1945, stockpiling and development of additional atomic weapons*[1] was an important Laboratory mission. In 1946, the Laboratory became involved in the technical direction of the atmospheric testing program in the Pacific, dubbed "Operation Crossroads." Later in 1946, the U.S. Atomic Energy Commission (AEC) was established to act as a civilian steward for the new atomic technology born of World War II. The AEC formally took over the Laboratory in 1947, making a commitment to retain Los Alamos as a permanent weapons facility. Postwar weapons research revolved around the development of advanced fission weapons* and, acting on an idea born in 1942, the development of the hydrogen bomb. The combined work of Edward Teller and Stanislaw Ulam led to the beginnings of the Laboratory's thermonuclear research program. In 1952, the first thermonuclear device, known as "Mike," was detonated at Eniwetok atoll in the Pacific (LANL 1993a).

Although weapons research and development* has always played a major role in the history of LANL, other key themes for the years 1943–1956 include early advancements in supercomputing, fundamental biomedical research and health physics* issues, explosives research and development, early reactor technology, pioneering physics research*, and the development of early high-speed photography.

Late Cold War Era (1957–1990)

The early years of the late Cold War era saw Los Alamos' continued support of the atmospheric testing programs* in the Pacific and at the Nevada Test Site (NTS). It was during this time period that the Laboratory also supported the many underground tests at NTS.

Other key defense mission undertakings during this time included treaty and test ban verification programs (such as using satellite sensors to detect nuclear explosion), research and development of space-based weapons, and continued involvement with stockpile stewardship* issues. Significant scientific themes during the years 1957–1990 are as follows:

[1] An asterisk denotes a LANL site-wide theme that has relevance to TA-21.

- Health and safety*, genetic research, and nuclear medicine advancements
- High-explosives research and development
- Reactor research*
- National Aeronautics and Space Administration (NASA) collaborations*
- Contained fusion reaction research* (Project Sherwood)
- High intensity x-ray research (the Pulsed High-Energy Radiographic Machines Emitting X-rays [Phermex])
- Linear and vertical accelerator research (Los Alamos Meson Physics Facility and Van de Graaff)
- Laser research
- Superconducting research*
- Alternative energy research*
- Nuclear safety advancements*
- Waste management and environmental cleanup technological innovations*

The following sections on plutonium and uranium research and on the origins of DP Site contain specific information intended to set the stage for the discussion of TA-21's historical context (Part 1, Section 3.0).

2.2 Plutonium and Uranium Research during the Manhattan Project

CM Division Research

In order to achieve the wartime goal of researching, developing, and testing the first atomic bomb, the chemical and metallurgical properties of various nuclear materials had to be researched. The Chemistry (C) Division was formed in 1943 and one of its first tasks was to develop methods to purify plutonium that would be coming to Los Alamos, first from Oak Ridge, Tennessee, and later from Hanford, Washington (LANL 1991). C Division was soon designated the Chemistry and Metallurgy (CM) Division (LANL Archives: Organization Charts Breakdown A-L).

Other early priorities of CM Division's radiochemistry program included the development of a neutron initiator for the first nuclear weapons and the preparation of materials for nuclear experiments. A metallurgy program was also begun at this time. The program included

> research and development on metal reduction of uranium and plutonium, on casting and shaping of these metals and compounds such as uranium hydride, and on various possible tamper materials. [Hawkins *et al.* 1983:21]

Necessary research on the physical properties of uranium and plutonium was conducted—especially research relating to metal alloys. The metallurgy group also supported the gun program and prepared projectile, target, and tamper materials (Hawkins *et al.* 1983).

While CM Division was developing processes for working with the as yet unreceived plutonium and uranium that would be used in the first bombs, the actual preparation of the fissionable core materials was being conducted on a parallel time line at Oak Ridge and Hanford (LANL 1993a).

> [Uranium-235] could be separated from natural uranium by a tedious, difficult physical process. [Plutonium-239] could be produced by bombarding the more abundant uranium isotope [uranium-238] with neutrons, and then chemically separating the created plutonium. [Hoddeson *et al.* 1997:2]

The separation of uranium-235 from uranium-238 could not be done using a chemical process. Two physical separation processes were being developed at Oak Ridge: gaseous diffusion separation and electromagnetic separation (LANL 1993a). Small quantities of plutonium for use at Los Alamos were first produced using an Oak Ridge "pile." However, larger production reactors were needed to produce the necessary volume of plutonium for bomb cores. Hanford reactors were soon producing plutonium nitrate for shipment to Los Alamos (LANL 1993a). The first plutonium-239 arrived at Los Alamos from Oak Ridge in October 1943. Larger gram amounts, first from Oak Ridge, then from Hanford, arrived early in 1944. The first kilogram of highly enriched uranium arrived from Oak Ridge in September 1944 (LANL 1993a).

Los Alamos scientists conducted the first experiments on methods of plutonium purification using other elements as stand-ins (LANL 1993a). This work was conducted in D Building, a wooden laboratory building located south of Ashley Pond in the main TA, TA-1 (Figures 7–10). Initial plutonium research, metallurgy, and World War II plutonium core production were carried out in this facility. The world's first significant piece of plutonium metal was produced in the centrifuge at D Building in the spring of 1944.

> This was accomplished by placing the reaction mixture in a cone-shaped refractory liner sealed inside a steel "bomb." [In this context, a "bomb" is a closed vessel, not a weapon.] The bomb was heated rapidly to a high temperature while rotating. As the reduction took place the metal was thrown together in the tip of the liner, producing a good yield of coherent metal. [LANL 1993a:28]

Although the first method of producing plutonium metal relied on centrifugal force, later research showed that gravitational force, along with calcium, iodine, and heat, was adequate. This method, the stationary "bomb" method, was ultimately used for the later, larger-scale production of plutonium (LANL 1993a).

Plutonium, Uranium, and the Gun Method

Of the two earliest weapon designs, the gun method was easier to develop than the implosion method. Furthermore, Los Alamos scientists thought that both uranium and plutonium could be used with the gun design. The implosion design was recognized early on as a technically efficient approach, but was primarily intended to be a back up to the gun device in case unexpected problems arose. Initial research on implosion was seen more as an intellectual challenge. In 1943, Oppenheimer, confident in the success of the gun program, allowed a small number of scientists to pursue this alternative approach (Hoddeson *et al.* 1997).

In 1944, the gun design was determined to be unsuitable for use with plutonium. The main reason being that plutonium produced in nuclear reactors contained an isotope (plutonium-240) that released neutrons. This high-neutron background would cause a chain reaction to start

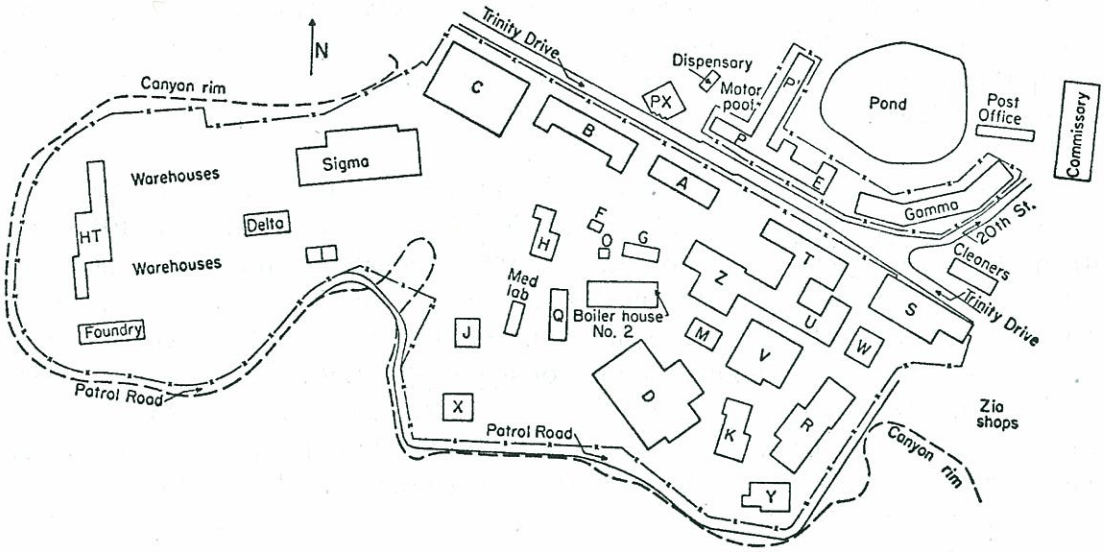
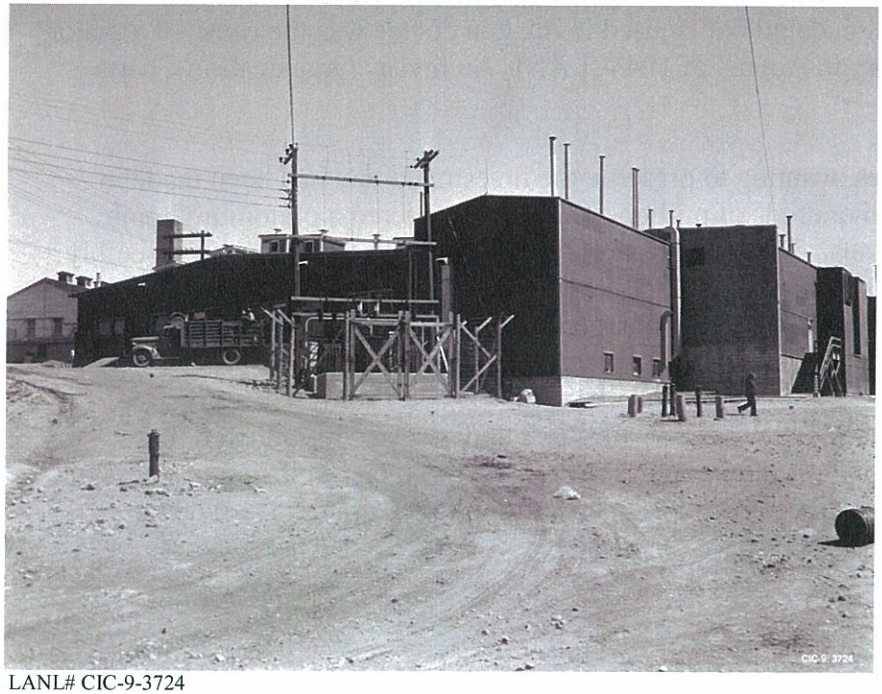


Figure 7. TA-1 map.

Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3029

Figure 8. Aerial view of D Building in foreground, 1946.



LANL# CIC-9-3724

Figure 9. D Building at TA-1, circa 1943 (under construction).

LANL# CIC-9:6163

Figure 10. D Building at TA-1, circa 1947.

prematurely if an assembly method as slow as the gun device was used (LANL 1993a). The realization that reactor plutonium could not be used in the gun device was the cause of a major reorganization at the Laboratory in August of 1944 (LANL Archives: Organization Charts Breakdown).

> A crisis ensued. Groves, wanting to preserve the investment that had been made in plutonium production (hundreds of millions of dollars), ordered a plutonium bomb assembled by other means. The only possible alternative was implosion, an assembly explored thus far at Los Alamos only as a contingency . . . . As a result, Los Alamos was forced to turn its relatively small implosion program into a model "big science" effort involving hundreds of workers. [Hoddeson *et al.* 1997:3]

Fortunately, the development of the gun weapon was well underway. This allowed the Laboratory to mobilize its limited resources and accelerate research on implosion in hopes of developing a plutonium weapon that could be used in addition to the uranium gun device (Hoddeson *et al.* 1997 and Rhodes 1986).

2.3 DP Site Origins

The shift in priorities eventually led to an increased reliance on large-scale plutonium processing. In September of 1945, the operations in D Building were moved to the newly constructed facilities on the west end of DP Site (LANL 1991) (Figures 11 and 12). Uranium and plutonium operations were transferred to the then state-of-the-art laboratory buildings. The work at DP West concentrated on the development of chemical and physical processes needed to purify fissionable material used to produce weapons-grade metal for nuclear weapons (LANL 1999).

Nitrate solution feedstock, primarily from Hanford, was purified to produce plutonium metal and metal alloys. Several processing steps were necessary to separate the plutonium and other actinides from the nitrate solution. Early research focused on the development of new purification and recovery techniques—purification byproducts were reprocessed to recover as much of the valuable plutonium and uranium as possible (LANL 1991).

DP East also began its operations in September of 1945. The new laboratory facilities on the east side of DP Site were smaller in scope than those at DP West. The buildings housed polonium and actinium processing operations, previously carried out in H Building at TA-1. This work with neutron sources was essential to the production of nuclear weapon initiators (LANL 1991).

Origins of the Name "DP"

There are several explanations of what the letters 'D' and 'P' stand for in relation to the Laboratory operations conducted at DP Site.

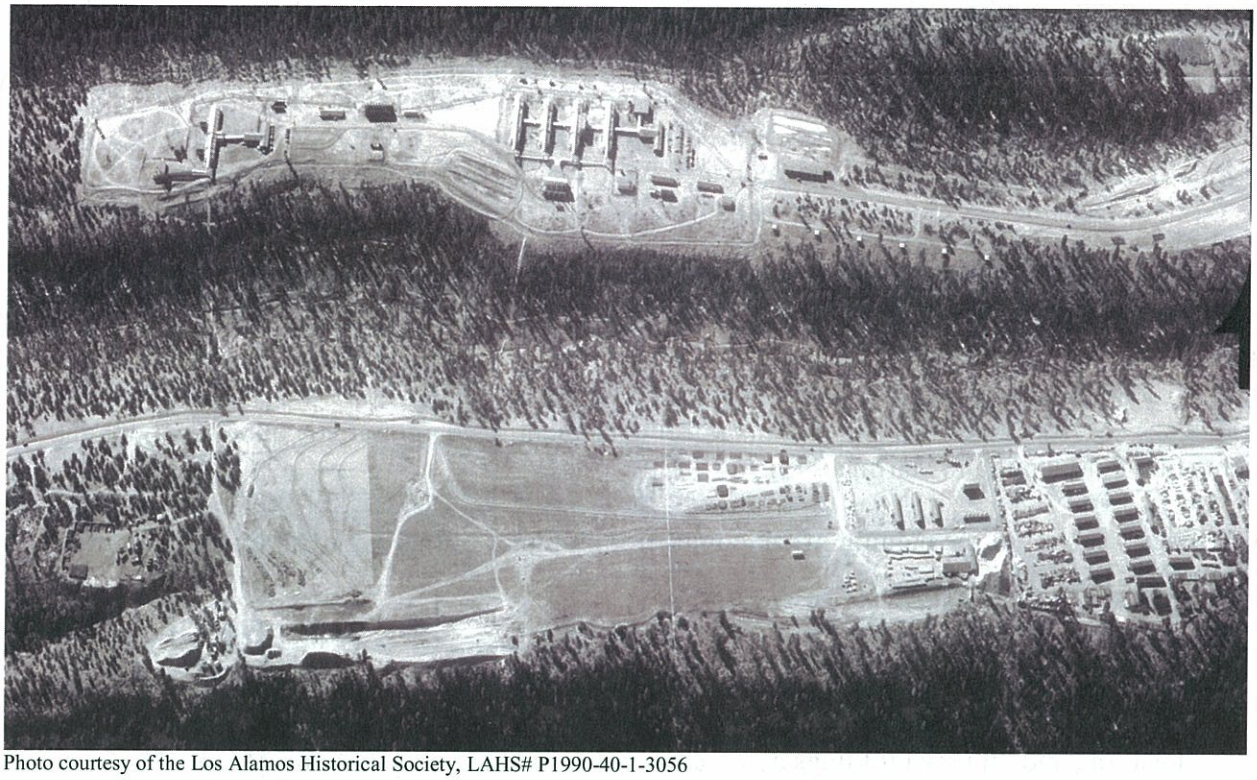


Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3056

Figure 11. Aerial view of DP Site, December 1946 (looking south; DP West is building cluster at upper right, DP East is at upper left).

LANL# CIC-9:6003

Figure 12. View of DP West, showing Buildings 2, 3, 4, and 5, circa 1947.

In a 1979 *Atom* article, the origin of the term "DP" is related to the common Manhattan Project practice of designating secondary buildings as the "prime" of a main building. Since DP Site was a direct outgrowth of the activities at D Building, this explanation logically concludes that "DP" stands for "D-prime." Another explanation mentioned in this article, although only a rumor, is that the name "DP" actually means "Displaced People," perhaps alluding to the somewhat isolated location of the new technical buildings (LASL 1979).

In a 1999 interview, Ron Stafford, a former DP Site worker, said that he had been told by William Maraman that "DP" stood for "D Building where they were going to do Plutonium operations" (Stafford 1999:1). Craig Martin's book on Los Alamos place names lists even more explanations for the naming of DP Site: "Damn Plumbers," "Devil's Productions" (attributed to early resident Eleanor Jette), and "D-Production" (attributed to early Laboratory administrator R. H. Dunlap). Martin states that some of his informants mentioned a possible connection with the scientist D. P. Macmillan (Martin 1998).

The earliest account of the naming of DP comes from minutes of the Plant Building Committee written by J. Burke in 1945.

> Due to the confusion that has been created because of the use of D Site for designating the plant location, it has been decided to change the name to DP Site. This site will include the new plant, the building being built for Dodson, the power house, the tank location, and all new buildings associated with any of these operations. [Burke 1945:1]

These minutes seem to suggest that 'P' stood for plant. However, Burke later stated in a 1981 article that 'P' stood for polonium (LANL 1995b). Ed Hammel, an early Los Alamos plutonium scientist, independently substantiates Burke's 1981 account. In Hammel's recent book, *Plutonium Metallurgy at Los Alamos, 1943–1945,* he recounts the following:

> On January 18, 1945, the roof of C-shop (one of the two Tech Area machine shops) caught fire. It was quickly extinguished, but the event focused attention on the consequences of a similar occurrence in D-Building, which clearly would have been catastrophic. A decision was quickly made to design and build a "fireproof" plutonium-handling facility about a mile and a half from the main Tech Area.... The facility was designated DP-site (it was initially called "D-Site" after the parent D-Building). After another building was added to process polonium, the name was changed to "DP-Site." [Hammel 1998:100]

3.0 HISTORICAL CONTEXT FOR THE TA-21 SITE

Manhattan Project/Cold War—Nuclear Chemistry and Metallurgy - 1945 to 1990

3.1 Themes

The following nine themes and their associated sub-themes provide the primary historical context within which to evaluate the historic resources at TA-21, "DP Site." The amount of

information presented about each theme is not necessarily an indication of the importance of the theme; rather, it may just be an indication of the availability of information. For example, much of the research conducted at TA-21 was originally "classified" and specific information related to some of the themes discussed in this report remains "classified" even today. A summary of the themes and an evaluation of their significance follow this section.

1) Plutonium Processing at DP West (1945–1977)

In 1941, Glenn Seaborg and his colleagues at the University of California discovered plutonium. Plutonium has 15 different isotopes. One isotope, plutonium-239, readily undergoes fission and is used as the "core" of nuclear devices (Rhodes 1986).

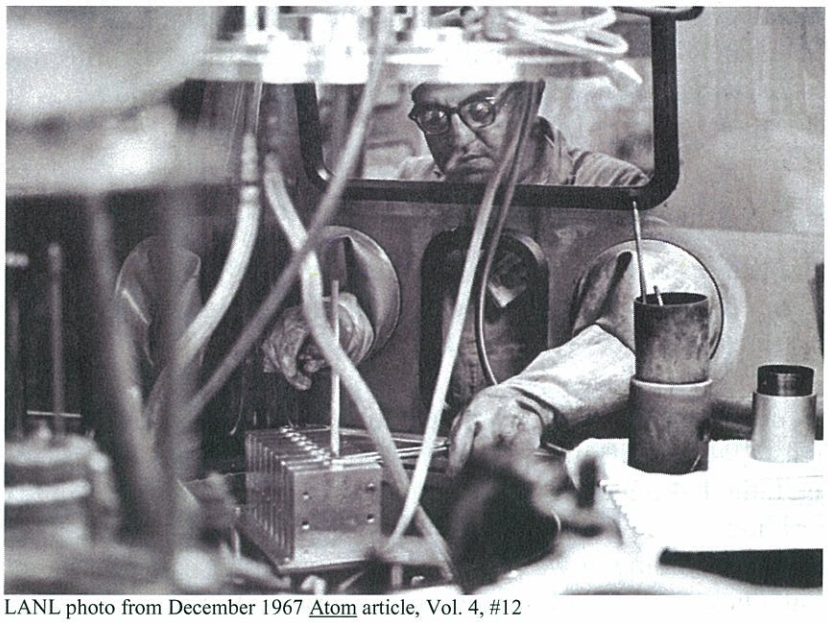
The earliest plutonium purification and recovery operations at Los Alamos were carried out from February 1944 to August 1945 in D Building, TA-1 (Christensen and Maraman 1968). Before the end of World War II, the Laboratory had already made the decision to continue nuclear weapon production. Although the plutonium used in the "Trinity" and "Fat Man" implosion devices was processed in D Building, it was apparent that any large-scale plutonium work would have to be conducted at a new facility. Plutonium processing at DP Site became fully operational just as World War II was ending (LANL 1983).

The plutonium nitrate from Hanford was relatively impure—new processing techniques had to be developed and associated equipment had to be fabricated. Plutonium work at DP West revolved around several key operations: purification, metal production, metal fabrication, and recovery (LANL 1983) (Figures 13–17).

After the war, the decision was made to transfer plutonium and uranium processing activities to Hanford, Savannah River, Rocky Flats, and Oak Ridge. Los Alamos was tasked solely with research and development activities; however, until new post-war production plants were built, DP Site was the only place in the world where weapons-grade plutonium could be processed (LANL 1983). Indeed, Los Alamos continued to fabricate plutonium weapon components during the 1940s and early 1950s. These operations were ultimately transferred to Rocky Flats in the 1950s (LANL 1995b).

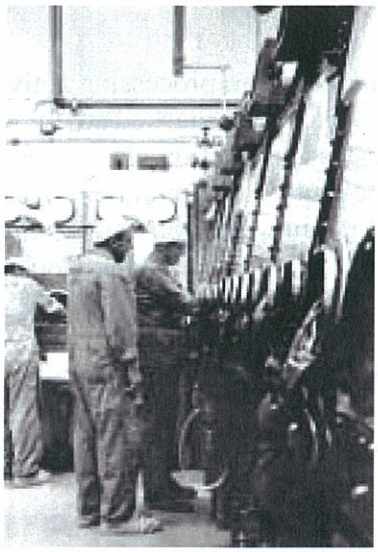
> The work at DP West thus settled into a program of basic research and development, and major advances were made in the fledgling plutonium technologies of vacuum casting, metal working, machining, electrorefining, and aqueous processing of scrap. [LANL 1983:146]

Plutonium processing advances also included improvements in the reduction process—improvements that yielded a purer product and reduced the risk of exposure to workers. Reusable foundry hardware, new ceramic coating processes, and chilled aluminum casting techniques were developed, greatly improving the processing operations. Furthermore, new plutonium alloys were developed for use in both reactors and weapons. Delta Prime, a new phase of plutonium, was discovered in 1954. This discovery was made possible due to increases in the purity of plutonium (LANL 1983).



LANL photo from December 1967 Atom article, Vol. 4, #12

Figure 13. A plutonium worker from the metal fabrication section removes a rod of plutonium from a mold.

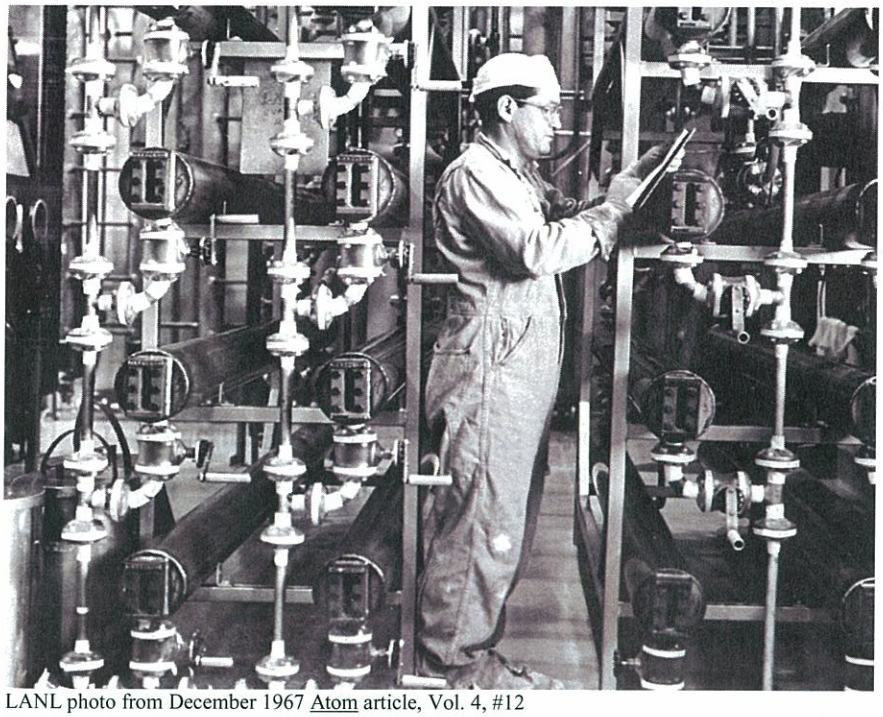


LANL photo from December 1967
Atom article, Vol. 4, #12

Figure 14. Workers from the plutonium recovery section work at the glovebox line.

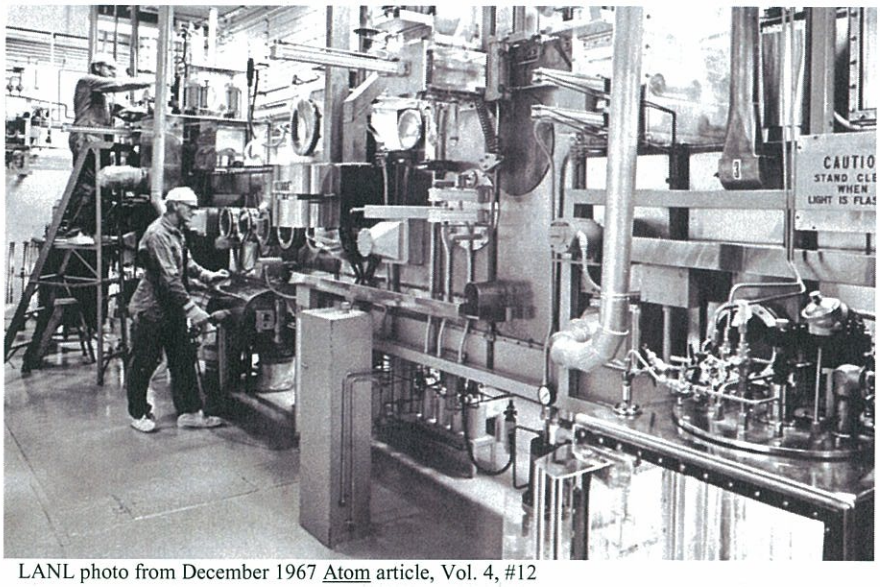
LANL photo from December 1967 Atom article, Vol. 4, #12

Figure 15. A worker operates a control panel of the metal production facility where plutonium nitrate solution is being converted into plutonium metal.



LANL photo from December 1967 Atom article, Vol. 4, #12

Figure 16. A worker from the plutonium recovery section logs the contents of storage tanks containing plutonium solutions.



LANL photo from December 1967 Atom article, Vol. 4, #12

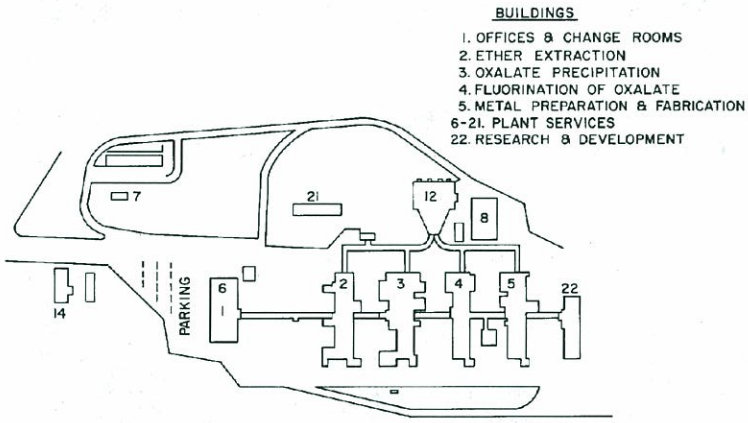
Figure 17. Workers on the plutonium metal production line. Worker at ground level is adding calcium and iodine, part of the final metal production process.

Over the years, weapons components developed at DP West were tested in the Pacific and at the NTS in support of the United States' atmospheric and underground testing programs (LANL 1983, Stafford 1999).

In 1978, the plutonium operations at DP Site were transferred to the new state-of-the-art Los Alamos Plutonium Facility at TA-55 (LANL 1983).

DP West Site Facilities

DP Site started its plutonium purification and recovery operations in September of 1945 (Figures 18–22). The DP West facilities were designed to process plutonium in larger quantities on a routine basis: ether extraction operations were in Building 2, oxalate precipitation operations were in Building 3, dry chemistry operations for conversion of oxalate to fluoride were in Building 4, and fluoride reduction and metal casting and machining operations were in Building 5 (Figure 18). The importance of plutonium recovery has been well understood since the earliest Manhattan Project years at Los Alamos. The initial scarcity of plutonium spurred researchers to develop methods for the recovery and purification of plutonium lost during fluoride reduction, the processing step that produces molten metallic plutonium (Christensen and Maraman 1968 and LASL 1967a).

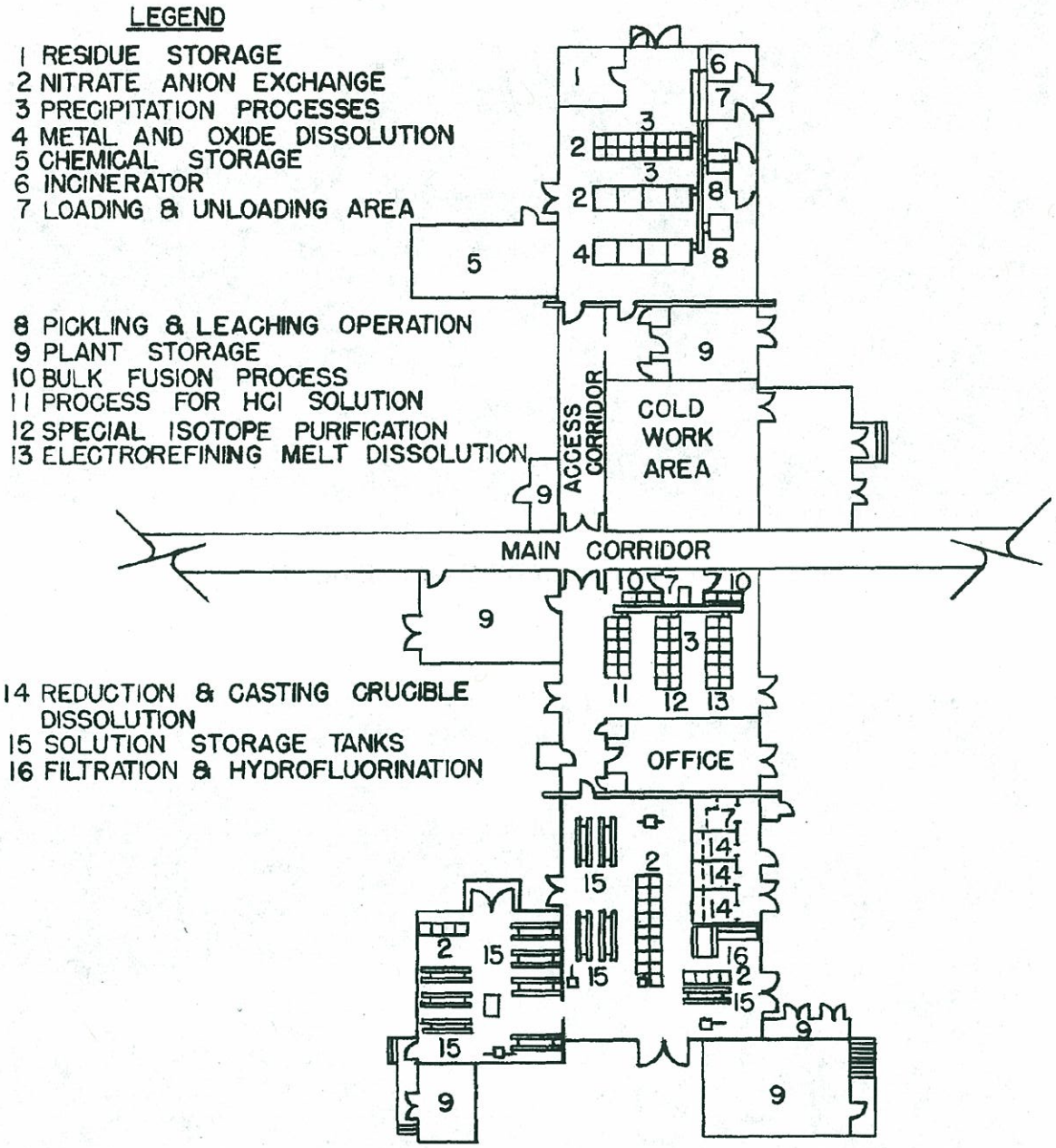


Drawing from Christensen and Maraman 1968, p. 8

Figure 18. General layout of DP West.

The plutonium recovery and purification processes were later consolidated into Building 2 (Figure 19). This rearrangement of operations was made possible by engineering improvements and advancements in research and development (Christensen and Maraman 1968). In addition to the processing of plutonium-239 and plutonium-241, americium-241 recovery and waste storage activities were also conducted in Building 2 (Garde *et al.* 1982, Stafford 1999).

From 1945 to 1948, part of the north half of Building 4 was a developmental laboratory for plutonium research. It was converted to an enriched uranium hydride production area in 1948. In 1960, the hydride equipment was removed and irradiated plutonium and enriched uranium fuel element research was conducted (Garde *et al.* 1982). After the consolidation of the recovery and purification operations in Building 2, enriched uranium recovery operations were established



Drawing from Christensen and Maraman 1968, p. 9

Figure 19. Recovery facilities at Building 2, DP West.

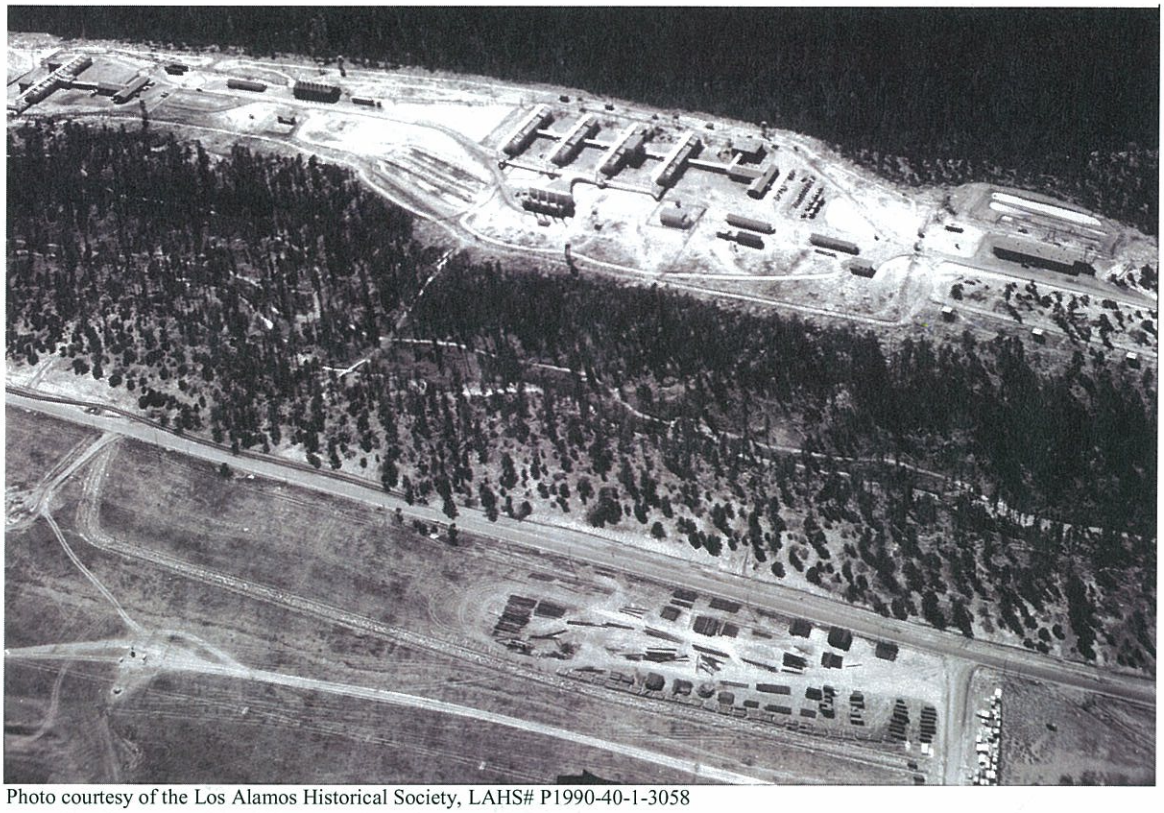


Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3058

Figure 20. Aerial view of DP West facilities, 1946.

Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3059

Figure 21. Aerial view of portions of DP West shown in foreground, 1947.

Photo courtesy of the Los Alamos Histsorical Society, LAHS# P1990-40-1-3059

Figure 22. Aerial view of DP West including main plutonium processing buildings, administration building, and filter building, 1946.

in Buildings 3 and 4 South in the mid-1940s (see "Uranium Recovery at DP West" below) (Garde *et al.* 1982, Stafford 1999).

Plutonium fabrication continued in Building 5. Work involved the production of high-purity plutonium-239 metal and metal alloys and precision plutonium parts for nuclear devices (Garde *et al.* 1982, Stafford 1999). In Building 5, the plutonium was machined in gloveboxes using lathes, milling machines, and grinders (Stafford 1999).

> Most of the gloveboxes used at Los Alamos are interconnected into trains, or suites, in such a way that a series of related operations can be performed on materials without taking it out of the enclosure. [Coffinberry and Waldon 1956:364]

2) Uranium Processing and Recovery at DP West (1950s–1984)

The Enriched Uranium Processing Facility at TA-21 was established in the 1950s to recover and recycle enriched uranium from scrap such as solution, rags, metal pieces, and unused fuel elements (Figure 23). The scrap material came from Los Alamos and other nuclear laboratories. The Enriched Uranium Processing Facility also prepared uranium metal, alloys, and compounds for weapons and energy programs (Penneman 1992, Johnson 1984).

Uranium-235 was recovered and concentrated in Building 3 South, the "Concentration Plant." In Building 4 South, the uranium was converted to oxide, then to fluoride, and finally to uranium metal. This operational area was known as the "Final Recovery and Purification Plant." The Enriched Uranium Processing Facility ceased operations in 1984 (Penneman 1992, Johnson 1984).

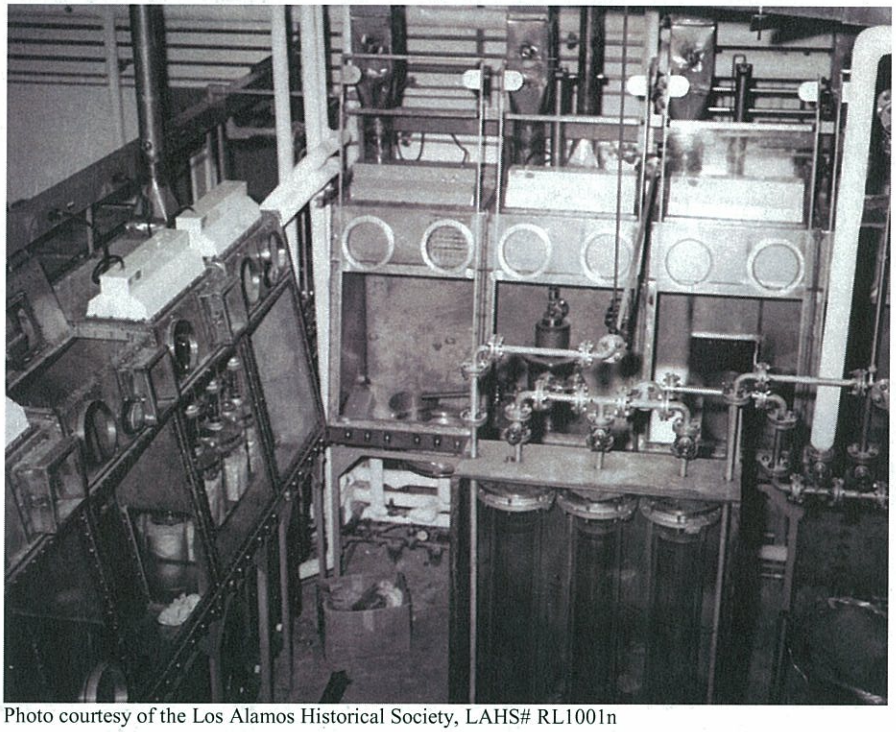


Photo courtesy of the Los Alamos Historical Society, LAHS# RL1001n

Figure 23. Hoods used in uranium recovery operations. In the foreground are the "ever-safe" glass storage tanks. TA-21-3 South, circa 1957.

3) Initiator Research and Development at DP East (1945–1955)

Nuclear weapons rely on devices, known as "initiators," to supply a source of neutrons that will quickly enhance the chain reaction at exactly the right moment (LANL 1993a). During the Manhattan Project at Los Alamos, polonium, a powerful source of alpha particles, was used in conjunction with beryllium in the first initiators (Rhodes 1995).

> Serber had proposed using radium-beryllium or polonium-beryllium initiators. Even before the war, Po 210 mixed with beryllium was a popular neutron source. The isotope's 140-day half-life was long enough to be stockpiled, yet short enough for the alpha particle flux to remain relatively high. Moreover, polonium could be obtained by ordinary chemical processes. [Hoddeson *et al.* 1997:119]

The biggest challenge in developing the first initiators was to control the release of neutrons (Rhodes 1986). When polonium comes in contact with beryllium, the alpha particles from the polonium encroach upon the beryllium and yield neutrons.

> Attention focused on how best to mix the polonium and beryllium to initiate the reaction, and how to keep the two substances separate until the neutrons were needed. [Hoddeson *et al.* 1997:316]

The alpha source and the beryllium could be kept apart in the gun device: one material with the bullet and the other with the target. The implosion device posed a greater problem for initiator design since the materials could not be easily separated. The polonium and beryllium would need to be side by side in the plutonium core until, at the last moment, the high explosives would squeeze the core and mix the two materials together. The eventual solution to the problem was to sandwich the polonium in metal foils, inhibiting the range of its emitted alpha radiation (Rhodes 1986).

Early polonium research was both novel and hazardous.

> Use of polonium for the implosion initiator was a major technical achievement that involved a lot of basic research into its chemical and 'metallurgical' properties. [Hawkins *et al.* 1983:224]

There were problems to overcome: how to prepare enough polonium, how to prepare the foils to uniform standards, and how to coat foils against escaping polonium and alpha particles. Polonium is extremely mobile and has high alpha activity. These factors make polonium work very dangerous because it is easily introduced into the human body (Hawkins *et al.* 1983).

The polonium used at Los Alamos came from bismuth irradiated in the Clinton pile. The Monsanto Chemical Company, Dayton, Ohio, separated the polonium from the bismuth, deposited the polonium on foils, and shipped the foils to Los Alamos. Some purification research was conducted at Los Alamos, but Monsanto was responsible for the majority of the polonium purification work (Hawkins *et al.* 1983).

In 1945, in large part due to the hazardous nature of polonium, the plans for DP Site were changed to accommodate polonium processing. Like the plutonium operations in D Building, the polonium research facilities in the main technical area (TA-1) were inadequate for working with larger quantities of material. Upgraded ventilation systems and improved laboratory equipment were necessary to protect the polonium workers (Hawkins *et al.* 1983).

Initiator production at DP East started in September of 1945 in Buildings 151 and 152 (Hawkins *et al.* 1983) (Figures 24 and 25). CM-15 was the original group responsible for initiator research. In 1945, CM-15 became CMR-3 (LANL Archives: Organization Charts Breakdown A-L). Early CMR-3 work at DP East focused on polonium research and recovery along with the fabrication and calibration of finished neutron sources (LANL Archives: CMR-3 Monthly Reports).

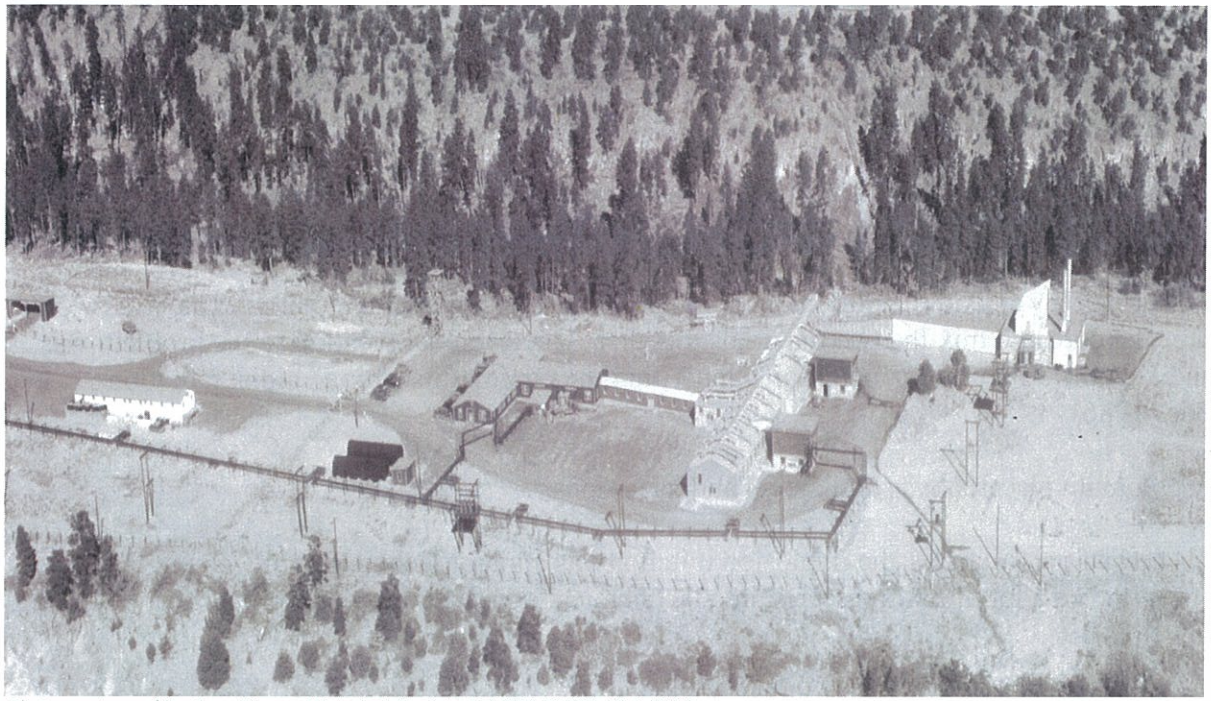


Photo courtesy of the Los Alamos Historical Society, LAHS# P3990-40-1-3064

Figure 24. Aerial view of DP East, looking north, 1946.

Photo courtesy of the Los Alamos Historical Society, LAHS# P1990-40-1-3065

Figure 25. Aerial view of DP East, looking south, November 1946.

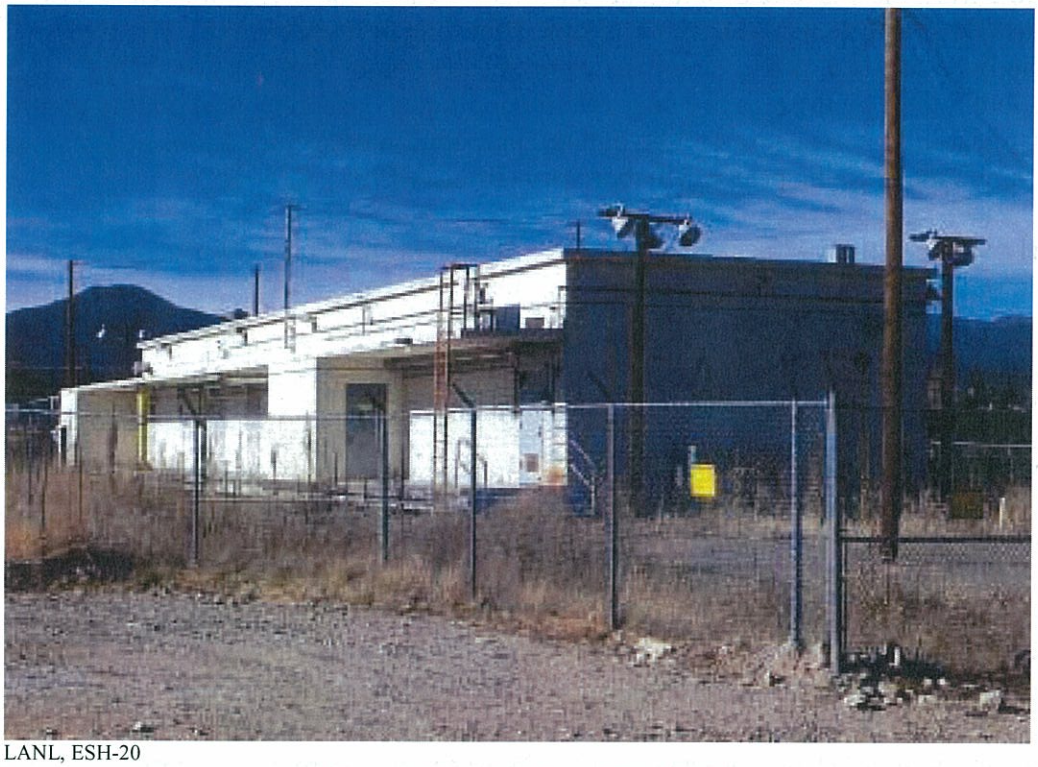
DP East research included the perfection of a variety of initiator designs in support of the Operation Crossroads atomic tests and NTS tests. Evolution of initiator design also included testing other materials to be used in place of polonium.

In 1948, actinium research was reactivated but the major emphasis was still on polonium research, which continued during the late 1940s and early 1950s. New initiator designs were developed during 1953 and 1954 and polonium and polonium/beryllium were used less (LANL Archives: CMR-3 Monthly Reports). By 1955, most of the initiator research and development work had been transferred to the Mound Plant in Ohio.

In 1956, CMR-3 became CMB-3. From 1945 to 1956 the group name also changed—first "Polonium Chemistry," then "Initiation Chemistry," and finally "High Temperature Chemistry" (LANL Archives: Organization Charts Breakdown A-L). In the later 1950s and 1960s, CMB-3 focused its research on high temperature chemistry studies and Project Rover (LANL Archives: CMR-3 and CMB-3 Monthly Reports).

4) Nuclear Material Stockpile Issues (1945–1977)

The very early years at DP Site—just at the end of World War II and before the AEC's involvement with the Laboratory in 1947—were extremely important to the nation's earliest stockpile of critical atomic weapons components. Plutonium pit manufacture and storage activities, although later shifted to other AEC facilities, were centered in the plutonium operations area at DP Site. Uranium and plutonium metal resulting from the operations at DP West were secured and stored in TA-21-21, the vault building (LANL 1991) (Figure 26).



LANL, ESH-20

Figure 26. Building TA-21-21.

Immediately after the end of the war, the Laboratory had to change the focus of its entire program (Rhodes 1995). Improvement of the Fat Man design and development of new weapons designs were early post-war priorities (Ullrich 1998). Although there was an awareness of the need for a stockpile of weapons, the number ready for immediate use was quite small. In a 1983 interview, Los Alamos scientist Carson Mark discussed the stockpile situation in 1946.

> To the extent that the production plants produced material, it was converted, as near as could be managed, into devices that could have been used, had there been an occasion. But, as I mentioned earlier, there was a large slump in production at the end of '45. Consequently we were not making tens of weapons per month or anything of that kind. It was necessary to take two to Bikini Island for Operation Crossroads in the first half of '46, and at that time they were not a trivial fraction of the stockpile. [LANL 1983:35]

In the spring of 1946, the Laboratory's Z Division in Albuquerque was making some progress on testing, development, stockpile assembly, and bomb assembly. However, this group, the precursor of present-day Sandia National Laboratories, was the only organization other than the Laboratory's Operation Crossroads group that was capable of bomb assembly. In fact, many people that worked in Z Division were also members of the Operation Crossroads group (Ullrich 1998 and Roger Meade, LANL Archivist, personal communication February 2000). In June 1946, components for only a few operational Fat Man bombs were in the U.S. nuclear weapons stockpile. Several other Fat Man devices were available but lacked initiators. The scarcity of ready weapons was directly linked to problems with the production of plutonium at Hanford. By late 1949, however, the atomic arsenal had increased dramatically (Rhodes 1986).

Another change from the wartime program at Los Alamos came about with the realization that the nation's usable stockpile would have to be stored for long periods of time. The weapons would ultimately be handled, not by scientists using select components in a controlled environment, but rather, by the military under field conditions. Issues such as quality control, parts interchangeability, personnel training, and the preparation of specifications and manuals suddenly became crucial to the post-war Laboratory (Rhodes 1995).

From the early 1950s to the 1970s, the vault at DP Site was primarily used for the storage of new designs of plutonium and uranium pit components.

5) Non-Weapons Research (1945–1990)

Nuclear Chemistry at DP West

Americium-241

In the late 1940s, americium was a relatively unexplored new element. At DP West, the original americium chemistry program focused on americium-241, an isotope formed by the beta decay of plutonium-241. Laboratory group CMR-4 isolated the first gram of americium in Building TA-21-3 North. By the 1950s, DP West was the world's center of research on americium. Los Alamos scientists wrote much of the classic literature on americium during this time (Penneman 1994). Although the research operations were located in Building TA-21-3, americium-241 recovery operations were conducted in Building TA-21-2 South (Stafford 1999).

In later years, americium-241 was processed at DP West for commercial applications. Formerly stockpiled material and material from Hanford called "Hanford Ash" were separated and

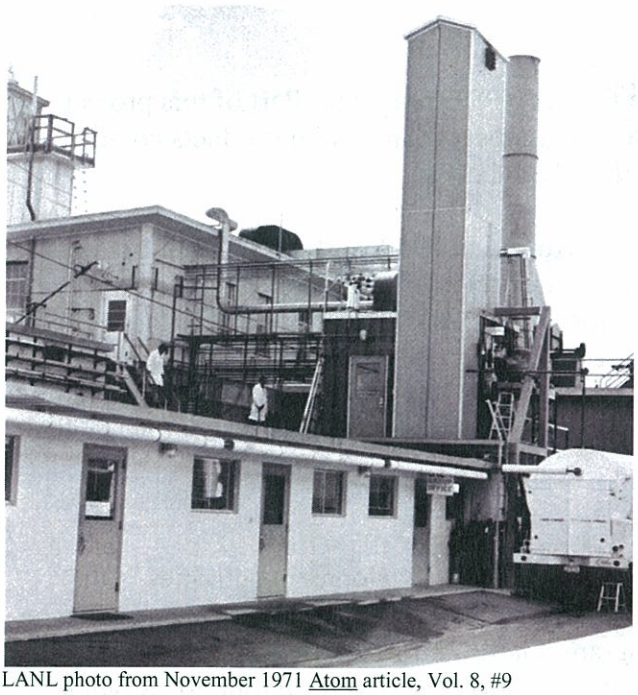
purified. The resulting americium-241 was very pure and was sold to a company making smoke detectors and fire detectors. This company used the americium-241 as an ionization source (Stafford 1999). Americium-241 ionizes the air molecules between a pair of electrodes allowing a current to flow between the electrodes. Smoke particles, if present in the air, adhere to the ionized air molecules and the flow of current is reduced, setting off an alarm.

Continued Isotope and Structural Chemistry Work at DP West

In the 1970s, inorganic and structural chemistry research had mostly supplanted earlier research with radioactive elements at TA-21-3 North (Penneman 1994). After the decontamination of DP West, which started in the summer of 1978, CNC-4 (later INC-4) continued its operations in Building TA-21-3 North but also acquired Buildings TA-21-4 North and TA-21-150 (Penneman 1994, Garde *et al.* 1982, and LASL 1979). In 1991 approximately 75 to 100 INC-4 group members were working at DP West and were conducting research in condensed-phase spectroscopy, organo-metallic chemistry, actinide chemistry, bioinorganics, and environmental chemistry (LANL 1991).

ICONS

CNC-4's Isotopes Separation section separated isotopes of carbon, oxygen, nitrogen, and sulfur (ICONS) at Building TA-21-3 North for use in basic chemistry, biology, medicine, agriculture, and environmental improvement. Clinical and environmental research and development programs use these isotopes to trace material containing carbon, oxygen, nitrogen, or sulfur. Facilities at DP Site included long distillation columns that passed from a tower structure down into 100-ft deep subfloor holes (LASL 1971) (Figure 27).



LANL photo from November 1971 Atom article, Vol. 8, #9

Figure 27. Tower structure, at right, used to house ICONS distillation columns, Building TA-21-3 North.

Plutonium-238 and Plutonium-239 Fuels

Space Heat Sources and Other Advanced Fuels

By the late 1950s, scientists at Los Alamos began to realize that the weapons program was not going to provide funding for all aspects of research. The research and development sections, in particular, began the search for other sources of funding. Non-weapons research originating from this period of programmatic diversification include the plutonium-238 heat source program and the Los Alamos Molten Plutonium Reactor Experiment (LAMPRE) program, an early reactor fuel project (Green 1999).

Plutonium-238 heat sources and plutonium-239 reactor fuels were both developed at DP West. Research and development activities associated with plutonium-238 and plutonium-239 were conducted at Buildings TA-21-3, -4, -5, and -150—the "Plutonium Fuels Development Facility" (LANL 1983, Maraman *et al.* 1975, Stafford 1999, and Green 1999).

SNAP

Systems for Nuclear Auxiliary Power (SNAP) devices convert heat energy from radioisotope decay into electrical energy. In 1959, the first sample of Pu-238 metal was produced by CMB-11. The metal was then used to fabricate a SNAP power source using plutonium. This first encapsulation of a plutonium-238 heat source was carried out in Building TA-21-5 (Stafford 1999 and Green 1999). Plutonium-238 heat sources have been used to power unmanned weather stations, navigational buoys, satellites, and spacecraft instrumentation (LASL 1967b). These SNAP power sources also support space electric power applications and have been used on manned space flights including the space shuttle Challenger (Garde *et al.* 1982 and Green 1999). Heat sources keep the engines and electronic systems of satellites and deep space probes working in the cold of space (Stafford 1999).

LAMPRE Program

In 1956, CMB-11 started making contributions to the LAMPRE program. Part of this project involved the reprocessing of reactor fuel at high temperatures so that fission products could be removed and unused plutonium could be recovered (LASL 1967b).

LAMPRE work was carried out in Building TA-21-4 North. In 1959, a plutonium hot cell was added to the north side of Room 401 for use in the research and development of recovery techniques associated with TA-35's LAMPRE reactor (Figure 28) (Green 1999 and Stafford 1999). In 1959, a reactor fuel program was also begun. This program focused on the development of ceramic and cermet (alloys of ceramic materials and metals) plutonium materials for use in reactors since pure metallic plutonium cannot be used—it expands and contracts when it is heated or cooled (LASL 1967b).

LMFBR

Building TA-21-150 was built in 1963 to house plutonium fuels development activities. One fuel program investigated the suitability of plutonium-containing ceramic materials for use in the Liquid Metal Fast Breeder Reactor (LMFBR) program (Garde *et al.* 1982). Plutonium-239 advanced fuels for the LMFBR program included fuels of mixed uranium-plutonium carbides and nitrates (Green 1999, Maraman *et al.* 1975, Garde *et al.* 1982). Plutonium-239 fuels are

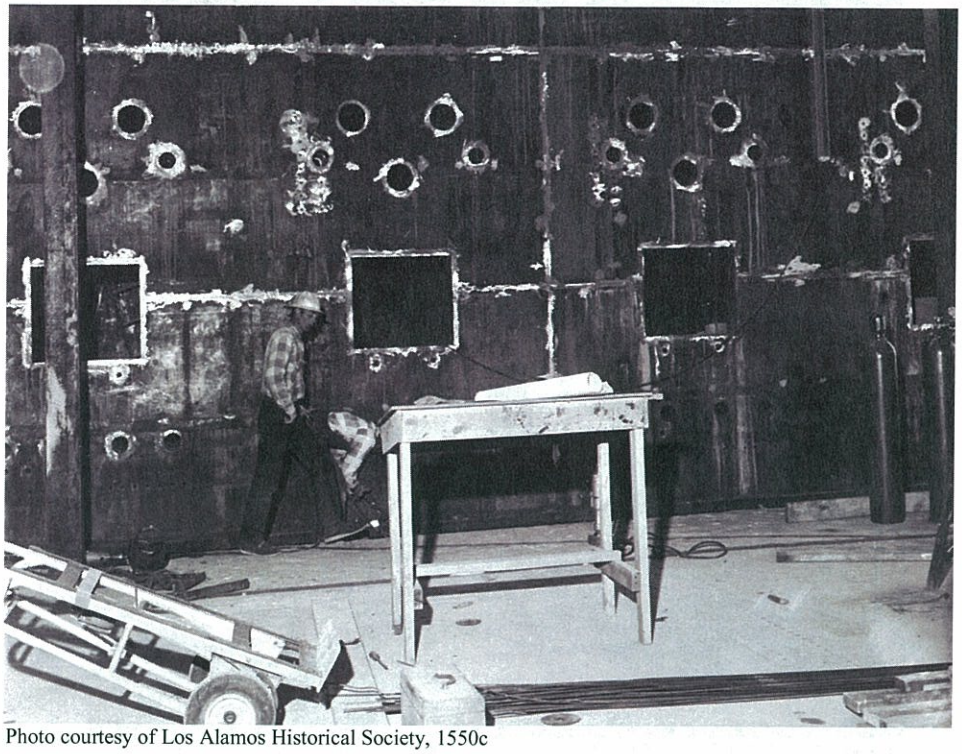


Photo courtesy of Los Alamos Historical Society, 1550c

Figure 28. Plutonium hot cell construction, January 1959.

important to the nuclear power industry, especially for use in breeder reactors, a reactor that produces more fuel than it can consume (LASL 1967b).

Artificial Heart Program

In the 1960s and 1970s, the Laboratory was involved in the development of a plutonium-238 heat source for the artificial heart (Figures 29–32). Much of this work was conducted in Building TA-21-4 North (Room 401) (Green 1999 and Stafford 1999).

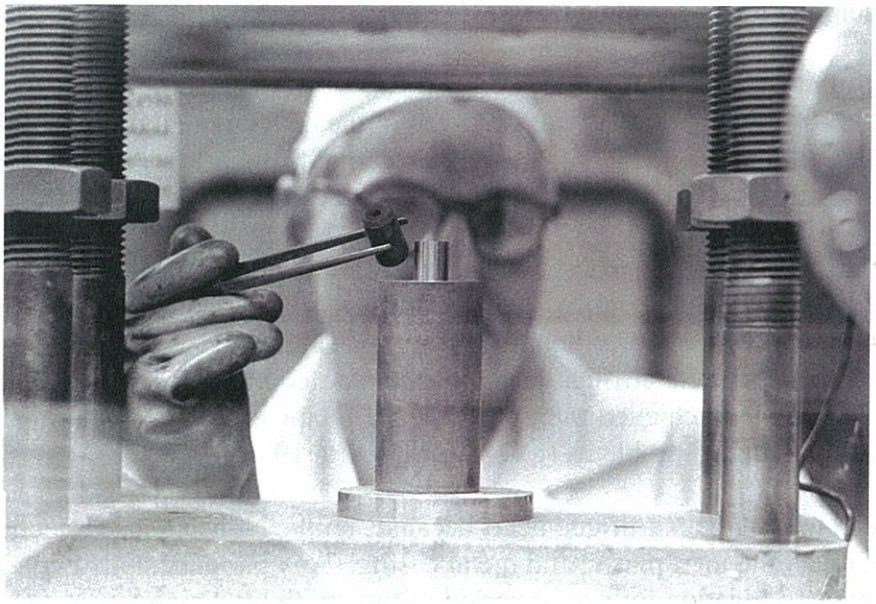
Medical scientists have been developing and testing artificial hearts since the 1950s. The first temporary booster pump was successfully implanted in 1966. The first completely artificial human heart was implanted in 1969, although it was not designed to be a permanent replacement. The first permanent artificial heart was implanted in 1982. Artificial heart technology today has not yet achieved true success since recipients of the modern heart designs often suffer strokes and related problems (Microsoft Encarta 1997).

Researchers wanted to design an artificial heart because, unlike human tissue rejection, the patient would not reject the inert plastic and metal casing. Any permanent artificial hearts, however, would have to function for a long period of time with little maintenance (LASL 1975).

In 1967, the AEC started a program to develop the power supply for the artificial heart (LASL 1975, LASL 1970). CMB-11, housed at DP Site, was tasked to conduct research and development activities. The Westinghouse Corporation was to design and manufacture the heart

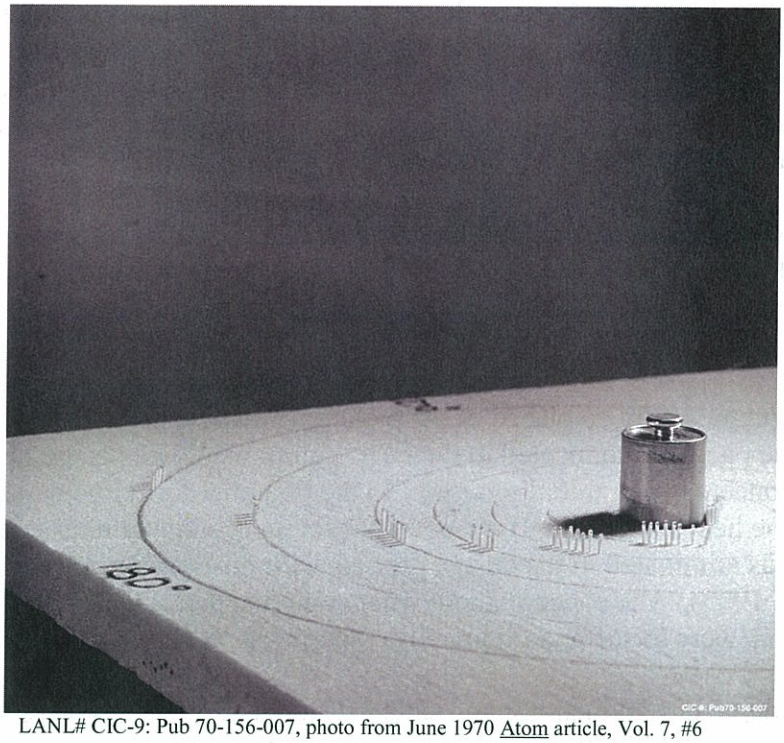
LANL# CIC-9: Pub 70-156-010, photo from June 1970 Atom article, Vol. 7, #6

Figure 29. Workers remove a plutonium-238 heat source from a "target."



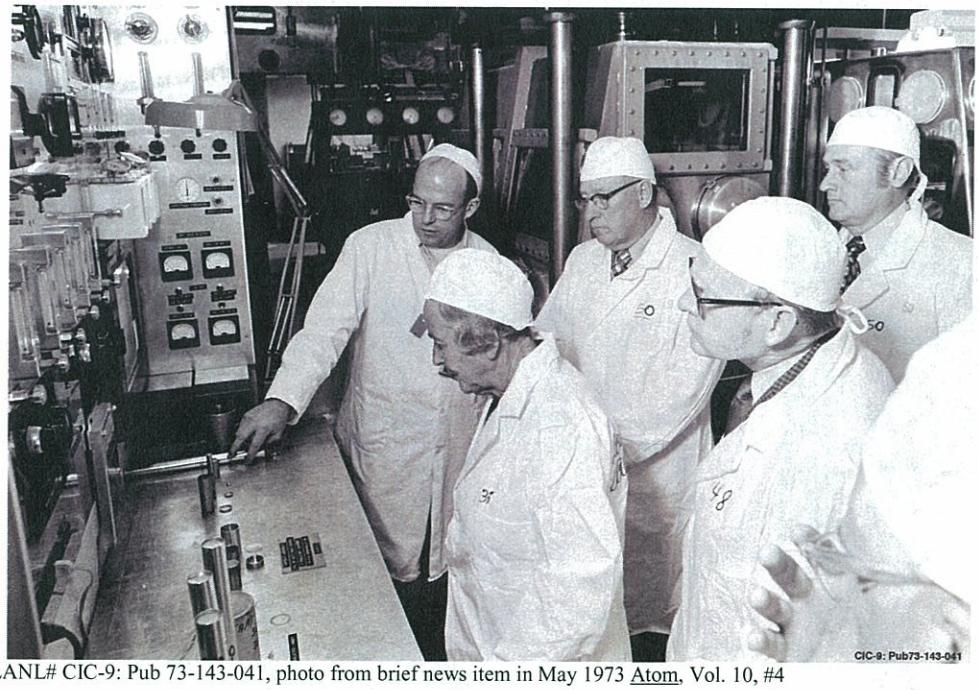
LANL# CIC-9: Pub 75-185-026, photo from July/August 1975 Atom article, Vol. 12, #4

Figure 30. A heat source (a mix of plutonium dioxide fuel and a binder) is removed from a press.



LANL# CIC-9: Pub 70-156-007, photo from June 1970 Atom article, Vol. 7, #6

Figure 31. A plutonium-238 heat source is positioned on a target for dosimetry measurements.



LANL# CIC-9: Pub 73-143-041, photo from brief news item in May 1973 Atom, Vol. 10, #4

Figure 32. University of California Regents tour plutonium-238 facilities at DP Site.

mechanism. There would be three parts to the artificial heart: the heart pump, the heat source, and an engine to convert the heat to energy to drive the pump. The heart pump would not be very big, the size of a small grapefruit. The pump would be connected to an engine by a flexible cable and the fuel source would be close to the engine. A nuclear fuel source was chosen since it would be very reliable and long lasting (LASL 1975).

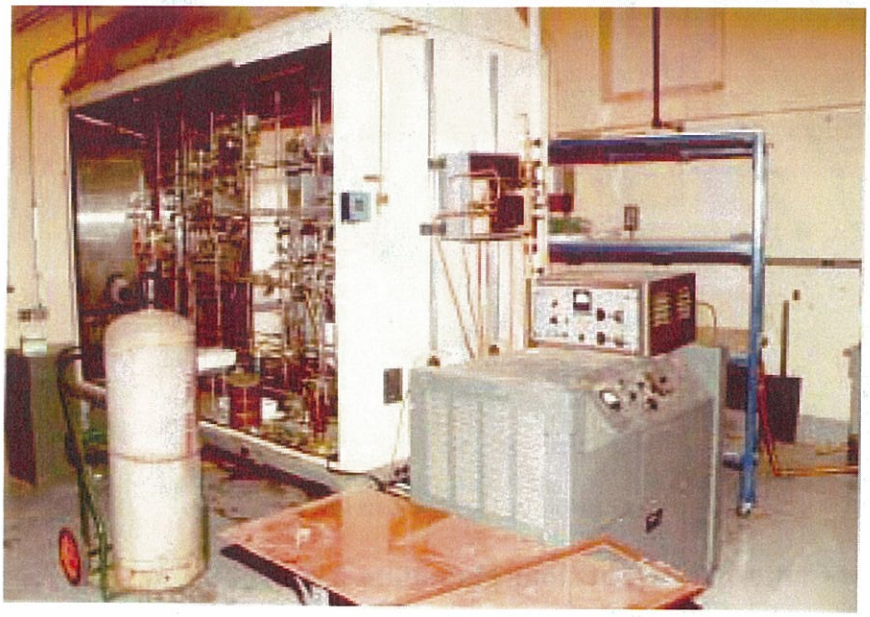
For this project, CMB-11 acquired 80% plutonium-238 from Savannah River's plutonium processing plant. This plutonium was purified at Los Alamos using an electrorefining process originally used to purify plutonium-239. The resulting ultra-pure plutonium-238 had drastically reduced emission rates (LASL 1970).

The artificial heart pump would be placed in the patient's chest replacing the heart, and the fuel container and engine package, connected to the heart pump, would be placed in the lower abdomen. Safety concerns were initially raised: 1) the potential for tissue damage from excess heat coming from the heat source and 2) the potential for an accidental release of plutonium-238. The heat concern was eliminated in the design process with the development of insulated components (LASL 1975). The concern about what could happen if a person with an implanted plutonium fuel source were to suffer a traumatic accident was harder to overcome.

Although the fuel source design incorporated safety features and used impact resistant, high-strength materials, the possibility that plutonium-238 could be released into the environment was the main reason for the cancellation of the program. Potential accident scenarios included catastrophic fires, explosions, and gun shots (LASL 1975, Stafford 1999).

High Temperature Research at DP East

Over the years, operations at DP East have supported high temperature research including carbide coatings associated with Project Rover and superconductivity research. These investigations involved the use of welding machines, radio frequency furnaces, DC arc melters, bead blasters, and mass spectroscopy (LANL 1995c). Some of the work was carried out in Building TA-21-152 (Figures 33–38).



LANL# B2016-24

Figure 33. TA-21-152, Bay 5208 – "California Hood."

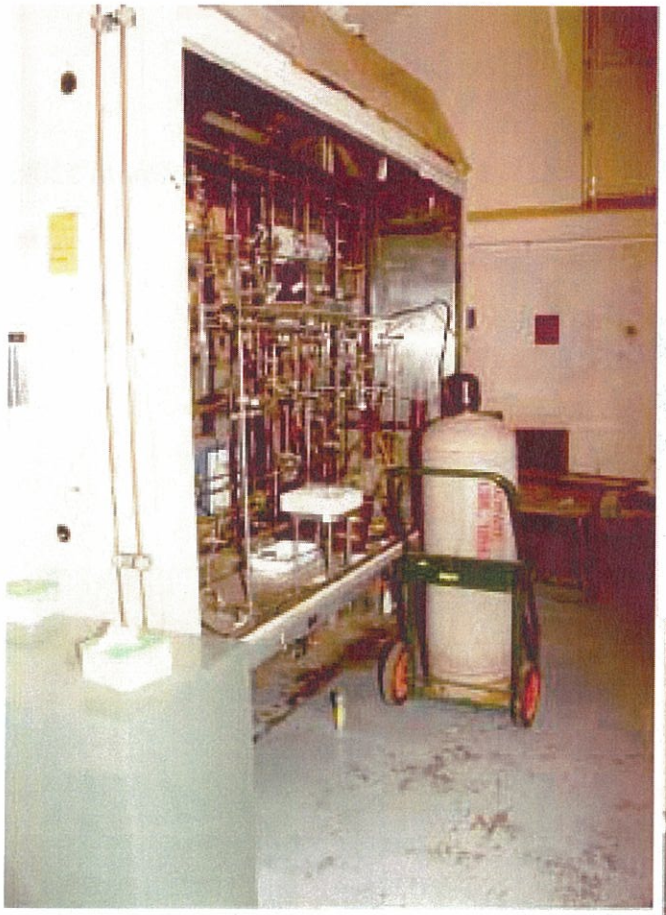


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Figure 34. TA-21-152, Bay 5208 – "California Hood."

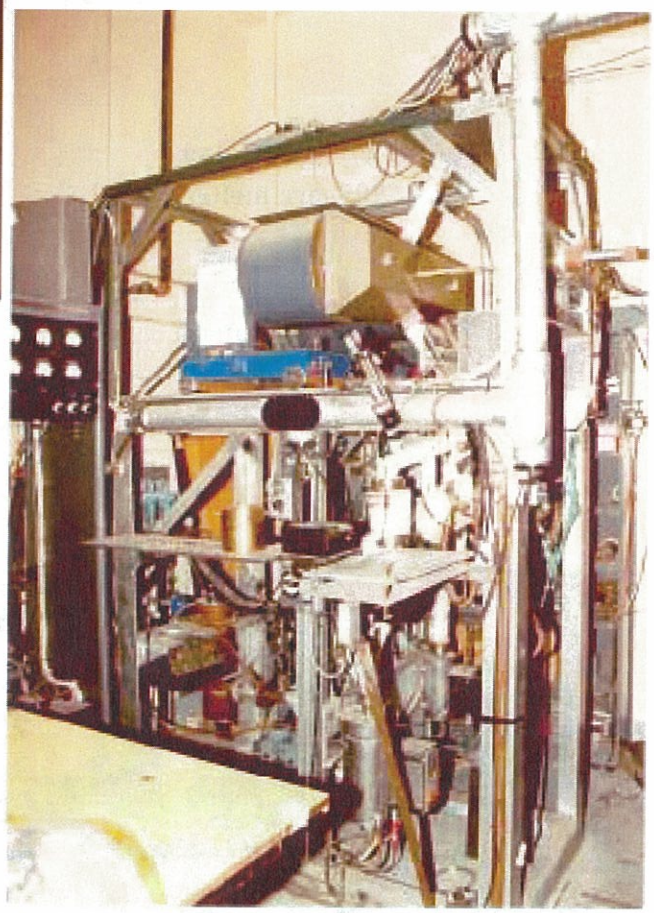

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Figure 35. TA-21-152, Room 5209, mass spectrometer.

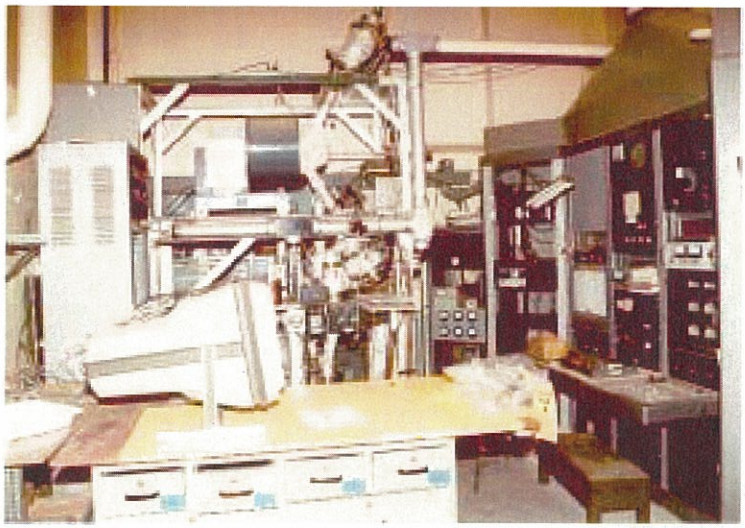

Figure 36. TA-21-152, Room 5209, mass spectrometer.

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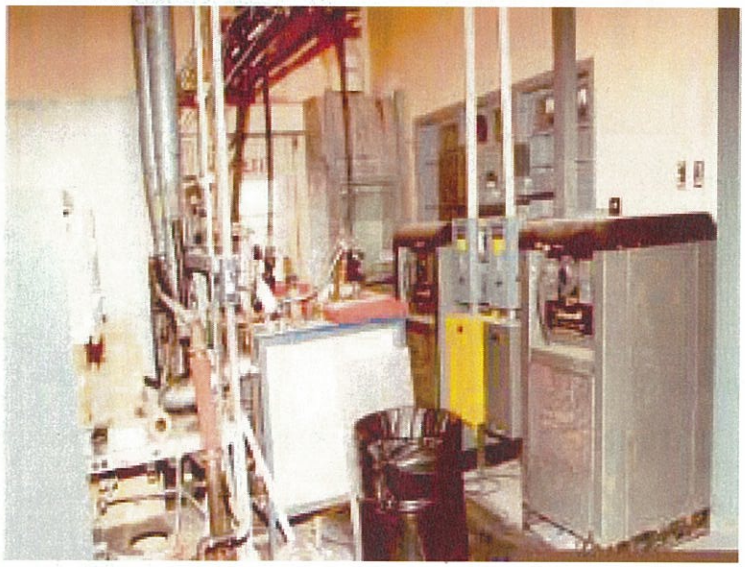

Figure 37. TA-21-152, Bay 5205, arc melter.

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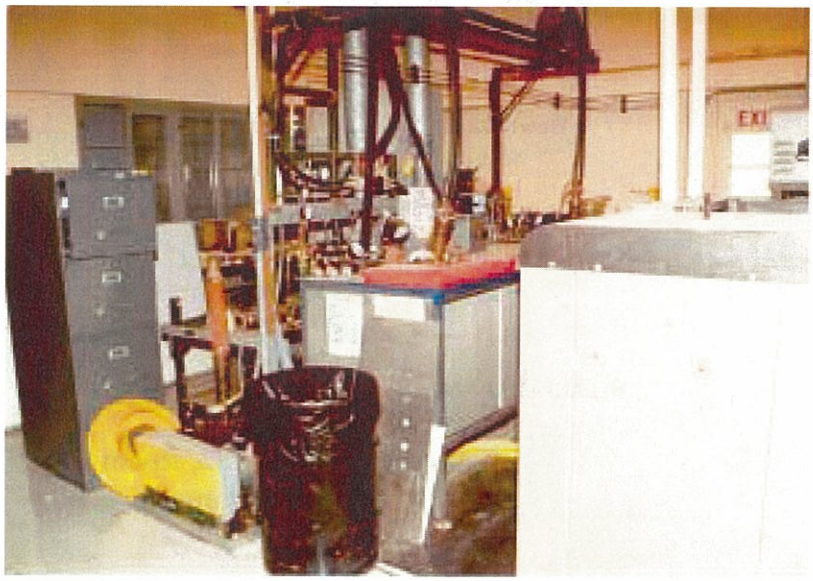


Figure 38. TA-21-12, Bay 5205, arc melter.

LANL# B2016-9

Project Rover

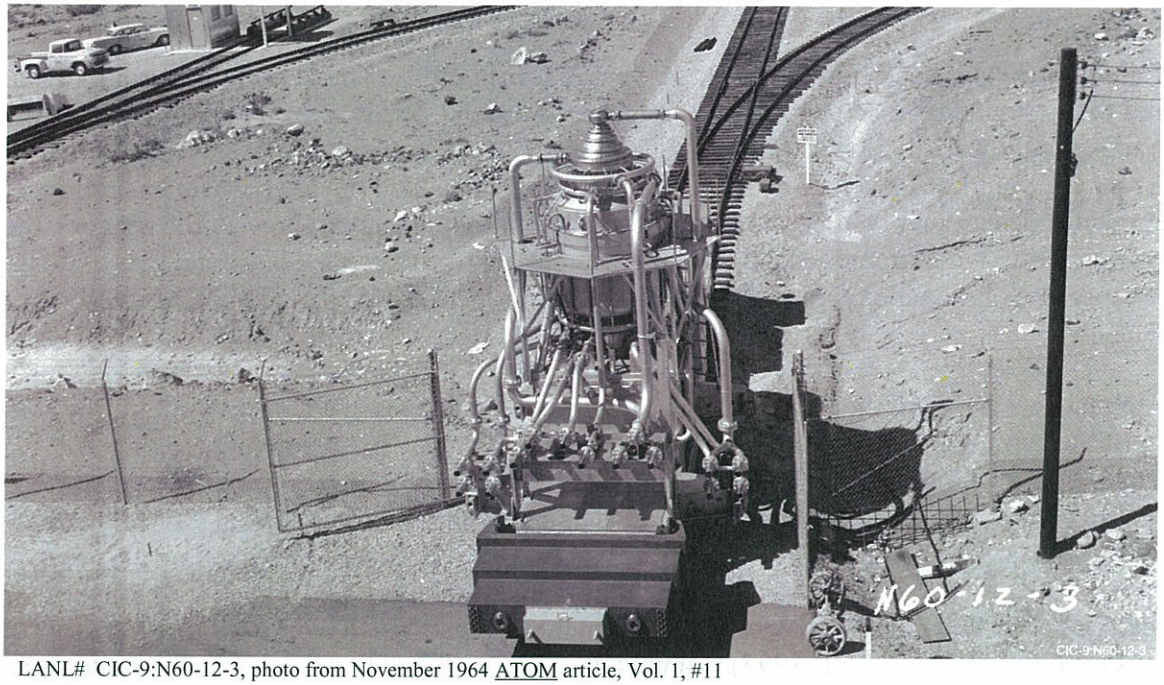
The Laboratory, AEC, and NASA started Project Rover in 1955. The goal of this program was to build the first nuclear reactor for use in rocket propulsion. The reactor would be incorporated into a rocket engine, or NERVA (Nuclear Engine for Rocket Vehicle Application). Nuclear space rockets would be used to launch large manned or unmanned payloads. The basic Project Rover reactor design involved passing hydrogen gas through a reactor core. In the process, the hydrogen is heated to extremely high temperatures. When the expanded hydrogen gas exits the reactor core at a high velocity, propulsion occurs (LASL 1967a, LANL 1993b, LANL 1995a, LANL 1997).

Los Alamos was assigned the technical and scientific details. Construction and initial low-power testing of the Project Rover reactors were carried out at TA-18. The reactors were then disassembled and shipped to the NTS for complete testing at the Nuclear Rocket Development Station. In addition to the work at TA-18, fuel element work was conducted at TA-21 and TA-46 (LANL 1997).

Project Rover had two phases of reactor development and testing—Kiwi (1959 to 1964) and Phoebus (1965 to 1972) (LANL 1997) (Figures 39–42). The first reactor, Kiwi A, was tested in 1959. "Kiwi" reactors were named after the New Zealand flightless bird since these reactors were never meant to fly (LASL 1967a). The Kiwi A uranium-graphite reactors were of a 100-MW design. Later Kiwi B reactors were of a 1000-MW design and were the first Project Rover reactors to be run with liquid hydrogen. The "Phoebus" reactor was named after Phoebus Apollo, the Greek god of light. Although actual operating times were short, the Phoebus reactors developed very large power levels, comparable to the power generated by Hoover Dam (LASL 1967a).

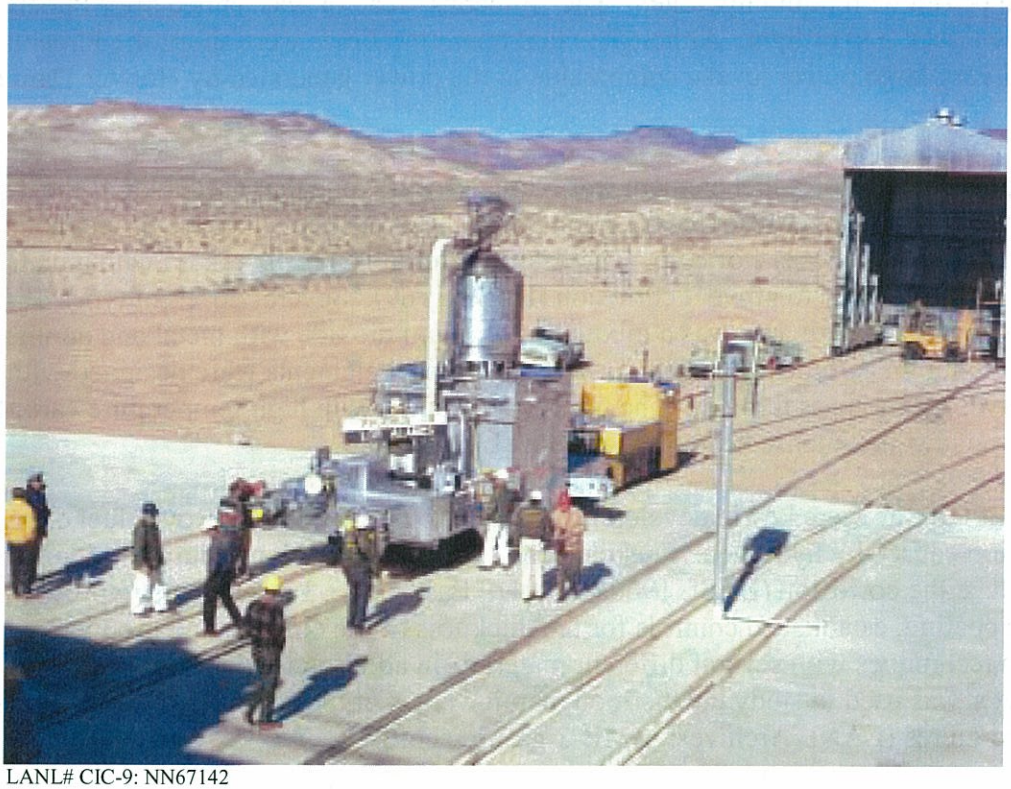
The design of the reactor's fuel element was a long process, one that used a lot of the Laboratory's Project Rover resources (LASL 1964). Fuel elements contain fissile material and are the central part of the reactor core. The fissile material is usually mixed with a matrix material and then coated to prevent corrosion (LASL 1969). Several different types of fuel elements were developed: one was a mixture of uranium dioxide with metal and another was a mixture of uranium carbide and graphite. The reactor fuel elements were designed with holes in them for hydrogen to pass through. The holes were coated with high-temperature carbides for protection against the intense heat of the reactor (LANL 1983).

Scientists at DP Site were key in developing coatings to protect Project Rover fuel elements from the corrosion caused by hydrogen. Fuel elements were coated with niobium carbide, which helped reduce the corrosion (LASL 1966a). At DP East, CMB-3 researchers improved the protective coating, established controls for the thickness of the coating, and used vapor deposition techniques with several different materials in addition to niobium. A mass spectrometer was used to study the thermodynamic values of these materials when exposed to high temperatures (LANL Archives: CMB-3 group records).



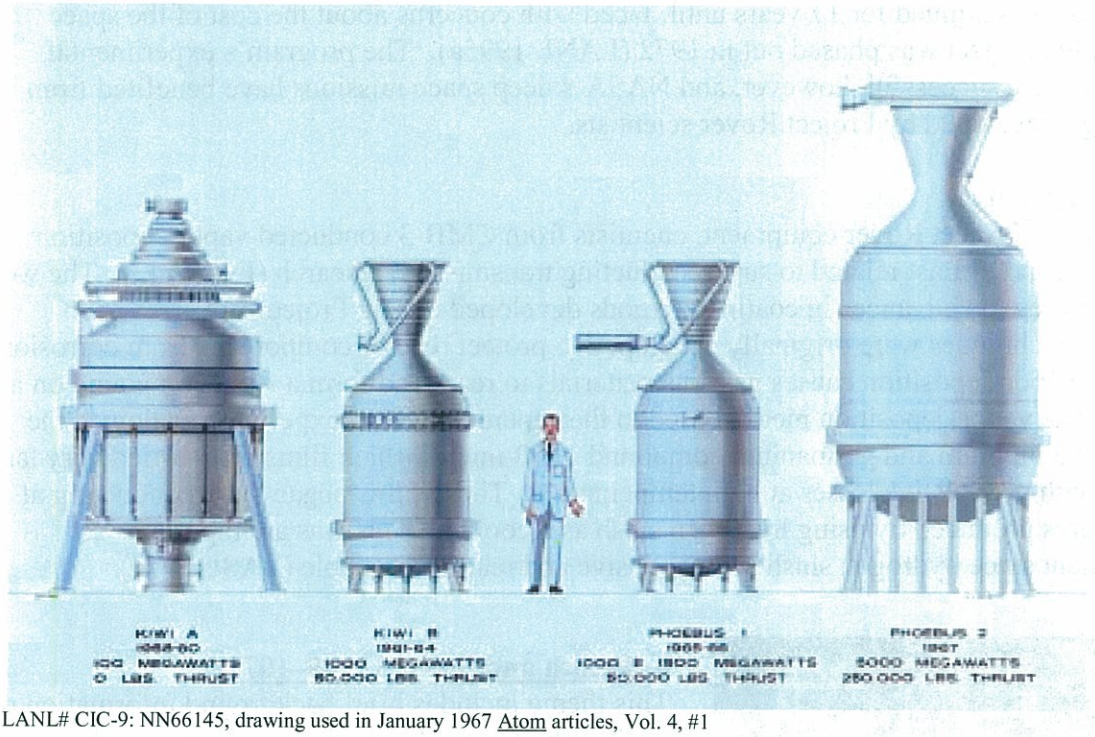
LANL# CIC-9:N60-12-3, photo from November 1964 ATOM article, Vol. 1, #11

Figure 39. A Los Alamos Kiwi reactor at the Nuclear Rocket Development Station in Nevada.



LANL# CIC-9: NN67142

Figure 40. The Phoebus-1B reactor in Nevada before a 1967 full power run.



LANL# CIC-9: NN66145, drawing used in January 1967 Atom articles, Vol. 4, #1

Figure 41. Relative sizes of the Project Rover reactor series, from Kiwi to Phoebus.

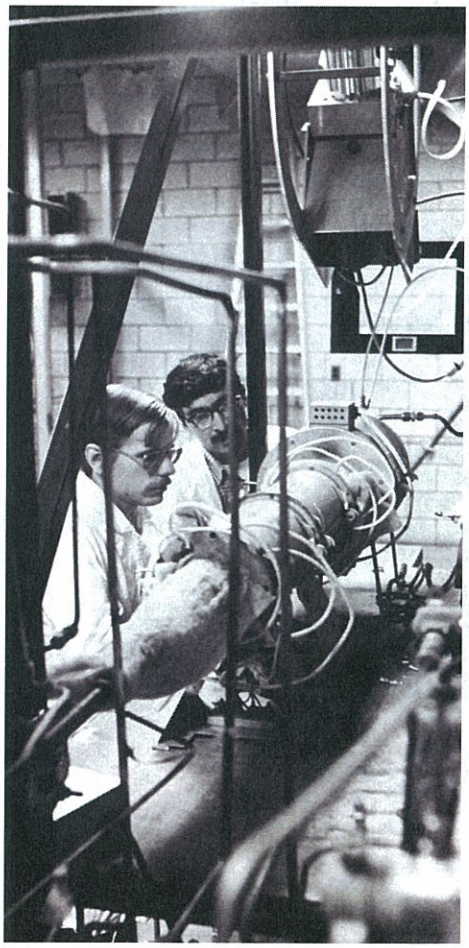
LANL, ESH-20

Figure 42. Kiwi A, left, and Kiwi B, right, reactor vessels at TA-21, LANL.

Project Rover continued for 17 years until, faced with concerns about the cost of the space program, the project was phased out in 1972 (LANL 1995a). The program's experimental objectives were successful, however, and NASA's deep space missions have benefited from technology developed by Project Rover scientists.

Superconductivity

Using surplus Project Rover equipment, chemists from CMB-3 conducted vapor deposition experiments at DP East related to superconducting transmission research (Figure 43). The work at DP Site drew on advances in coating methods developed during Project Rover. Vapor deposition techniques were originally developed to protect reactor components from corrosion. Chemical vapor deposition causes gaseous materials to react and form a solid compound on a surface. The vapor deposition method used in the superconducting experiments allowed the buildup of a niobium and germanium compound in 50-micron-thick films that carried very large currents with no resistive losses at high temperatures. These films began superconducting at temperatures produced by using hydrogen slush as a coolant. This was an important development since hydrogen slush is inexpensive and readily available (LASL 1974).



LANL photo from September/October 1974 Atom article, Vol. 11, #5

Figure 43. Workers at DP East operate the vapor deposition device constructed, in part, with components from the defunct Project Rover.

6) Health and Safety (1945–1977)

This theme includes brief background information on the health effects of radiation exposure and discusses the early operations in D Building and the later working conditions and safety improvements at DP Site. A summary of the 1958 Cecil Kelley accident is presented, and the health and safety changes that came about as a result of that accident are also discussed.

Health Issues Related to Uranium, Plutonium, and Polonium

Early processing operations were not conducted by today's standards of health protection, and many of the early workers received appreciable radiation doses (LANL 1995b). Occupational exposures to uranium, plutonium, and polonium constitute a definite threat to human health. Acute radiation exposures can lead to severe radiation sickness and death; chronic exposures can increase the risk of cancer (LANL 1998).

By the start of World War II, the health effects of uranium were well understood and researchers could guard against the dangers of heavy-metal poisoning (Hawkins *et al.* 1983).

Plutonium, on the other hand, was newly discovered and had not yet been worked with in sufficient quantities for its health effects to be known. However, the metabolism of radium is similar to that of plutonium and handling problems are comparable (Hawkins *et al.* 1983). The earliest safe handling protocols for plutonium were based on radium studies and on biological experiments carried out by Glenn Seaborg (LASL 1973).

Plutonium is an alpha emitter and, as such, is not a significant source of external radiation exposure. An alpha particle's range in air is short, about 1 to 2 inches, and alpha radiation can be blocked by fairly thin materials such as paper or a person's outer layer of skin (LANL 1998). Internal exposures pose a far greater health risk—key pathways include inhalation and ingestion. When plutonium enters the human body it first circulates in the blood stream. Any unexcreted material will be deposited in bone and in various organs (LANL 1995b). Plutonium remaining in the body can cause cellular damage since it has the potential to deposit large amounts of energy in small areas of tissue (LANL 1998).

Working with polonium is hazardous because it spreads quickly around the work place and is, therefore, easily introduced into the human body. Polonium, also an alpha emitter, is not as dangerous as plutonium because it is eliminated rapidly from the body and is not deposited in bone in the same manner as radium and plutonium (Hawkins *et al.* 1983).

Working Conditions in TA-1, D Building

Early nuclear chemistry operations were crude in comparison to today's operations (LASL 1973). Workers typically used open hoods, hood-type cabinets with sliding doors, and even unventilated gloveboxes (Maraman *et al.* 1975, LANL 1995b) (Figure 44). The prototype gloveboxes, called "dry boxes," were made of plywood and constituted a fire hazard (LANL 1983).

Figure 44. An early plutonium worker performs a purification operation in an open chemical hood.

LANL # CIC-9: 1829, photo from April 1973 Atom article, Vol. 10, #3

Plutonium and polonium workers wore surgical rubber gloves and respirators, and often wore face shields. Safety regulations at D Building dictated that workers change from street clothes into coveralls, booties, and caps, and that, whenever possible, they should conduct hazardous operations in closed systems (LASL 1973, Hawkins *et al.* 1983, LANL 1995b).

Radiation monitors, air samplers, and similar monitoring equipment were either non-existent or in the early stages of development (LASL 1973). Lacking adequate monitoring equipment, work surfaces suspected of being contaminated were wiped with oiled filter paper. The activity on the filter paper was then measured using stationary radiation counters. Suspected contamination of the hands and nostrils was also monitored using the same procedure (Hawkins *et al.* 1983).

D Building was one of the most elaborately constructed Manhattan Project buildings at Los Alamos. It had a complex air-conditioning system built to filter out dust in order to maintain the plutonium at a high level of purity. To some extent, the air-conditioning system also helped confine the plutonium, although the hood air went directly into the room exhaust system. Air released from the early plutonium operations was not filtered in the same way it is today (Maraman *et al.* 1975, LANL 1983, LANL 1995b). Operations at D Building were conducted as safely as possible given the wartime situation. In a LANL interview, Los Alamos scientist Ed Hammel talked about early plutonium operations.

> I think that everyone in D Building was aware of the risks. But there was a war going on. [LANL 1995b:132]

Sometimes the work was conducted in a haphazard fashion. In 1944, eight grams of plutonium were spilled on the floor at D Building, and, because of a series of errors, that batch of plutonium was eventually reprocessed four times (LASL 1973, LANL 1995b).

Even at DP Site, workers weren't sure of the exact nature of the material they were working with (LANL 1995b). In a LANL interview, Art Beaumont, another former plutonium worker, recalled the lack of education and the novelty of plutonium.

> There was a stainless steel glovebox with weapons components, and one of the first things I did was use a piece of sandpaper to make a certain tolerance for a weapon item. It was really kind of amazing. I would be sanding away and all of a sudden I would see a little fire in front of me. Plutonium dust had accumulated and caught on fire. I would use graphite to put out the fire or just take a piece of sandpaper and smother it. [LANL 1995b:134]

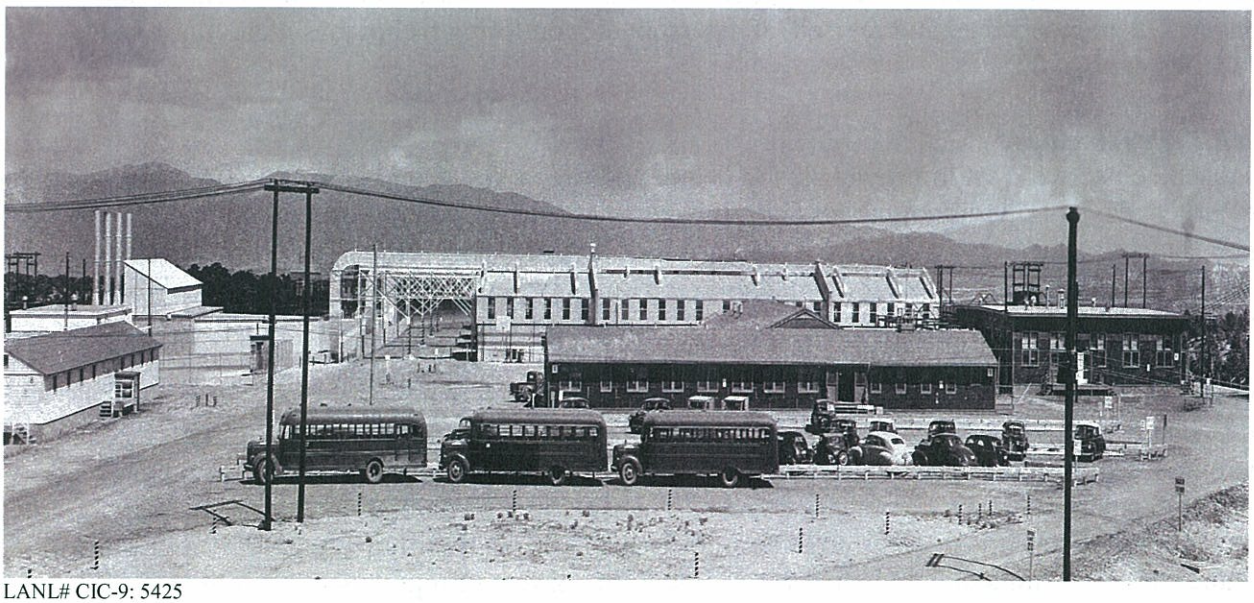
Working Conditions at DP Site

The inadequacies of D Building were apparent by 1944. A larger and safer facility was needed, one where greater amounts of radioactive material could be handled in an environment designed to protect workers from the health hazards of plutonium and polonium. The wooden D Building was a fire risk and the new facilities at DP Site (Figure 45) were planned to be entirely noncombustible—operations areas had nonflammable steel walls and roofs. In a vast improvement over the facilities at D Building, the rooms were designed to be easily decontaminated. State-of-the-art features at DP Site included elaborate ventilation-filtration

LANL# CIC-9: 2108

Figure 45. DP West under construction, 1945.

systems, closed hoods, and improved gloveboxes (LANL 1995b, Hawkins *et al.* 1983). New stainless steel handling equipment was corrosion and fire resistant. Negative pressure gloveboxes were designed so that the internal atmosphere was at a lower pressure than surrounding air. This pressure difference would keep the plutonium better contained in case of a leak (LANL 1983, Hawkins *et al.* 1983). Hood air was withdrawn from the work areas at a rate of about 2 ft^3/s and the resulting exhaust air was filtered in a three-step process before being released to the environment (Hawkins *et al.* 1983). However, even with these new safety features, the possibility of a catastrophic accident was uppermost in the minds of the DP Site planners (Figure 46):



LANL# CIC-9: 5425

Figure 46. DP West view with evacuation busses in foreground, circa 1947.

> Pittman reopened the subject of transportation from the area in the event of a major accident. He feels that the mechanism of escape formerly agreed on is inadequate and should be replaced by a number of individual positive pressure units. At present it is planned to procure two busses to be located at the Site for this purpose. However, no provisions will be made at this time to fit these busses with a positive pressure air supply. Pittman will check carefully and determine the number of such individual positive pressure units required and place orders for the equipment. [Veltman 1945:1]

Indeed, one of the early plutonium processing methods was a very dangerous procedure.

> The established processing technique when the war ended involved an ether extraction of plutonium nitrate in glass columns. This was the process used when DP Site became the center of operations. The fragility of the glass columns, the explosive nature of the ether vapor, and the toxic properties of the plutonium combined to make DP Site a potentially extremely hazardous operation. [Hawkins *et al.* 1983:336]

In 1946, changes to the plutonium production cycle eliminated the ether stage and made the operation safer (Hawkins *et al.* 1983). Other safety improvements over the years included changes in the design of both the gloveboxes and the process ventilation systems (Christensen and Maraman 1968, Stafford *et al.* 1974).

> Procedures during the early production period at DP were performed under the guidance of the best knowledge available at the time, but were still driven by an urgency only slightly diminished from the wartime period just passed. Procedures and health-safety improved steadily over the years, including better containment, ventilation, filtration, liquid treatment, and remote-handling. [Penneman 1992:2]

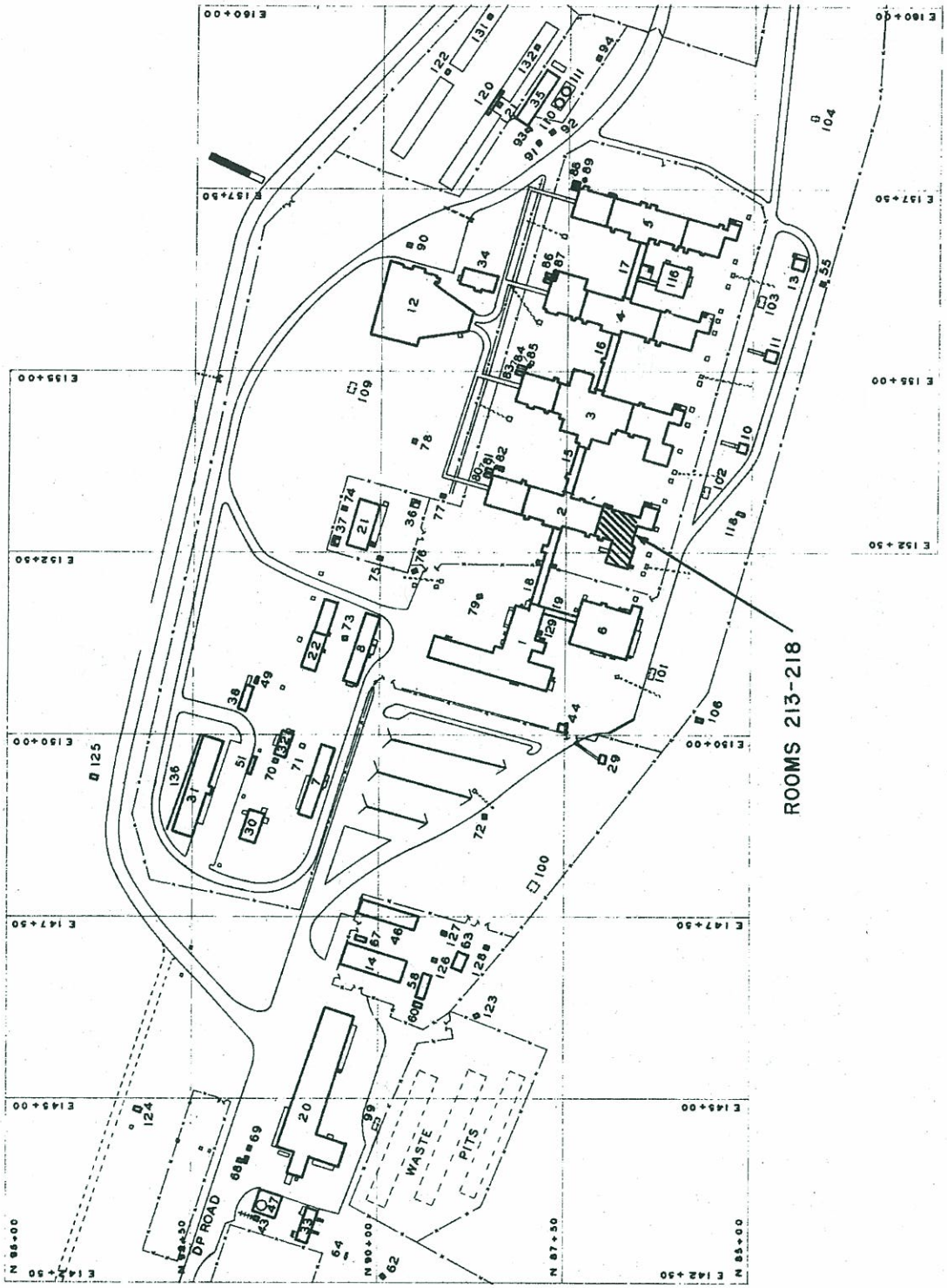
Besides the physical plant improvements at DP Site, personnel safety improvements continued to be a focus of the Laboratory's Health Group: workers were better educated about risks, safety standards were researched and revised, and personnel monitoring techniques were improved (Hawkins *et al.* 1983).

Cecil Kelley Accident

As discussed above, vast improvements in health and safety had been made at Los Alamos since the earliest days of plutonium processing. In spite of these improvements, a fatality occurred at DP West at the end of 1958 that had a major impact on safety and processing procedures and, perhaps more importantly, laid the foundation for the Laboratory's Human Tissue Analysis Program.

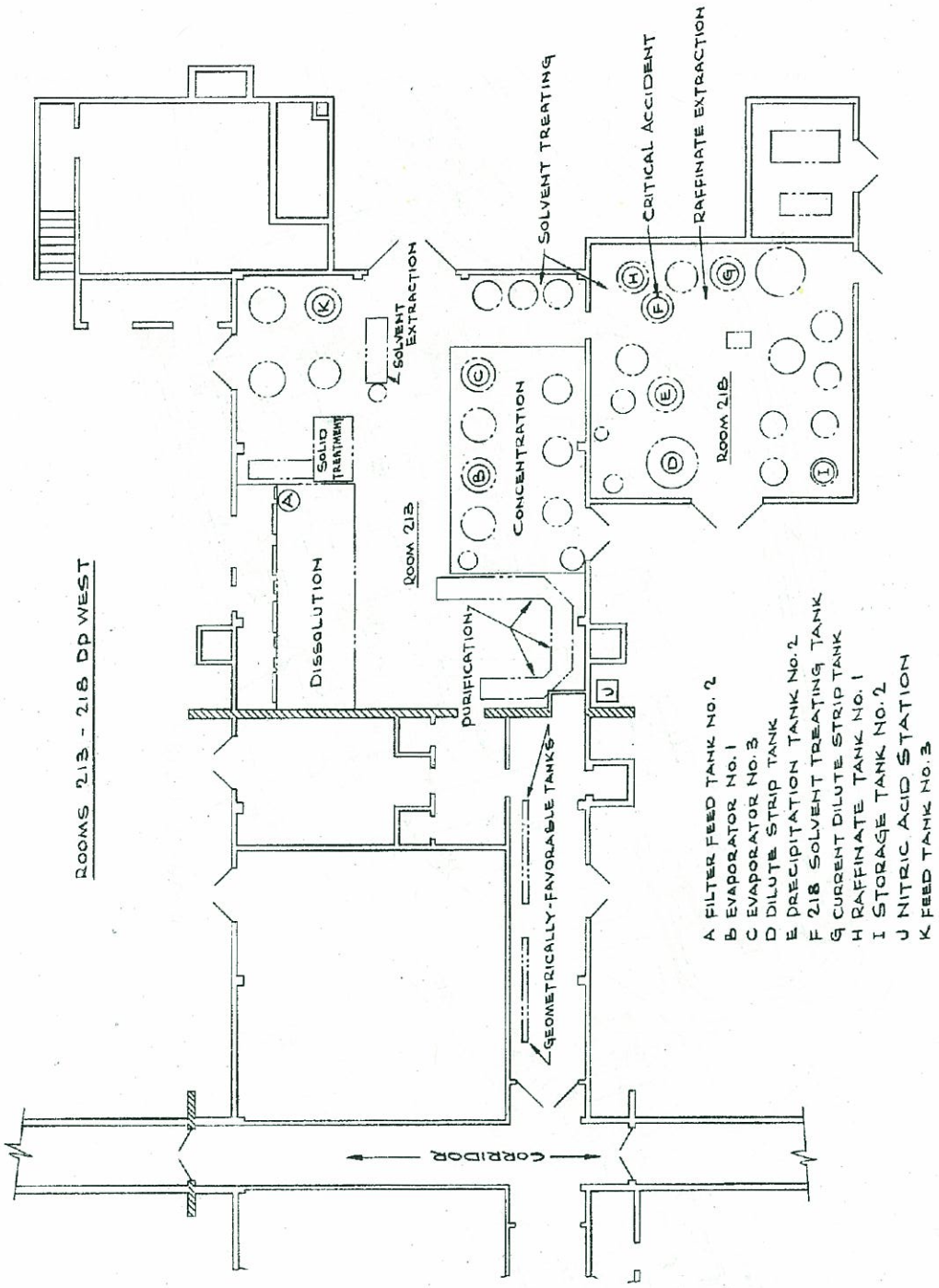
Overview of Events

On December 30, 1958, a nuclear-criticality accident occurred in DP West's plutonium recovery operation area, Building TA-21-2 South (Figure 47). The accident involved a liquid solution of plutonium compounds and chemical reagents. This solution, containing unexpectedly high levels of plutonium, was transferred to a stainless steel tank in Building TA-21-2, Room 218 (Figures 48–50). Immediately before the accident, two layers of liquid were present in the large



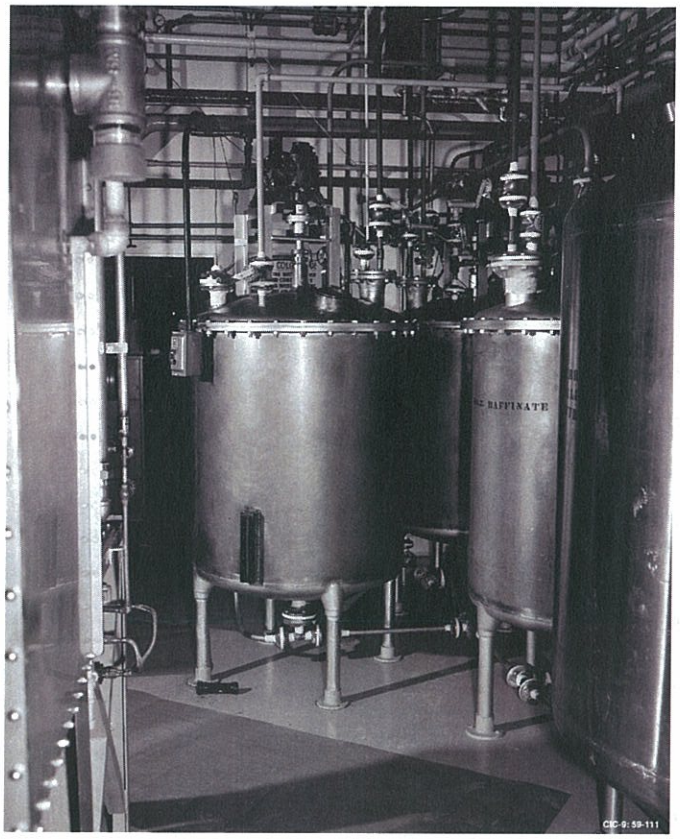
From Paxton et al. 1958

Figure 47. Map showing location of Cecil Kelley accident.



From Paxton et al. 1958

Figure 48. Layout of accident location.



LANL# CIC-9: 59-11

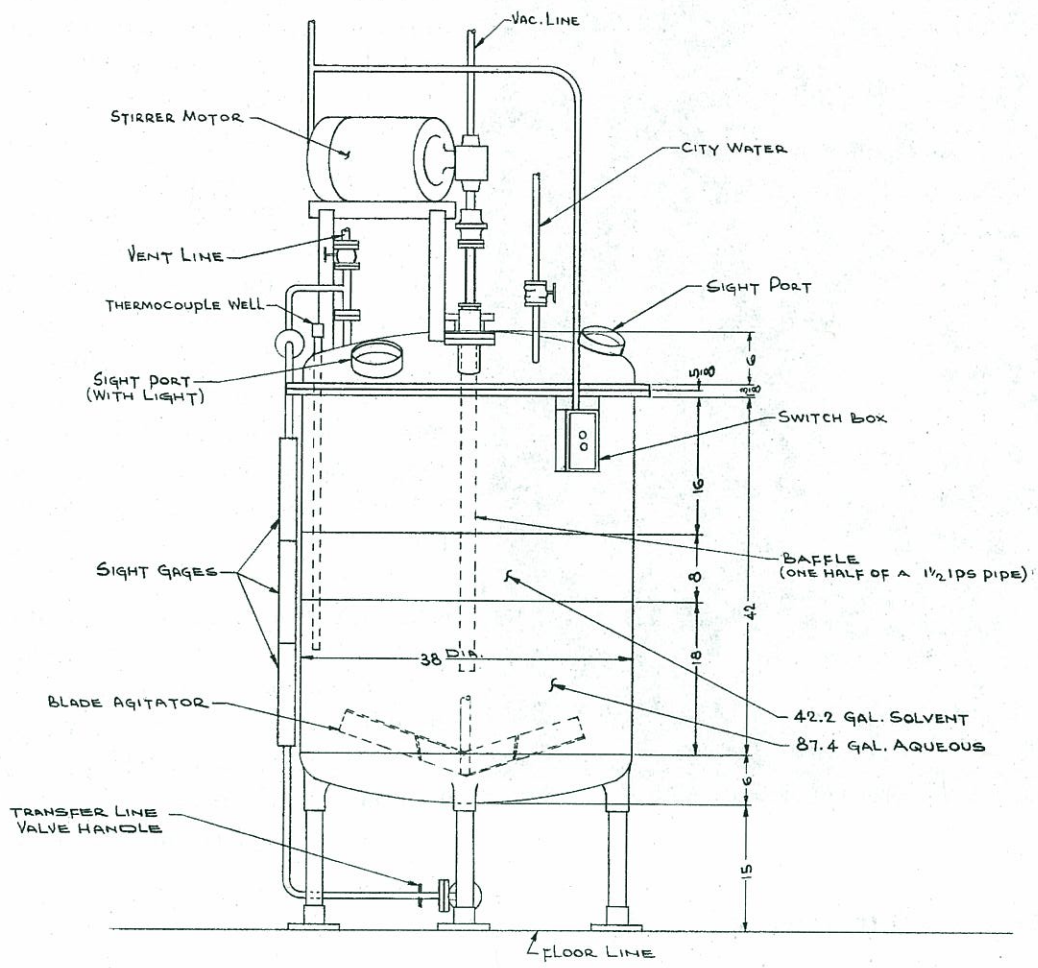
Figure 49. Solvent-treating tank, center.

mixing tank—both contained amounts of plutonium, but the upper layer was very close to sustaining a chain reaction. The criticality occurred when the operator, Cecil Kelley, turned on the tank's stirrer. The stirring action immediately brought the bottom layer up the sides of the tank causing a thickening of the upper layer of liquid. This changed the system to 'super-prompt critical.' The resulting power excursion, a huge burst of neutrons and gamma radiation, caused Kelley's death approximately 36 hours later. His radiation dose was probably around 12,000 rem (± 50%).

Radiation monitoring staff investigating the accident scene initially suspected some sort of plutonium incident involving alpha radiation. It was only when they noticed the high level of gamma radiation near the tank that they realized a criticality had occurred.

Kelley was taken to the Los Alamos Medical Center for treatment but it soon became apparent that his condition was grave and that death was imminent. He ultimately passed through four stages of the most severe form of acute radiation syndrome.

Immediately after the accident, he was in shock and virtually unconscious. Kelley was in the second stage of the syndrome when he arrived at the medical center: he was still barely conscious, was vomiting, and was hyperventilating. His skin color was dusky reddish-violet and he had external indications of poorly oxygenated blood. Kelley entered the third stage almost two hours after the accident. He regained consciousness and, although he was experiencing abdominal pain and was still occasionally vomiting, he seemed much improved. The fourth and final stage occurred the second evening after the accident. Kelley experienced increased abdominal pain; he began to sweat copiously, his skin color became ashen, and his pulse became irregular. Cecil Kelley died early the next morning at 3:15 a.m., January 1, 1959; he was 38 years old (Stratton [rev. Smith] 1989, LANL 1995b, Paxton *et al.* 1958, LANL Archives: Box A-93-076).



From Paxton et al. 1958

Figure 50. Diagram of solvent-treating tank, showing levels of aqueous and organic phases before stirrer was activated.

Safety Changes Resulting from the Accident

The Laboratory Nuclear Criticality Safety Committee reviewed the plutonium processing operations about a month before the criticality occurred. One of the recommended safety changes involved changing the design of the stirrer tank used by Kelley: large-volume tanks were to be replaced by vessels with a more favorable geometry. This new equipment would prevent sub-critical material from accumulating in the amounts needed to sustain a chain reaction.

After the accident, operations were halted until the large vessels could be replaced. Additionally, solid sampling techniques were improved and a greater emphasis was placed on following procedural controls (Stratton [rev. Smith] 1989). Other plutonium operation changes brought

about by Kelley's accident included an improved nuclear training program for site workers, the installation of gamma alarms, and the development of updated evacuation protocols.

Recovery operations at Building TA-21-2 South were also changed to prevent a reoccurrence of the accident. Physical process changes included the tank design modifications mentioned above, the blocking of supplemental feed lines, and, in case of an accidentally introduced plutonium solution, the addition of a neutron-absorbing solution of cadmium nitrate to some of the tanks as a protection against criticality (Paxton *et al.* 1958).

The Kelley Accident and the Origin of the Human Studies Program

An important Los Alamos health and safety program originated as a result of Cecil Kelley's death. Before the accident, existing personnel monitoring methods had not been validated since no post-mortem studies of human tissue from long-term radiation workers had been conducted (LANL 1995b).

Since the early 1940s at the Laboratory, medical staff have been monitoring workers and have been issuing guidance concerning acceptable dose limits. One of the earliest personnel monitoring strategies was to measure the urine of radiation workers.

> A plutonium body burden usually cannot be detected by an external radiation monitor because the alpha particles emitted by the plutonium are completely absorbed and never leave the body. The most reliable detection scheme is to measure the small fraction of that burden that is excreted in the urine daily. So starting in the forties, the urine of a plutonium worker was monitored on a regular basis. The amount measured in the urine is then related to the amount retained in the body using data and methods derived from a series of animal and human experiments. [LANL 1995b:126]

One commonly used method of ensuring a worker's safety was to remove him from an operation if his estimated whole-body burden reached a certain threshold. This estimate would be calculated using urine assays and nose-swipe counts (LANL 1995b). Plutonium worker Art Beaumont recounted his experience with this early health and safety protocol.

> ....I had absolutely no fear of plutonium, but one afternoon about 3:30 P.M., I was asked to go to the administration building. There they told me, "You've reached the threshold of allowed plutonium in your body; we have to transfer you." [LANL 1995b:135]

The significance of the Kelley accident to the Los Alamos Human Tissue Analysis Program had nothing to do with the criticality itself. Rather, it was Kelley's body burden of plutonium from his two periods of employment as a plutonium worker that enabled researchers to compare Kelley's estimated whole-body plutonium burden against actual data. This was of great importance to Laboratory scientists who were able to revise existing urine excretion models to more accurately reflect a worker's dose from occupational plutonium exposures. The analysis of the distribution of plutonium in Kelley's body helped define effective doses in other long-term plutonium workers. Because Kelley had two distinct time periods as a plutonium worker and because the ratios of plutonium-238 to plutonium-239 had changed between the two periods of employment, scientists were able to identify relative time scales for the movement of plutonium

in Kelley's body. This allowed researchers to better determine how plutonium moves from the lungs to the other organs (LANL 1995b).

7) Site Security, Administration, and Infrastructure Support (1945–1990)

Security Practices

The Laboratory opened its Intelligence and Security Office in April of 1943, which was located at TA-43-39 (Figure 51). This office's tasks included safeguarding classified information and investigating new employees. Other areas of responsibility included the guard system, visitor control, and the pass system. Although the mail was censored, this activity was not conducted at Los Alamos (Truslow 1991).

LANL# CIC-9: LAT 1511

Figure 51. TA-43-39, former police barracks and AEC administration office building, constructed during 1948 and 1949.

In order to safeguard classified information, the Intelligence and Security Office issued document classification and handling instructions. The issuing of security clearances, also arranged by this office, was often a lengthy process. This background investigation, however, was a requirement for assignment or employment at Los Alamos for both military and civilian personnel (Truslow 1991).

As a part of the Security Office, the main duty of the guard system was to provide a high level of security while allowing the scientists to work expeditiously. The physical components of the guard system included main guard posts placed at key entrances to Los Alamos and at entrances to the main technical area (TA-1). Other guard facilities were also established at outlying technical areas. The main technical area was surrounded by a woven- and barbed-wire fence. This fence had 1500-W flood lights mounted along its perimeter in order to provide security lighting. Similar fences were in place at the outlying sites (Truslow 1991). Automatic fence alarms were experimented with briefly—these were abandoned in the early part of 1945.

> . . . . a prowler system was installed on the fence surrounding the Technical Area . . . . The system was not satisfactory, as the least vibration, such as a strong wind, set up the signals and caused more confusion and trouble than good. [Truslow 1991:94]

The Security Office supplied guards for classified shipments, couriers for documents, and guards for convoys. The Security Office was responsible for incoming shipments and made the arrangements for meeting these shipments as well as safeguarding and delivering them (Truslow 1991).

Special nuclear materials and the technical and scientific operations associated with them were under the direct oversight of the Security Office. Due to the expense and military importance of these special materials, they were placed under continuous armed surveillance by a dedicated detail of military and civilian guards (Truslow 1991).

The pass system was an integral part of the Laboratory's security system. In addition to the permanent pass, there were passes that admitted essential personnel to certain areas. Badges were color coded depending on whether a site worker was a key scientist or a non-key worker such as a clerical or a construction employee. At outlying sites, individual groups controlled access by use of a visitor list and only those people named on the list could access an area (Truslow 1991).

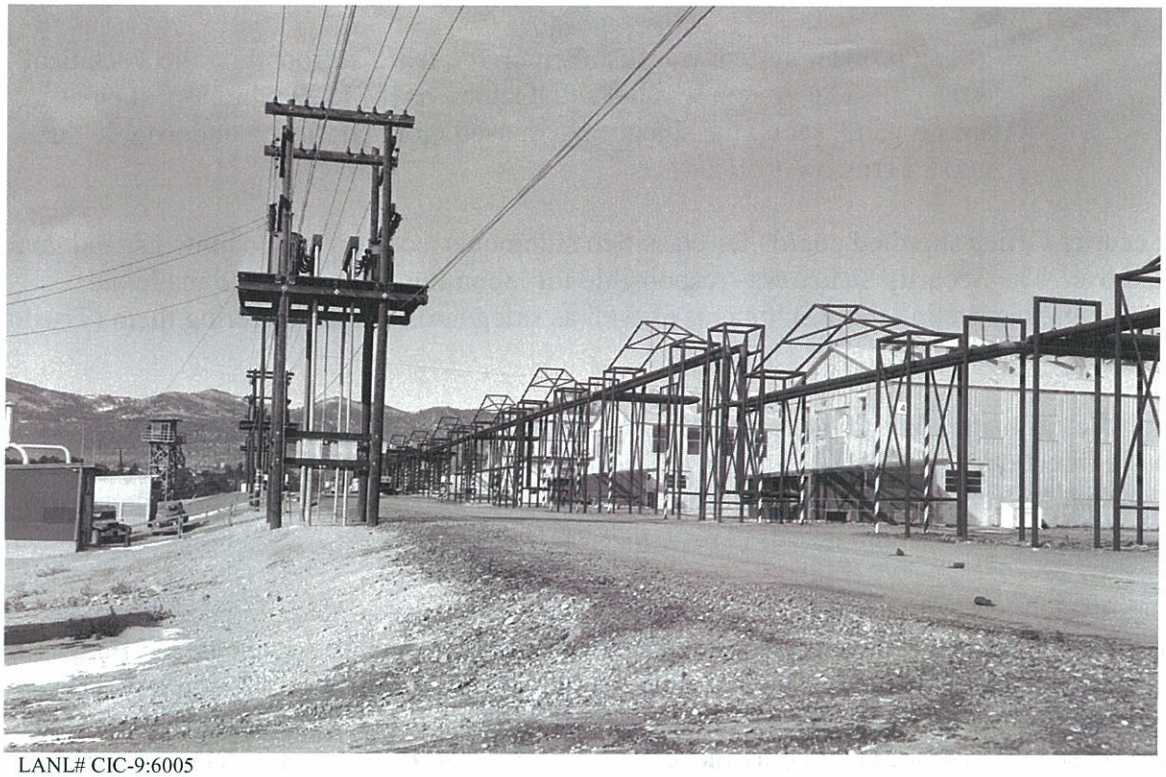
Access to Los Alamos was tightly controlled until the end of the war. The only people allowed entry were those who were involved in Manhattan Project business and who were authorized by the Security Office (Truslow 1991). In 1957, more than ten years after the end of World War II, the "closed" city of Los Alamos finally opened its gates.

At DP Site, the nature of the work with special nuclear material necessitated strict adherence to security protocols. A security fence surrounded the site area and a guard post was located at the entrance to the technical area in order to control entry. Guard towers and 1500-W flood lights, placed around the perimeter of the site, provided additional physical security (Figures 52 and 53). Finished metal shapes associated with the uranium and plutonium processing operations were stored in a special vault, Building TA-21-21. The guard towers were taken down in later years but the security fencing, a guard station, and one pair of the old-style security lights still remains (Figures 54–56).

Site Administration

At DP West, the main administrative functions were housed in Building TA-21-1 and later in Building TA-21-210, built in 1964 to replace the original administration building.

> Bldg. 1 was not a "Butler" type building. It was a framed structure, nothing fancy. It housed the administrative offices, change rooms, H-1 offices were there, an Engineering-4 representative had an office in this building, a nurse's office, and cafeteria. The functions of the building didn't change from Bldg. 1 to 210, the original building was just replaced. [Green 1999:2a]



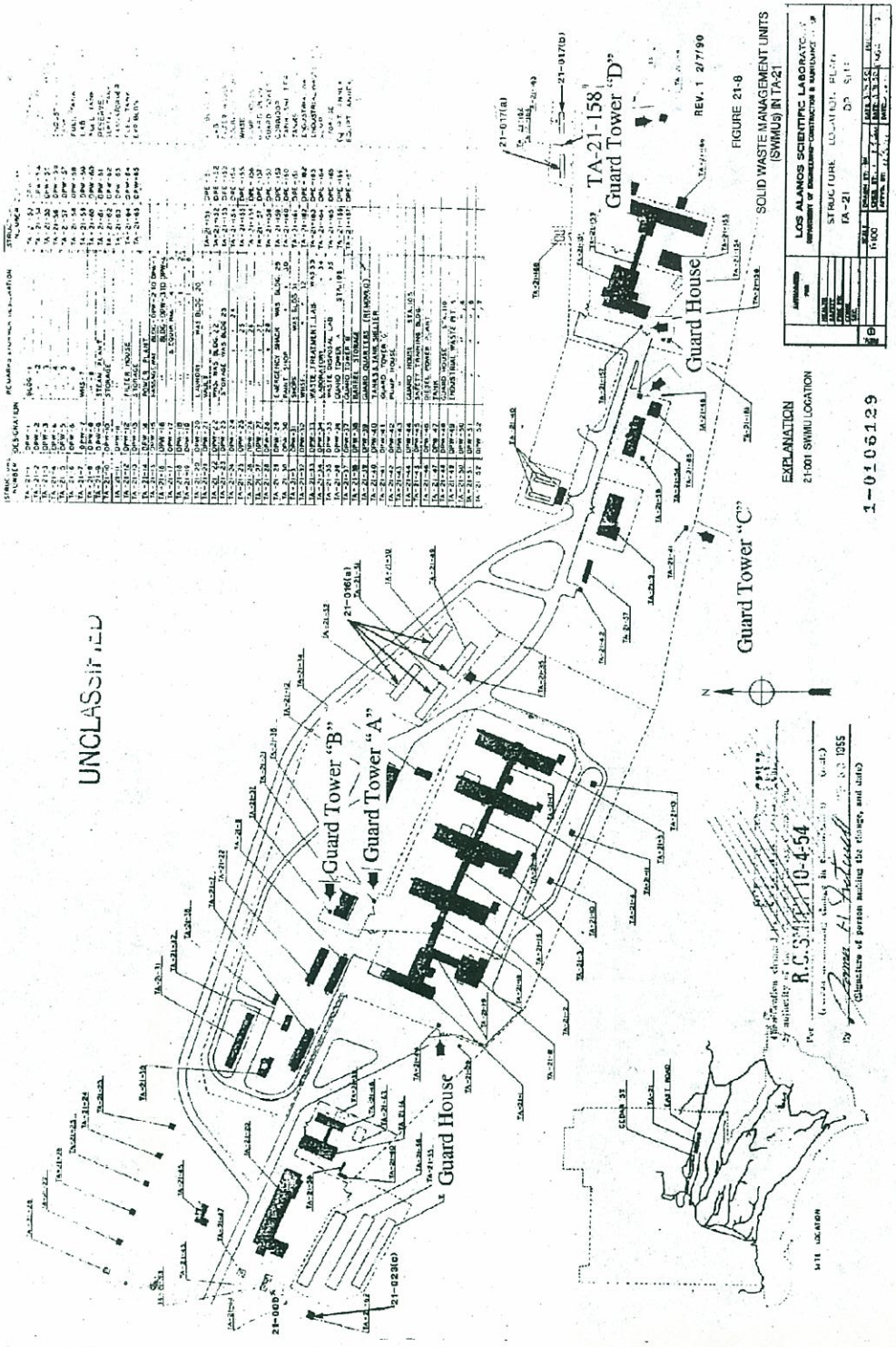
LANL# CIC-9:6005

Figure 52. View of DP West, with guard tower in left background.

Administrative support important to the DP West plutonium operations included medical surveillance facilities, office space for personnel and research activities, changing and shower facilities, and a "clean" eating facility. Similar administrative functions were housed in Building TA-21-209 at DP East.

Infrastructure Support

Structures and buildings that provide support functions are critical to the operation of a large technical area. At DP Site, a variety of support facilities were needed to safely process the nuclear materials used in the development of nuclear weapon technology. Basic utilities such as gas, water, sewer, and electricity had to be provided; additionally, many utility facilities were expected to stand alone and not rely on links with the rest of the Laboratory. Filter buildings were critical in the purification of contaminated "process air." Separate water tanks kept TA-



LANL drawing

Figure 53. Structure location plan of TA-21 showing guard tower and guard house locations, 1950.

LANL, ESH-20

Figure 54. Old-style security lights at TA-21.

LANL, ESH-20

Figure 55. Close up of old-style lights at TA-21.

LANL, ESH-20

Figure 56. Close up of old-style lights at TA-21.

21's water away from the townsite's water supply. In 1966, a water tower was moved from TA-1 to TA-21. This "checkerboard" water tank, originally built in 1941 and erected at the townsite in 1948, was a visible landmark of the early Cold War years in Los Alamos (Figures 57–63). Although used at TA-1 for fire protection, the tower was moved to TA-21 for a different purpose.

> At a new location, near the entrance to LASL's plutonium refining and research facility, TA-21, the tower will fulfill a health and safety role – namely, guarding against the possibility of contaminated water backing from the TA-21 water system into townsite mains. [LASL 1966b:31]

Other key support facilities include the contaminated laundry facility, shop facilities for both technical and non-technical work, industrial waste treatment facilities, incinerator facilities, and waste storage areas such as aboveground tanks and drain lines and underground pits.

Photo courtesy of the Los Alamos Historical Society, LAHS# (EL) 1543 (e)

Figure 57. The "checkerboard" tank at its original TA-1 location, circa 1955.

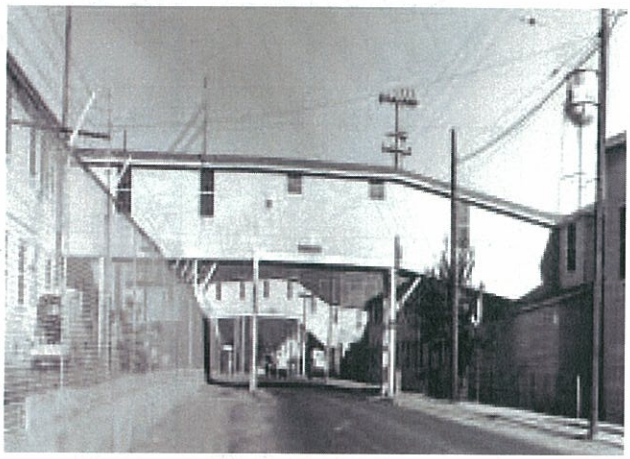


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Figure 58. The "checkerboard" tank, TA-21-258, at TA-1 (far right), circa 1958.

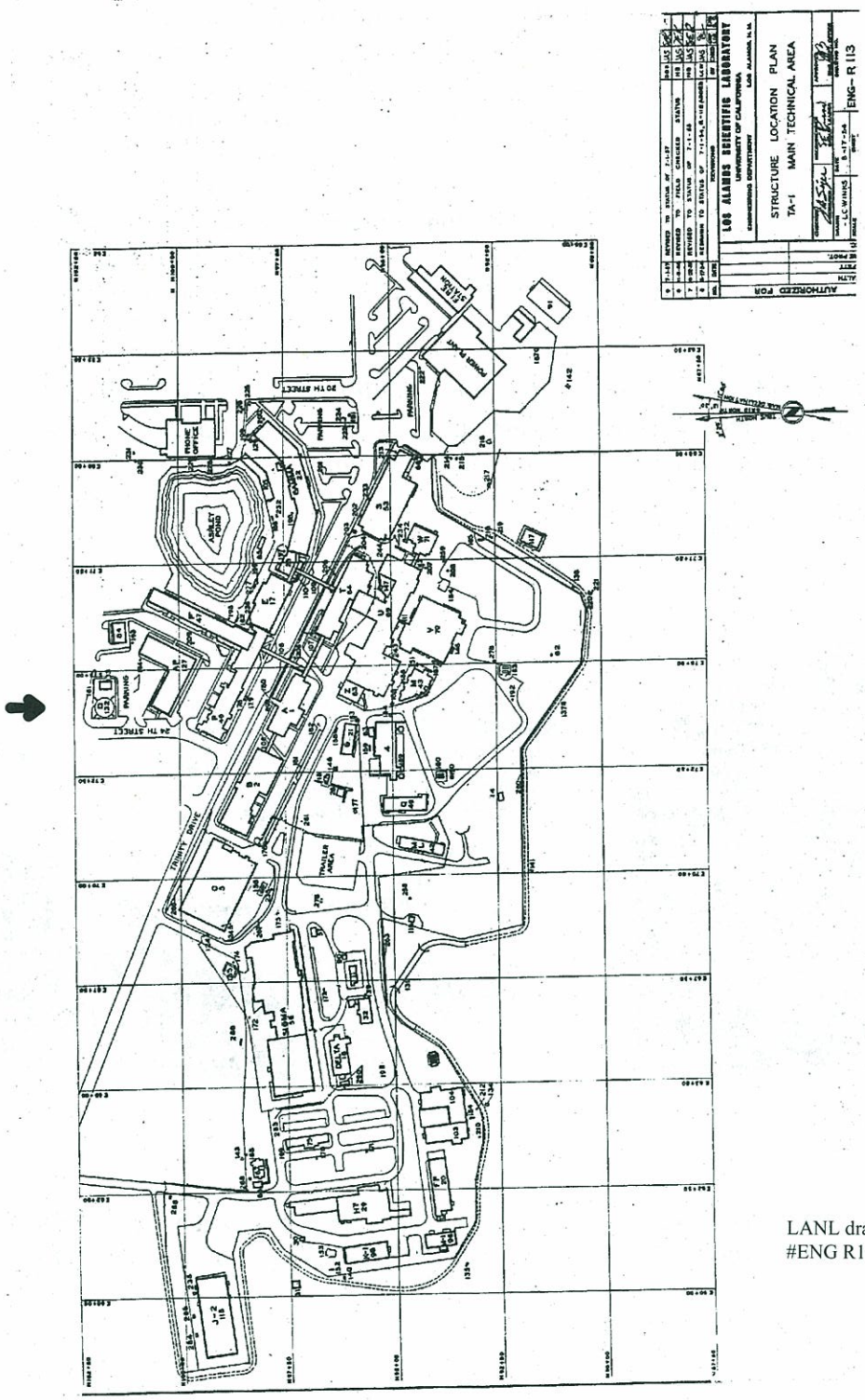

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Figure 59. Structure location plan of TA-1 showing the original location of the "checkerboard" water tank (TA-21-258, formerly TA-1-132).

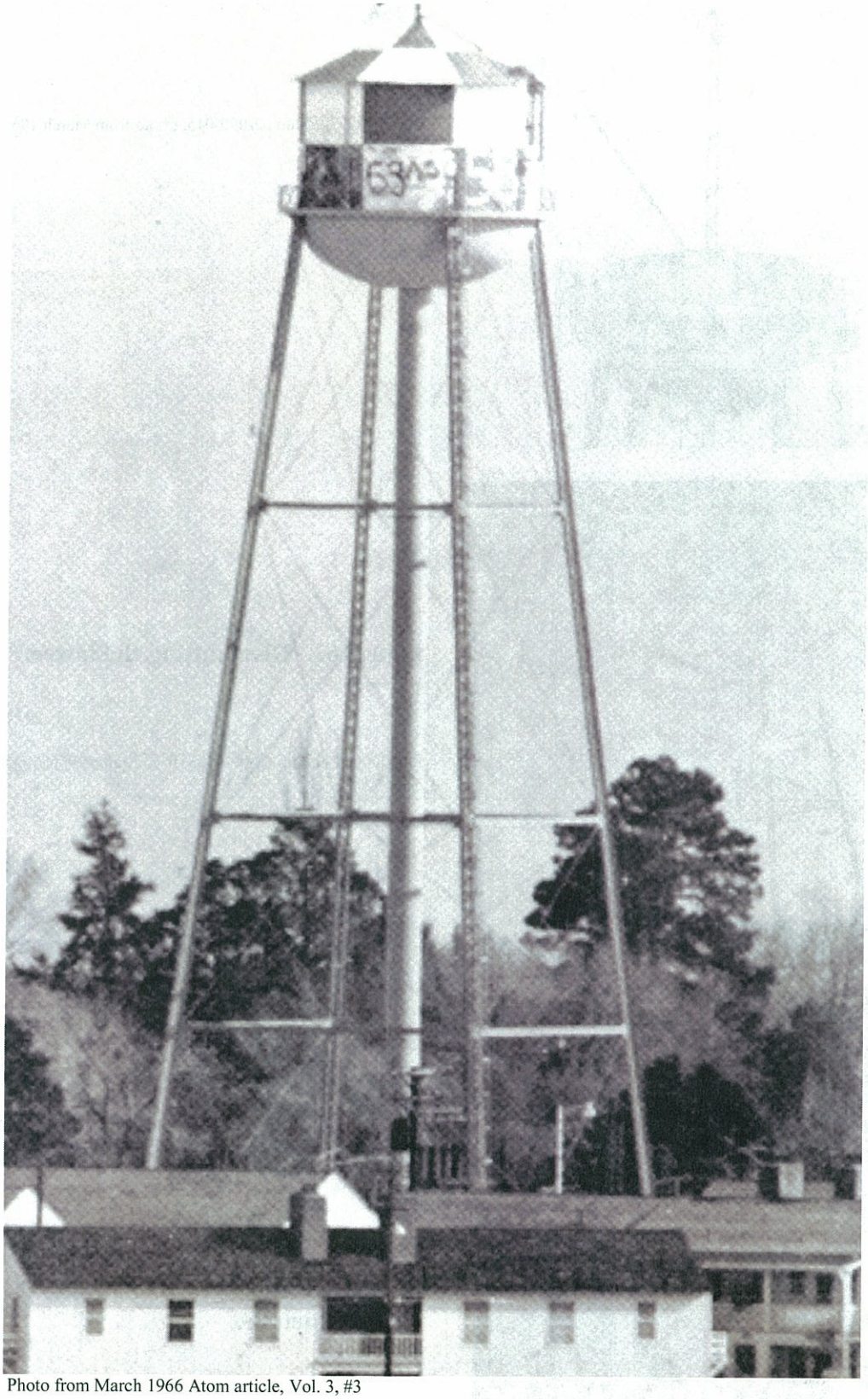


Photo from March 1966 Atom article, Vol. 3, #3

Figure 60. The water tank before its relocation, circa 1966.

Figure 61. The dismantling of the tank, 1966.

LANL# CIC-9: Pub 62-090-015, photo from March 1966 Atom article, Vol. 3, #3

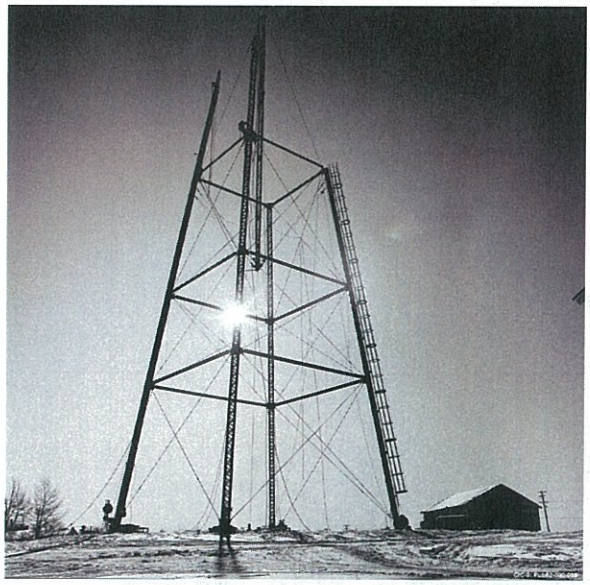


Figure 62. Dismantling the tower.

LANL# CIC-9: Pub 62-090-038, from March 1966 Atom article, Vol. 3, #3

Figure 63. Workers dismantling the tower structure.

LANL# CIC-9: Pub 62-090-052 photo from March 1966 Atom article, Vol. 3, #3

8) Waste Management, Environmental Restoration, and Decontamination and Decommissioning (1945–1990)

Waste Management Practices at DP Site

Plutonium processing activities were the largest contributor to the waste streams at DP Site. Plutonium recovery operations, however, were essential due to the scarcity of plutonium; this practice led to the recycling of some of the main process waste streams. Most of the process waste was in liquid or solid form and was either radioactive or chemical in nature. The wastes were generally disposed of on-site at one of the five Material Disposal Areas (MDAs) (LANL 1991).

Solid wastes were usually buried in pits in the MDAs. Occasionally the wastes were incinerated or, in the case of building debris, pushed over the mesa edge, piled near DP East, or abandoned somewhere at DP Site. Long trays, called salamanders, were used for the open burning of solid waste (LANL 1991).

Liquid wastes were piped to nearby disposal and treatment facilities. Early liquid wastes were stored in tanks in the hope that future technology could improve extraction processes. Absorption beds located in some of the MDAs were also used to remove radioactive contaminants from the waste liquids. In 1952, sufficient technological advancements had been made and liquid wastes were reprocessed in liquid waste treatment facilities in order to recover additional amounts of plutonium (LANL 1991).

During the early years at DP Site, sanitary wastes were mixed with other liquid waste and discharged over the mesa edge or piped to septic tanks. In 1966, a sewage treatment plant was constructed at the east end of DP Mesa (LANL 1991).

Air from the DP West and DP East operations areas was routed to filter houses and cleaned by filters and electrostatic precipitators. Other "non-process" air was exhausted through stacks (LANL 1991).

Most of the waste management practices were discontinued in 1978 when the plutonium operations were relocated to TA-55. The five MDAs were shut down by 1983 (LANL 1991).

MDAs

MDA A is a little more than an acre in size and contains three pits and two underground storage tanks (LANL 1990) (Figure 64). These tanks, known as the "General's Tanks," are the oldest underground storage tanks in New Mexico and were connected to the waste treatment plant by a steel drain line (Stafford 1999 and LANL 1990). The waste in this MDA probably consists of plutonium and americium solutions, and solid waste contaminated with polonium and plutonium. One of the pits also contains building debris (LANL 1990). This MDA ceased operation in 1978 (LANL 1991).

MDA B is a six-acre inactive landfill. Solid wastes, contaminated with plutonium, polonium, uranium, curium, americium, and actinium, were buried at MDA B. A contaminated truck from the Trinity test is also buried at this MDA (LANL 1990). MDA B ceased operating in 1948 (LANL 1991).

LANL# CIC-9: 2284

Figure 64. View of MDA-A, circa 1948.

MDA T is about two acres in size and includes absorption beds, a pit, and 62 shafts. The beds received untreated plutonium processing wastes from 1945 to 1952. A monitoring pit, known as the "Snake Pit," was placed in MDA T but did not contain waste. The shafts contain americium wastes (LANL 1990). This MDA closed down in 1983 (LANL 1991).

MDA U is small, only about .25 acres in size. Two absorption beds are located in this MDA. The beds were used for the disposal of liquid wastes from DP East processing operations. The wastes contained polonium-210, now since decayed away, and actinium-227 (LANL 1990). MDA U ceased operations in 1968 (LANL 1991).

MDA V was the disposal site for contaminated wastewater. This wastewater, from nearby laundry operations, was discharged into three absorption beds. Liquid wastes contained barium, strontium, plutonium, tritium, probably uranium, and various chemicals (LANL 1990). This MDA stopped operating in 1961 (LANL 1991).

The ER Program and Past Decontamination and Decommissioning at DP Site

As part of LANL's ER Program, environmental characterization activities were conducted at TA-21 in the early 1990s. The ER Program, using historical records and interview sources, identified suspected Solid Waste Management Units (SWMUs), or areas where a potential release of contaminants into the environment may have occurred. Surface and subsurface soil sampling was conducted in order to characterize contaminant levels at the various SWMU locations within the geographical boundaries of TA-21, from the bottom of Los Alamos Canyon

to the south and to the bottom of DP Canyon to the north. The results of this characterization work helped determine cleanup priorities for future ER Program work. In a related action, LANL's Decontamination and Decommissioning personnel evaluated the remaining buildings and structures at DP Site and identified candidates for large-scale cleanup and removal.

DP Site has a long history of decontamination and decommissioning actions. The original DP West administration building, TA-21-1, was torn down in the early 1960s, presumably from the need for a more modern facility. Other buildings have undergone significant remodeling, in many cases from programmatic and technical changes. Buildings TA-21-12 and TA-21-153, the original filter buildings serving DP West and DP East, were decontaminated and eventually demolished in the early 1970s (LANL 1990). In 1994, two of the main plutonium buildings, TA-21-3 and TA-21-4, were decontaminated and torn down. Associated filter buildings, TA-21-146 and TA-21-324, were also decontaminated and decommissioned at this time.

Perhaps the largest decontamination effort to date took place in 1977 at DP West (Figures 65–68). The plutonium operations at DP Site were moving to a new facility at TA-55. Several Laboratory divisions and the primary support subcontractor of the day, the Zia Company, worked together to remove all of the contaminated items from DP West. This was the first time that a plutonium facility of this kind had been cleaned up for reuse. The decontamination effort was costly, approximately $6 million (LASL 1979).

Clean-up workers removed gloveboxes, overhead conveyors, piping, pumps, tanks, ductwork, and filters. They also located and removed waste lines and industrial liquid waste pits. Walls, ceilings, and floors were cleaned, openings in the floors were filled with concrete, new tile floors were added, and "clean" walls were painted orange. Any of the interior surfaces that could not be cleaned were removed. Former site workers were interviewed in order to determine the location and specifics of any spills or incidents. Historical records were also reviewed (LASL 1979).

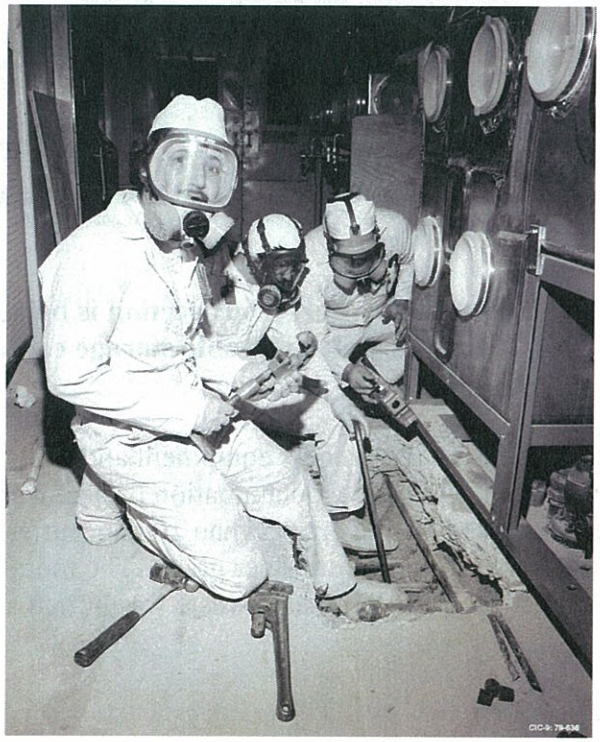
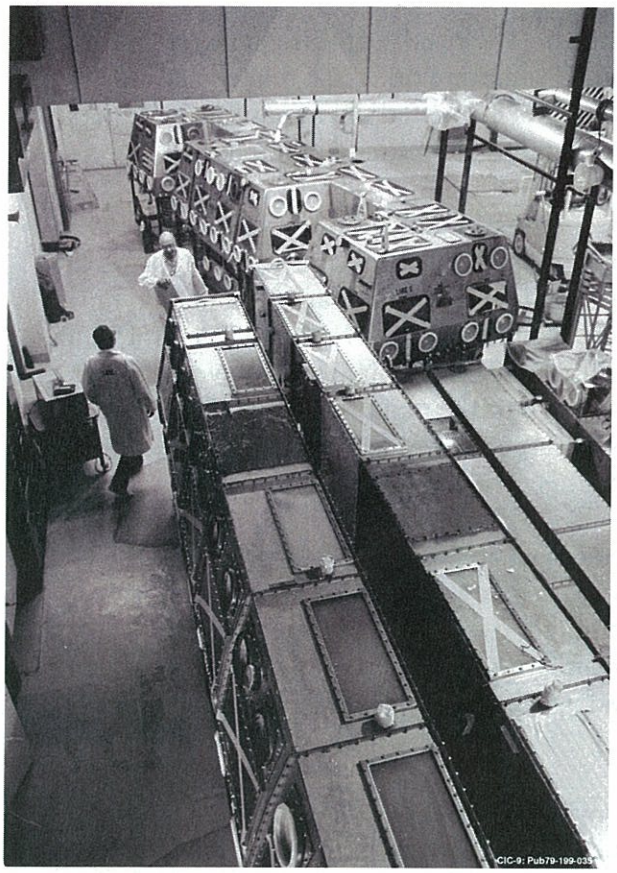


Figure 65. Craftsmen remove contaminated lines from a section of floor.

LANL# CIC-9:79-636, photo from July/August 1979 Atom article, Vol. 16, #6



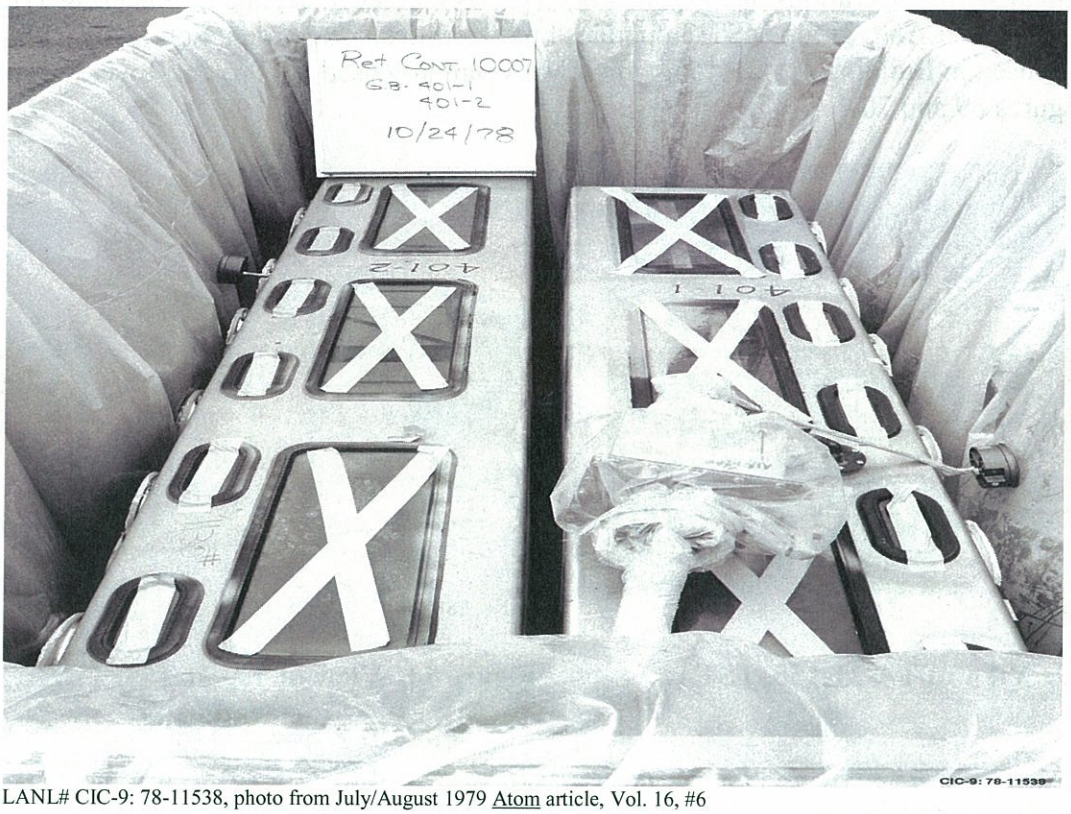
LANL# CIC-9: Pub 79-199-035, photo from July/August 1979 Atom article, Vol. 16, #6

Figure 66. Glovebox sections waiting packaging before being sent to retrievable storage.

LANL# CIC-9:78-15543, photo from July/August 1979 Atom article, Vol 16, #3

Figure 67. A glovebox section is being loaded into a retrievable storage container.

A variety of detection instruments were used to measure the process equipment and walls and ceilings for radioactive contamination. The wastes from this decontamination project were sorted into two main categories: those contaminated to a level greater than 10 nanocuries of transuranics per gram and those wastes with less than 10 nanocuries per gram. The more contaminated material went to retrievable storage. Less contaminated waste was buried as non-retrievable waste (LASL 1979).



LANL# CIC-9: 78-11538, photo from July/August 1979 Atom article, Vol. 16, #6

Figure 68. Two glovebox sections are packaged together for retrievable storage.

After decontamination, the buildings were released to other groups for re-occupation; any restrictions on facility use were transmitted to the new tenants (LASL 1979).

9) Recent Nuclear Chemistry at DP Site (1977–1990)

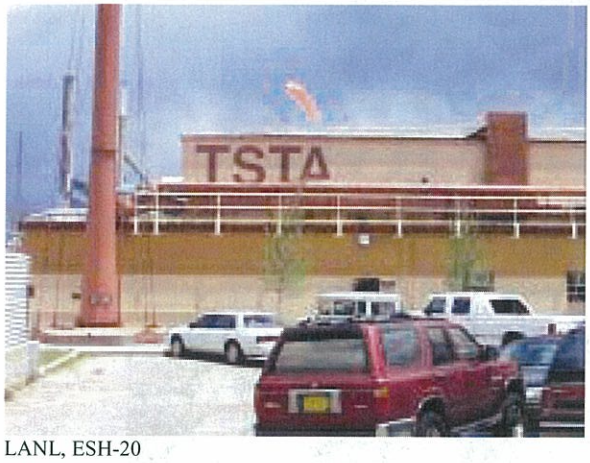
Tritium and Deuterium Work at Tritium Systems Test Assembly (1977 to present)

At the Tritium Systems Test Assembly (TSTA), researchers are developing new technologies for processing tritium and deuterium fuel. This fuel will be used in the magnetic fusion energy program (LANL 1991). Principal objectives for TSTA include the demonstration of the deuterium-tritium fuel cycle for fusion reactor systems, the development of equipment for tritium use in the fusion program, and the development of environment, safety, and health protocols (Anderson and Sherman 1977).

In addition to its main mission, TSTA has supported the Accelerator Production of Tritium Project. Research and development related to tritium recovery and tritium plasmas has also been conducted at TA-21 (Anderson 1999).

TSTA is the only research facility in the DOE complex that can handle significant quantities of tritium and do research and development related to tritium technology in support of fusion. TSTA is the center of international collaboration with Japan for the tritium research and development related to the fusion energy program (Anderson 1999).

TSTA, which started operations in 1977, is related to work at the Weapons Engineering Tritium Facility (TA-16). LANL group MST-3 operates both facilities. The production facility for TSTA is housed in Building TA-21-155, which was originally used for Project Rover (Anderson 1999) (Figures 69 and 70).



LANL, ESH-20

Figure 69. View of TA-21-155, TSTA.

LANL, ESH-20

Figure 70. View of TA-21-155, TSTA, west elevation.

3.2 Summary of Themes

The themes discussed above provide a context within which to analyze the significance of DP Site's historic resources. Some of the themes have national and international importance and contribute not only to the history of the Laboratory at Los Alamos but to the United States' role in the Cold War and to the international development of nuclear science.

Associated properties are listed with each of the themes summarized in this section. The four principal property types are defined in Section 3.3 below. Core properties are in bold and site-wide utilities are marked with an asterisk. Several of the buildings were removed during earlier decontamination and decommissioning actions at TA-21. These properties are marked with a cross.

Major Themes

Most of the major themes at DP Site supported fundamental plutonium, uranium, and initiator research and development that was critically important to the U.S. nuclear weapons program during the Cold War. Key themes include Plutonium Processing at DP West (1945–1977), Uranium Processing and Recovery at DP West (1950s–1984), Initiator Research and Development at DP East (1945–1955), Nuclear Material Stockpile Issues (1945–1977), and Health and Safety (1945–1977). See pages 73 through 77.

<u>Plutonium Processing at DP West (1945–1977)</u>

DP West was the first industrial plutonium processing facility in the U.S. and in the world. Prototype methods were developed for production-scale plutonium processing and over the years these methods were refined as the facility shifted its focus to research and development. All post

World War II weapons-grade plutonium and plutonium cores were processed at DP West until new facilities could be built at other newly established weapons plants around the country. In addition, the nuclear devices used during early U.S. atmospheric tests, including Operation Crossroads, contained plutonium components from DP West.

Associated Properties
Laboratory/Processing Buildings: TA-21-**2**, -**3**†[2], -**4**†, -**5**, -**150**, and -**212**
Administration: TA-21-1 and -**210**
Security Buildings: TA-21-**21**, -254, and -286
Support Buildings: TA-21-14, -30, -**31**, -42, -46, -116, -144, -149, -166, -167, -213, -227*, -228, -229*, -257*, -**258***, -312/18, -313, -314, -315, and -328.

Uranium Processing and Recovery at DP West (1950s–1984)
The earliest industrial quantities of weapons-grade uranium metal were processed at DP West and the first uranium recovery methods were developed. The recovery of uranium-235 was critical to the U.S. weapons program during the late 1950s because of the shortage of weapons-grade uranium.

Associated Properties
Laboratory/Processing Buildings: TA-21-**3S**† and -**4**†
Security Buildings: TA-21-**21**
Support Buildings: TA-21-227*, -229*, -257*, and -**258***.

Initiator Research and Development at DP East (1945–1955)
Post World War II weapons initiators were developed and produced at DP East. Los Alamos initiators were key components in the nuclear devices used in the U.S. nuclear testing program. Initiator production and the later research and development at DP East played an important role in the U.S. efforts to maintain a nuclear stockpile during the Cold War.

Associated Properties
Laboratory/Processing Buildings: TA-21-**151**†, -**152**, and -**155**
Support Buildings: TA-21-**166**, -**167**, -227*, -229*, -257*, -258*, and -342*.

Nuclear Material Stockpile Issues (1945–1977)
During the earliest post World War II years, the U.S. had a fledgling nuclear stockpile. The continued development of this stockpile was of key importance to the U.S. during the late 1940s and early 1950s and played a critical role in the early Cold War with the Soviet Union. Weapons-grade uranium and plutonium were in short supply, and Los Alamos processed all available materials as soon as they were received. The finished weapons components were housed at DP West in vault building, TA-21-21.

[2] Core properties are in bold, site-wide utilities are marked with an asterisk, and previously removed buildings are marked with a cross.

Associated Properties
Laboratory/Processing Buildings: TA-21-**2**, -**3**†, -**4**†, -**5**, and -**212***
Security Buildings: TA-21-**21**
Support Buildings: TA-21-227*, -229*, -257*, and -**258***.

Health and Safety (1945–1977)
Local site workers and other radiation workers from around the U.S. weapons complex have benefited from the continued health and safety improvements at DP Site. The Cecil Kelley criticality accident contributed to the development of the Los Alamos Human Tissue Analysis Program—a nationally recognized program that has refined exposure protocols for radiation workers.

Associated Properties
Laboratory/Processing Buildings: TA-21-**2**
Administration Buildings: TA-21-**210**
Support Buildings: TA-21-**258**

Other Important Themes
Some of the sub-themes of Non-Weapons Research (1945–1990) have national significance even though they are not directly related to Cold War weapons development. These sub-themes are scientific or technological innovations developed as an outgrowth of weapons science and are now characterized as "great science." Major sub-themes include Nuclear Chemistry at DP West (Americium-241 Research), Plutonium-238 Fuels (Space Heat Sources and Other Advanced Fuels), and High Temperature Research at DP East (Project Rover). See pages 79 through 81.

Nuclear Chemistry at DP West (Americium-241 Research)
DP West was at one time the world's center for americium-241 research. The first gram of americium-241 was isolated at the laboratory facilities in Building TA-21-3.

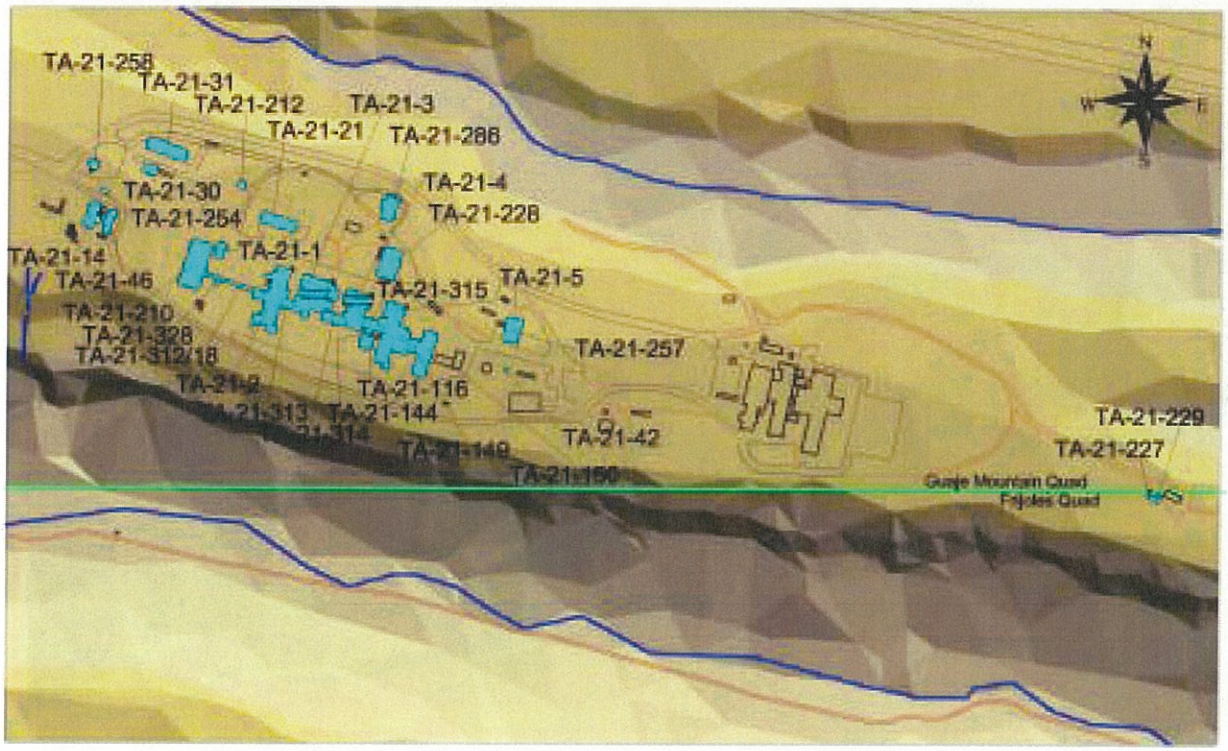
Associated Properties
Laboratory/Processing Buildings: TA-21-**2- and -3**†
Support Buildings: TA-21-227*, -229*, -257*, and -**258***.

Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and Other Advanced Fuels)

The development of plutonium-238 and plutonium-239 fuels at DP West has led to new technologies that currently support manned and unmanned NASA space missions and nuclear energy research, most notably in the development of reactor fuels.

Associated Properties
Laboratory/Processing Buildings: TA-21-**3**†, -**4N**†, -**5**, and -**150**
Support Buildings: TA-21-227*, -229*, -257*, and -**258***.

High Temperature Research at DP East (Project Rover)
Project Rover was a national program whose technology still supports the U.S. space program, especially NASA deep space missions. High temperature research conducted at DP East has led



Plutonium Processing at DP West (1945-1977)

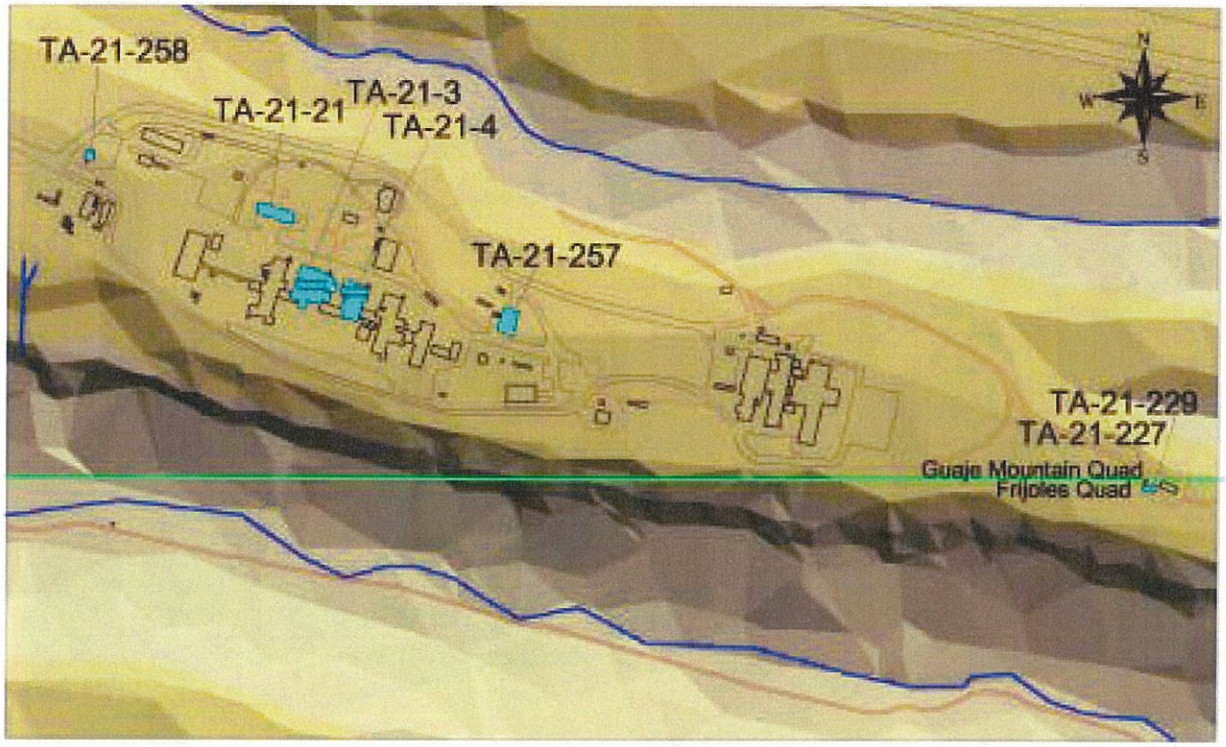
Associated Properties

Laboratory/Processing Buildings: TA-21-2, -3, -4, -5, -150, and -212 (TA-21-3 and -4 have previously been removed)

Administration Buildings: TA-21-1 and -210

Security Buildings: TA-21-21, -254, and -286

Support Buildings: TA-21-14, -30, -31, -42, -46, -116, -144, -149, -227, -228, -229, -257, -258, -312/18, -313, -314, -315, and -328



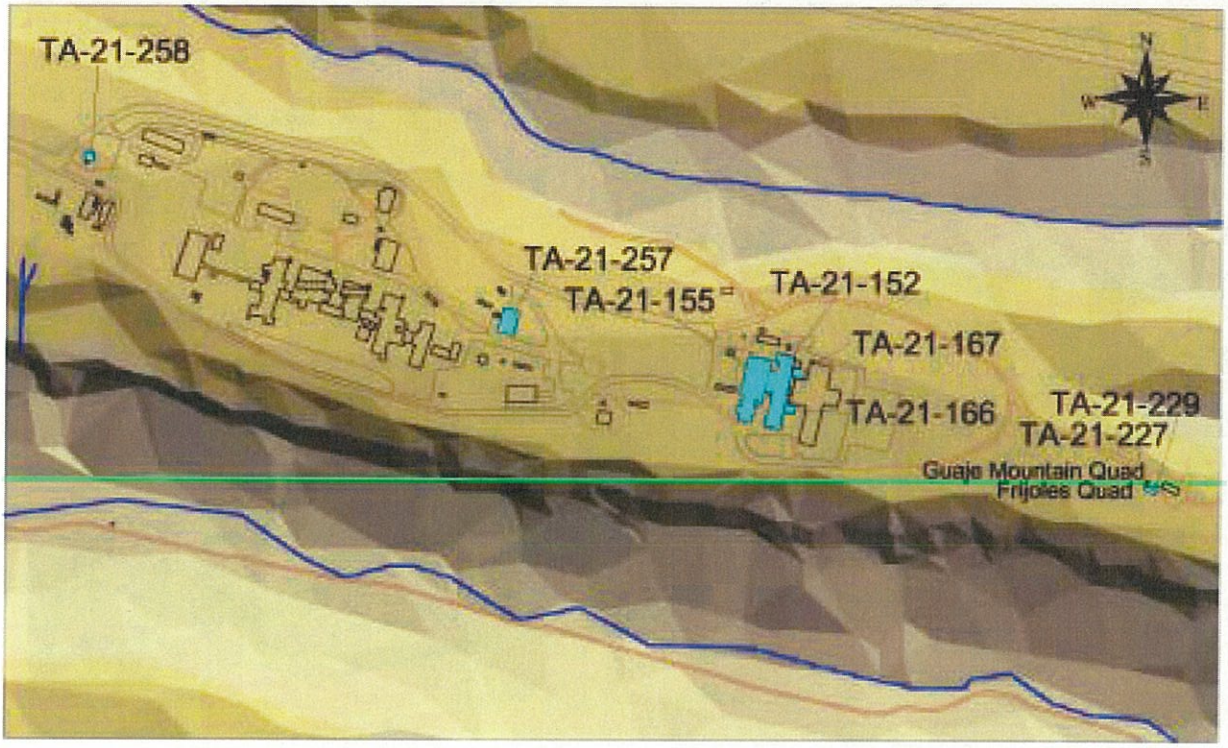
Uranium Processing and Recovery at DP West (1950s-1984)

Associated Properties

Laboratory/Processing Buildings: TA-21-3S and -4 (both previously removed)

Security Buildings: TA-21-21

Support Buildings: TA-21-227, -229, -257, and -258

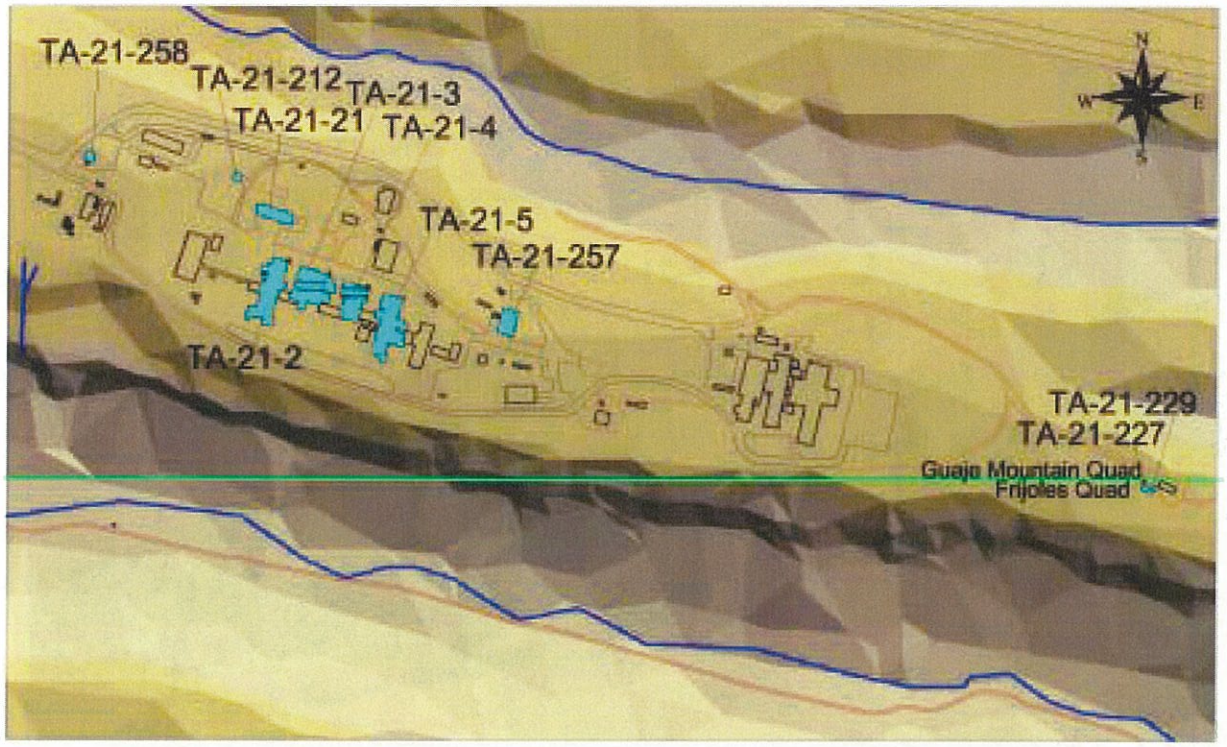


Initiator Research and Development at DP East (1945-1955)

Associated Properties

Laboratory/Processing Buildings: TA-21-151 (previously removed), -152, and -155

Support Buildings: TA-21-166, -167, -227, -229, -257, and -258



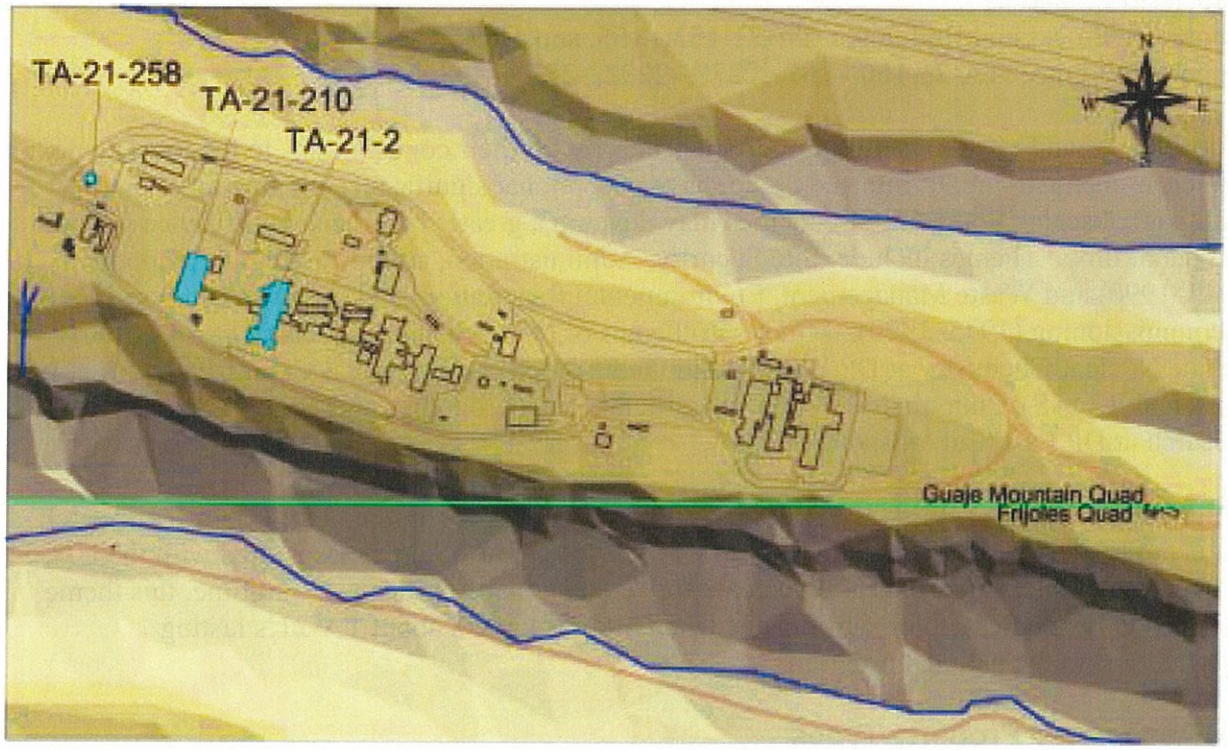
Nuclear Material Stockpile Issues (1945-1977)

Associated Properties

Laboratory/Processing Buildings: TA-21-2, -3, -4, -5, and -212
(TA-21-3 and -4 have previously been removed)

Security Buildings: TA-21-21

Support Buildings: TA-21-227, -229, -257, and -258



Health and Safety (1945-1977)

Associated Properties

Laboratory/Processing Buildings: TA-21-2

Administration Buildings: TA-21-210

Support Buildings: TA-21-258

to other scientific developments including advances in superconductivity brought about by using vapor deposition methods and equipment originally developed for Project Rover.

Associated Properties
Laboratory/Processing Buildings: TA-21-**152, -155,** and **-209**
Support Buildings: TA-21-**166**, **-167**, -227*, -229*, -257*, **-258***, and -342.

Minor themes and sub-themes are important primarily for their contributions to the local context of nuclear chemistry at DP Site and do not have exceptional significance on a national or international scale. Some of these themes may develop a greater historical significance with the passage of time. Themes include: Site Security, Administration, and Infrastructure Support (1945–1990) and Waste Management, Environmental Restoration, and Decontamination and Decommissioning (1945–1990). Minor sub-themes of Non-Weapons Research (1945–1990) include Nuclear Chemistry at DP West (Continued Isotope and Structural Chemistry Work at DP West, and ICONS), Plutonium-238 Fuels (Artificial Heart Program), and High Temperature Research at DP East (Superconductivity).

Tritium and Deuterium Work at TSTA (1977 to Present) is a recent theme of scientific research that is not related to the original mission of DP Site. Work at TSTA is associated with the U.S. fusion program and is too recent to evaluate for "exceptional significance." In time, this theme will need to be reassessed for significance when more is known about TA-21's lasting contributions to the national program.

3.3 Associated Property Types

The multiple property documentation format stipulates the identification of property types that are associated with historical contexts. This identification facilitates the evaluation of individual properties within the broader complex of properties being reviewed. Properties are compared with other historical resources that have similar histories and similar physical characteristics (Hanford 1999a).

At TA-21, four general property types are associated with the themes discussed in Section 3.1 above:

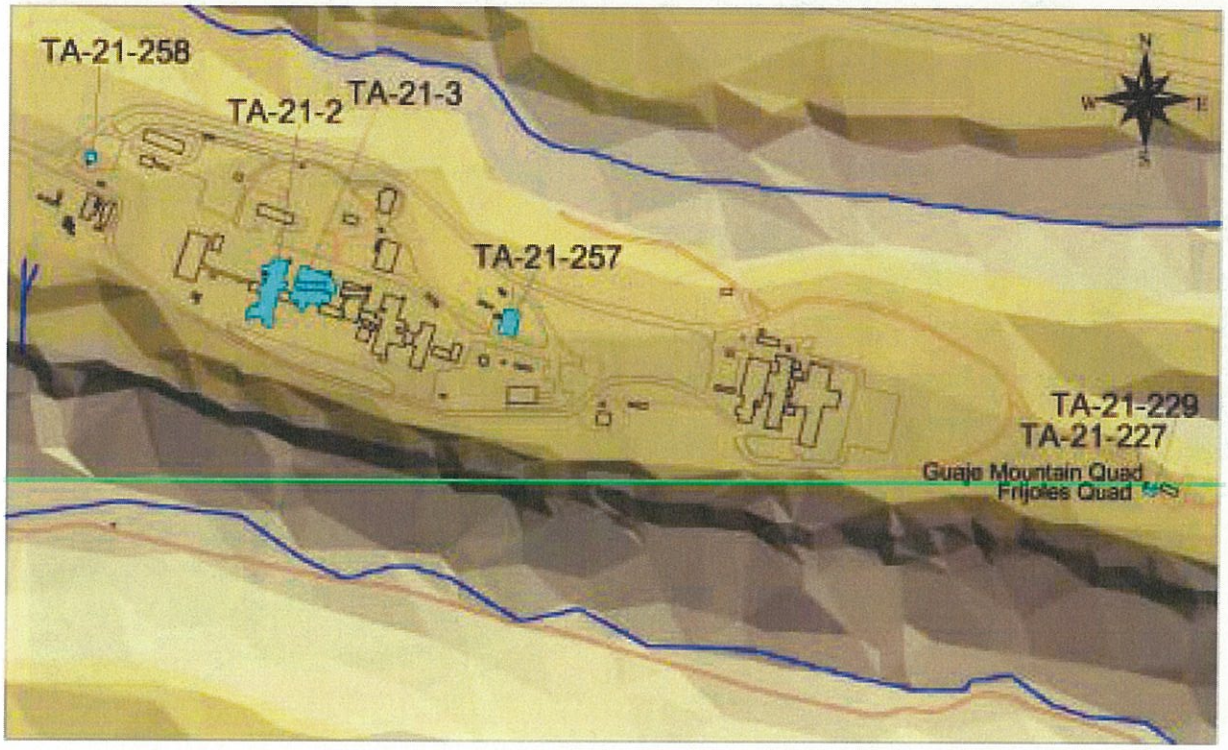
1. Laboratory-Processing Buildings such as plutonium, uranium, americium, and polonium processing and research facilities, and high-temperature research and experimental facilities.

2. Administration Buildings such as office buildings and facilities housing cafeterias and health and safety offices (change rooms and offices for monitoring and medical staff).

3. Security Buildings and Structures such as guard stations, security lights, and vaults.

4. Support Buildings and Structures such as warehouses, water tanks, utilities, and waste treatment facilities.

All laboratory-processing buildings are associated with the Laboratory's Cold War weapons mission—active at TA-21 from 1945 to 1977. Post-1977 non-weapons work carried out in the



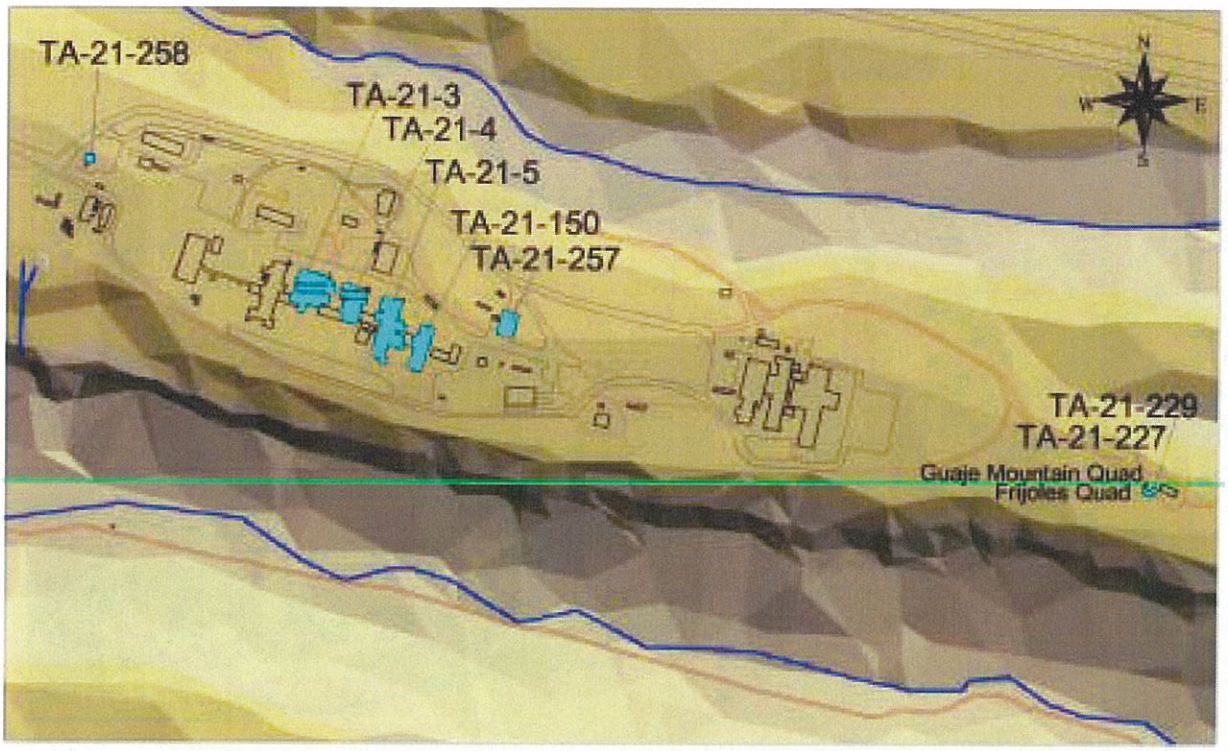
Non-Weapons Research (1945-1990):

Nuclear Chemistry at DP West (Americium-241 Research)

Associated Properties

Laboratory/Processing Buildings: TA-21-2 and -3
(TA-21-3 has previously been removed)

Support Buildings: TA-21-227, -229, -257, and -258



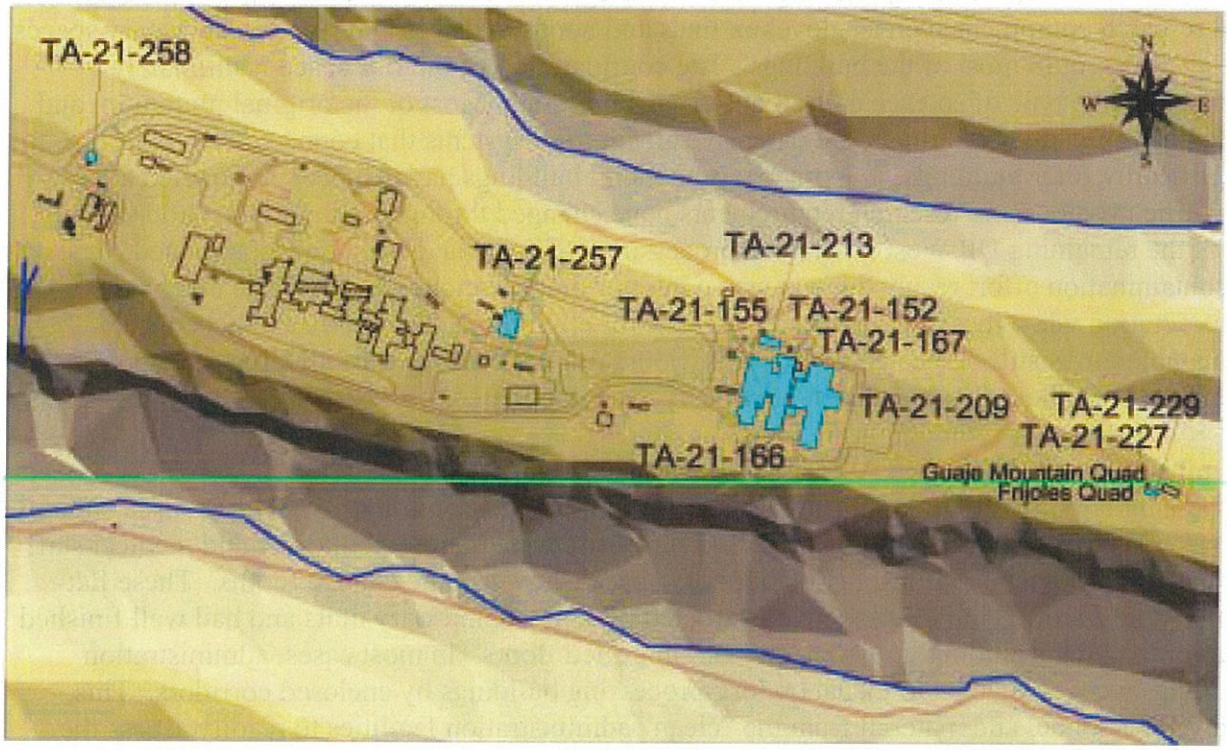
Non-Weapons Research (1945-1990):

Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and Other Advanced Fuels)

Associated Properties

Laboratory/Processing Buildings: TA-21-3, -4N, -5, and -150
(TA-21-3 and TA-21-4 have previously been removed)

Support Buildings: TA-21-227, -229, -257, and -258



Non-Weapons Research (1945-1990):

High Temperature Research at DP East (Project Rover)

Associated Properties

Laboratory/Processing Buildings: TA-21-152, -155, and -209

Support Buildings: TA-21-166, -167, -213, -227, -229, -257, and -258

original DP East laboratory facilities includes high-temperature work related to Project Rover and superconducting research. Laboratory-processing facilities at TA-21 are representative of the "industrial vernacular" architectural style prevalent at all technical areas in Los Alamos. Specific construction styles include pre-fabricated metal-walled structures and concrete masonry unit structures. The buildings are large and are designed with work bays containing processing and research equipment such as glovebox lines and hoods. Offices and smaller laboratory spaces are also present in most of the buildings. The configuration of interior space is ultimately dictated by the type of science carried out in each building. Most of the original plutonium and polonium operations buildings had extensive air filtering systems that connected the buildings to large nearby filter buildings. Laboratory-processing buildings have all been remodeled as scientific missions and research requirements have changed throughout the years. Additionally, all of the remaining DP West laboratory-processing facilities have been decontaminated. The decontamination effort resulted in extensive interior modification, which will be taken into consideration when these buildings are assessed for eligibility. Radioactive and chemical contamination is still suspected in the walls, floor, and subfloor areas of all laboratory-processing facilities, even those that have been previously decontaminated.

Administration buildings at TA-21 are closely associated with the operation of laboratory-processing facilities at DP West and DP East. Administration buildings typically housed support and research operations: administrative and staff offices, radiation monitoring and medical staff offices, food service facilities, light laboratory space, showers, and change rooms. These flat-roofed, multi-storied buildings were constructed of concrete masonry units and had well finished interior features including linoleum- and ceramic-tiled floors. In most cases, administration buildings were connected to the laboratory-processing buildings by enclosed corridors. This allowed personnel and material from the "clean" administration facilities to readily access the "hot" operations areas during the work day. Due to the nature of the radiation work carried out in the adjoining laboratory facilities, some contamination may be present in administration buildings.

Security buildings and structures are associated, first and foremost, with Laboratory weapons research carried out during the years 1945–1977. Most of the original facilities have been removed and only a few examples of this property type remain at TA-21: one guard station, one set of perimeter lights, and two vault buildings. The remaining security facilities at TA-21 are currently inactive resulting from a change in security status after the relocation of plutonium operations in 1977. Security properties are constructed out of a variety of materials including metal siding, concrete masonry units, and wood. Radiation contamination is present in the two vault buildings; however, the guard station is not known to be contaminated.

Support buildings and structures at TA-21 were originally built to support Cold War weapons work associated with plutonium, uranium, and initiator research and development conducted during 1945 to 1990. Some of the original support properties have been replaced in recent years with more modern facilities. Materials used in the construction of this property type include metal siding, wood, and concrete masonry units. Radioactive and chemical contamination are suspected in some of the support properties, depending on the specific support function.

Support facilities have been divided into two subcategories. "First tier" support properties are primarily buildings and include machine shops, water tanks, warehouses, power plants, etc. At

TA-21, shop buildings were used to build equipment for laboratory-processing operations. Paint shops were used for painting equipment and they also housed a supply of paint used for maintenance and housekeeping purposes. Water tanks held water used for project operations and served to separate the TA-21 water supply from the civilian townsite water supply. Warehouses stored a variety of material used to support both operations and administrative facilities. Site-wide utilities and waste treatment facilities supported the operations in DP West and DP East and included gas, electrical, steam, water, and waste treatment and removal. "Second tier" support properties are primarily structures and, at TA-21, include corridor structures, an open shed, and a pump house.

Core properties within each associated property type have also been identified. These are eligible buildings or structures that are key representatives of their associated theme(s).

3.4 Integrity and Eligibility Criteria

Integrity

Although properties may be significant or exceptionally significant and may be eligible for the Register based on association with historical events and contexts, integrity must be determined for all buildings that, on "first-cut," are considered eligible. The LANL Cultural Resources Team has developed four integrity codes to better assess potentially eligible properties. The integrity requirements for properties eligible under Criterion A are less stringent than for those properties eligible under Criterion C. A historically significant property with a level 3 integrity could still be eligible, especially if an element of historical uniqueness is involved. Properties eligible under Criterion C should have no lower than a level 2 integrity. Level 4 integrity properties are not eligible for the Register.

1. Excellent Integrity - the property is still closely associated with its primary context and retains integrity of location, design, setting, workmanship, materials, feeling, and association. Little or no remodeling has occurred to the property and all remodeling is in keeping with its associated historic context/significant use period. Good examples at LANL would be Building TA-21-1001 with its original file cabinets and relatively stable use history (the building has always housed records) and the Van de Graaff facility (Building TA-3-16) with its original equipment, records, and control panels.

2. Good Integrity - the property's interior and exterior retain historic feeling and character but most of the original equipment may be gone. The property may have had minor remodeling. Good examples would be the former 90's line at TA-16 and V-Site at TA-16.

3. Fair Integrity - a property in this category should retain original location, setting, association, and exterior design. All associated interior machinery/equipment may be absent but the key question is "Is this property still recognizable to a contemporary of the building's historic period?"

4. Poor Integrity - the property has no connection with the historically significant setting, feeling, and context. Major changes to the property have occurred. The property would be unrecognizable to a contemporary.

Eligibility Criteria

At TA-21, laboratory-processing buildings, administration buildings, and security buildings and structures do not need to possess an integrity of both exterior and interior features in order to be eligible for the National Register under Criterion A. In cases where original equipment has been removed, a property can still be considered significant for its historical associations. Laboratory-processing, administration, and security properties need only retain original location, setting, association, feeling, and exterior design to maintain significant historical integrity under Criterion A. Properties eligible under Criterion C have to meet a more stringent standard of physical integrity. Additions and remodeling that reflect changing scientific missions are acceptable under Criterion C (Hanford 1999b).

In order to be eligible under Criterion A, support buildings and structures must have functioned as significant support facilities within an associated historical context (Hanford 1999b). "First tier" support properties, if linked to a historically significant context and 50 years old or older, may be eligible for the Register. If less than 50 years old, the support properties must then be exceptionally significant.

"Second tier" support properties, primarily structures, are usually not eligible for the Register (even if they are 50 years old or older) because of the minor role they played in history.

4.0 ELIGIBILITY RECOMMENDATIONS AND LISTING OF EXEMPT PROPERTIES

4.1 Overview

One hundred and ten buildings and structures exist in the TA-21 Site. Thirty-nine buildings were evaluated for historic significance. These buildings are described in Volume 1, Appendix A. Seventy-one buildings and structures lack any qualities to be considered significant historic properties and therefore were exempt from review. Exempt properties are described in Section 4.3. The properties in the TA-21 Site have lost the potential for historic district consideration because of earlier cleanup and removal activities that have affected key portions of the DP Site.

Volume 2, Appendix B contains a map showing the locations of the buildings located in this tract. Appendix C contains the Historic Building Inventory Forms, photographs, and building plans of the evaluated buildings.

4.2 Eligibility Summary

Through documentation and research, it has been determined that 19 buildings and structures located at TA-21 (DP Site) are eligible for the National Register of Historic Places. Eleven properties are 50 years old or older and are eligible under Criterion A due to their association with significant historical events during the Manhattan Project and early Cold War years at Los Alamos. Six properties, although less than 50 years old, are also eligible under Criterion A. This determination was made due to their association with events of exceptional importance during the Cold War years at Los Alamos (Criterion Consideration G: properties that have achieved significance within the last 50 years) (U.S. DOI 1991). Two properties are eligible for the National Register under both Criteria A and C due to historical associations and architectural considerations. Nineteen buildings and structures, although documented in this report, are not

eligible for the National Register because they lack the qualities necessary for historical significance. One laboratory building, TA-21-61, is of undetermined eligibility pending additional research. The summary table in Part 1, Section 5.0 lists all evaluated properties along with eligibility recommendations and associated themes. [Integrity definitions and eligibility criteria were presented in Part 1, Section 3.4 above.]

General Eligibility Considerations

Criterion A

With the exception of TA-21-209, all of the eligible buildings and structures, regardless of age, are closely associated with exceptionally significant Manhattan Project/early Cold War weapons research involving either plutonium and uranium processing at DP West or initiator development at DP East. The speedy development of the very first methods for large-scale processing of weapons-grade nuclear material was a great achievement, especially when the basic chemistry of some types of material was relatively unknown. The very construction of the earliest incarnation of DP Site, which went from initial groundbreaking to full operation in well under a year, was an incredible feat considering the war time conditions at Los Alamos. Post World War II weapons support at DP Site continued to be exceptionally significant, especially in the areas of plutonium and initiator research and development, early stockpiling, and fundamental health physics research.

Many of the buildings and structures are also associated with significant non-weapons themes such as applied nuclear chemistry or nuclear propulsion. Building TA-21-209 was the administrative hub for TA-21's contribution to Project Rover, a national project involving the development of reactors for use in space. From 1955 to 1972, the Laboratory's contribution to this project, in terms of money and human resources, was sizable. Project Rover's significance comes not only from its technological innovations but also from its association with the peaceful application of nuclear energy, a new chapter in the history of the Laboratory during the 1960s.

Resulting from the interconnected layout of DP Site, some support properties are physically and historically linked to significant processing facilities. Buildings TA-21-166 and TA-21-167 at DP East are eligible support buildings. Their true significance lies with their relationship with TA-21-152, one of the original polonium processing buildings. Buildings TA-21-166 and TA-21-167 were built at the same time as TA-21-152 and were originally designated as 21-(1)52 "A" and "B." They are both, in essence, integral architectural components of their "parent" building. In a similar case at DP West, the significance of Building TA-21-116 comes from its physical association with the original plutonium processing line, made up of Buildings TA-21-2, -3, -4, and -5.

TA-21-258, a water tower, is eligible under Criterion A as a symbol of both early Los Alamos and of the Cold War era DP Site. With its distinctive checkerboard paint scheme, this tower was visible from all parts of the Laboratory and the Los Alamos "townsite." The tower is a good example of a support property, and, although moved from its original location in downtown Los Alamos, this tower continues to fulfill a similar function by providing water for both Laboratory employees and for Laboratory operations. The setting and feeling have not changed dramatically

since the time before the move—the tower was moved east of its original location, is still on the same mesa, and is situated at approximately the same elevation.

Criterion C

Two properties have retained sufficient setting, association, feeling, design, and integrity to be considered for eligibility under Criterion C. TA-21-21, a weapons component vault, has excellent physical integrity and is a good representative of a security property, one of the four identified associated property types at TA-21. This building, although no longer functioning as a vault, has remained essentially unchanged since the relocation of plutonium operations to TA-55 in 1977. TA-21-31, a shop building, is an excellent example of a plutonium support property and retains a good level of physical integrity. This building has interesting architectural elements even though it is representative of the Laboratory's "industrial vernacular" style. During the initial recording phase of this project, IT Corporation personnel noted the exposed wooden trusses on the building's exterior and identified TA-21-31 as the only building of architectural interest within TA-21.

Criteria B and D

None of the properties at TA-21 met the requirements for eligibility under Criterion B, associations with historically significant persons, or Criterion D, research potential.

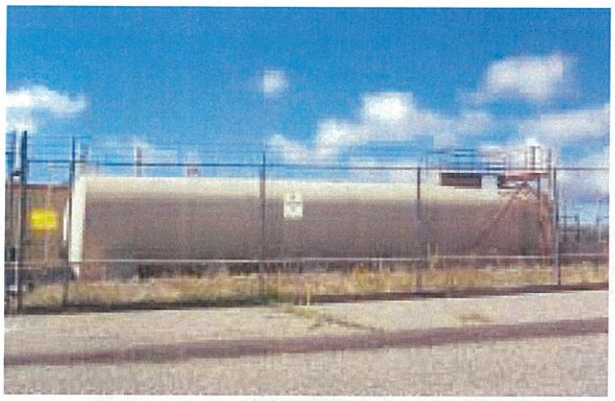
Ineligible Properties

At TA-21, the majority of ineligible properties were not strongly associated with events of exceptional significance and, furthermore, lacked architectural significance. Ineligible "first tier" support properties did not meet the requirements for eligibility outlined in Part 1, Section 3.4 above. They are either, less than 50 years old and not of "exceptional" significance, or, if 50 years old or older, did not play a significant role in any significant theme. "Second tier" support properties, such as corridors and utility structures, clearly played a very minor role in the history of TA-21 and were determined "not exceptionally significant." One property, Building TA-21-1, although of sufficient age and historical association, has been modified to such a degree that it is now unrecognizable. This lack of integrity was the key factor in a recommendation of ineligibility. Two site-wide support properties, TA-21-342 and TA-21-357, had fairly recent construction dates and were not associated with any of the significant themes identified in Part 1, Section 3.4 above.

4.3 Buildings and Structures Exempt from Review

The 71 other buildings or structures lack any qualities to be considered significant historic properties and, based on initial reviews, are exempt from further review due to the type, function, and construction date of the property. Exempt property types, documented during this survey, played a minor support role in the history of LANL. These support buildings and structures include an oil fuel tank, manholes, various small metal sheds, acid tanks, electrical and telephone substations, steam pits, sludge drying beds, exhaust stacks, containment vessels, a condensate tank, portable trailers, transportainers, Morgan™ sheds, portable sheds, gas manifold, and a small concrete shed.

Oil Fuel Tank



TA-21-57

TA-21-57 is a 6,000-gallon oil fuel tank built in 1945. The tank is constructed of light gauge steel plate and rests on concrete saddles.

Storage Sheds

TA-21-458

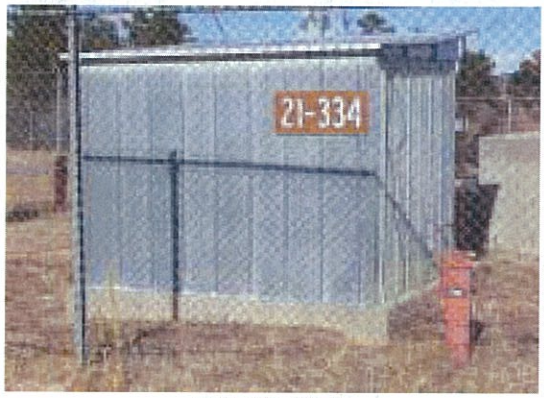
TA-21-550

TA-21-387, -458, and -550 are prefabricated metal storage sheds. They are situated on concrete slabs or on wood pallets or sleepers on asphalt pads. Sheds TA-21-387 and TA-21-550 are Morgan™ type sheds. TA-21-387 has a gambrel roof and TA-21-550 has a pitched roof.

TA-21-451

TA-21-451 is a pre-engineered wooden storage shed. It is situated on a concrete slab.

Utility Building



TA-21-334

TA-21-334 is a small (4 ft by 6 ft 8 in. by 8 ft) corrugated light gauge steel utility shed set on a concrete slab.

Manholes

Manholes, whether they are for water, steam, sewer, acid waste, power, or phone vary in size from approximately 3 ft 6 in. by 4 ft by 5 ft deep to approximately a 5-ft 6-in. diameter by 10-ft deep holes. They are constructed with brick or concrete walls, sometimes lined with plastic liners and have steel or wood covers.

Several of the manholes currently on the list for decontamination and decommissioning activities have been referenced in earlier LANL documents (LANL 1990 and 1991) as already having been removed.

Water

TA-21-69	Water (built 1945)	
TA-21-82	Water (built 1945)	This manhole has also been referred to as an acid sump and has been reported to have been previously removed in 1979-1980 (LANL 1991).
TA-21-259	Water (built 1965)	

Steam

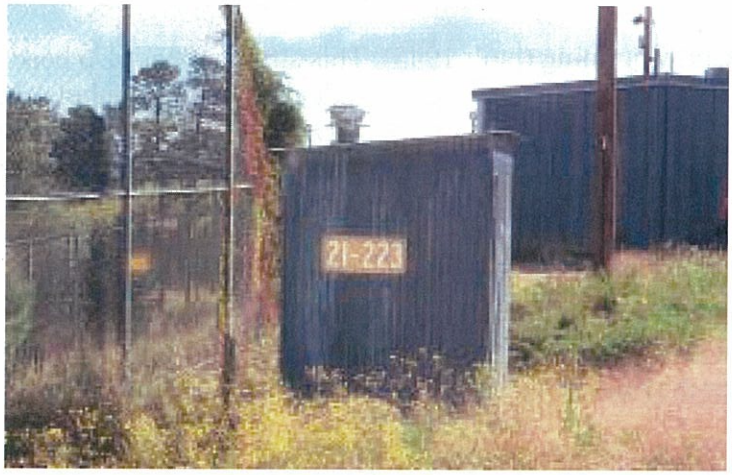
TA-21-75	Steam (built 1946)	
TA-21-77	Steam (built 1945)	
TA-21-164	Steam (built 1946)	This manhole has also been referred to as an acid sump (LANL FWO-FDS, MOADS database).
TA-21-216	Steam (built 1964/1965)	
TA-21-260	Steam (built 1965)	
TA-21-261	Steam (built 1965)	

Sewer

TA-21-81	Industrial Sewer (built 1945)	This manhole has been reported to have been previously removed in 1978-1981 (LANL 1990).
TA-21-218	Sanitary Sewer (built 1964/1965)	

Acid

TA-21-87	Lab Sump Acid (built 1945)	This manhole has been reported to have been previously removed in 1979-1980 (LANL 1991).
TA-21-222	Acid (built 1964/1965)	
TA-21-223	Acid Sump (built 1964-1965)	There is a small corrugated metal structure/shelter over this manhole. It is similar to the shelters built over the back flow prevention equipment.



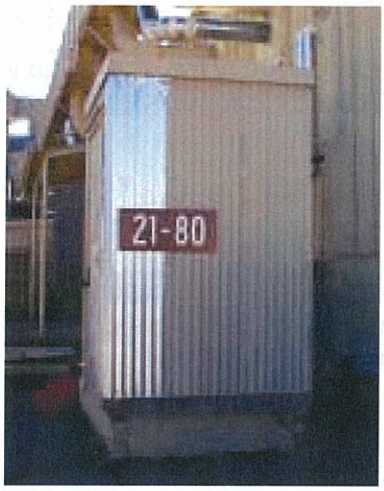
Power

TA-21-303 Power Manhole #1

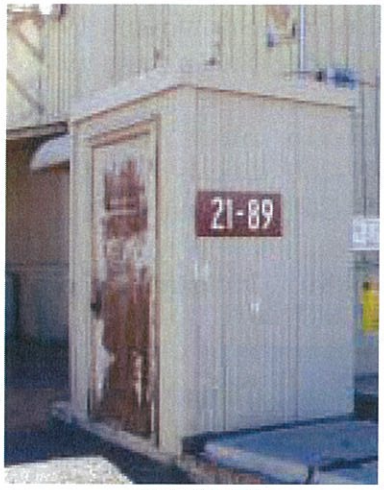
Telephone

TA-21-316

Back Flow Buildings



TA-21-80



TA-21-89

Buildings TA-21-80 and -89 are examples of the small metal utility shelters/structures that can house mechanical equipment such as back flow prevention equipment or pressure relief valve pits. These structures are approximately 7 ft by 5 ft by 7 ft tall.

TA-21-80 back flow building (built 1945)	This structure has also been referred to as a pressure relief valve for water (LANL FWO-FDS, MOADS database) measuring 5 ft by 12 ft by 6 ft deep.
TA-21-89 back flow building (built 1945)	This structure has also been referred to as an industrial sewer manhole (LANL FWO-FDS, MOADS database) and as an acid sump which was reported to have been removed in 1979-1980 (LANL 1991).

Pressure Relief Valve Station

Pressure relief valve stations are pits approximately 5 ft by 12 ft by 6 ft deep with center partitions and may or may not be covered with small sheet metal shelters.

TA-21-86 water (built 1945)	This structure has been reported to have been previously removed by the decontamination and decommissioning program (LANL FWO-FDS, MOADS database). There is no aboveground structure/shelter associated with this pit.
TA-21-88 water (built 1945)	There is no aboveground structure/shelter associated with this pit.

Acid Tanks

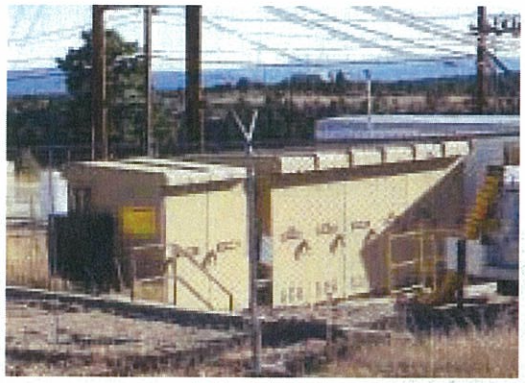
TA-21-110 and TA-21-111

TA-21-112 and TA-21-113

Acid holding tanks are steel plate tanks located on reinforced concrete pads with pipe railing along the top of the tank. These tanks contain low-level radioactive material from operations at DP Site. The tanks are labeled "Influent Storage Tanks Radioactive."

TA-21-110 (sited 1951-1952) (relocated from within DP Site in 1967-1968 to current location)
TA-21-111 (sited 1951-1952) (relocated from within DP Site in 1967-1968 to current location)
TA-21-112 (sited 1951-1952)
TA-21-113 (sited 1951-1952)

Substations



TA-21-148

Electrical substations are mounted on reinforced concrete pads. There are several located around DP Site that service different buildings. They range from a 2,500-KVA three-phase 13,200-2,400 volt to 300-KVA three-phase 13,200-480Y/277 volt, and to a switch substation that provides stand-by services and is only used in an emergency. There are also transformers associated with these substations.

TA-21-148 (built 1957)
TA-21-188 (built 1961)
TA-21-193 (built 1961)
TA-21-307
TA-21-308
TA-21-309
TA-21-338

Telephone Pedestals/Cabinets

Telephone Pedestals/Cabinets

Telephone cabinets are steel cabinets mounted on reinforced concrete pads that can be as large as 5 ft by 5 ft by 9 ft.

TA-21-300	Pedestal
TA-21-316	Pedestal
TA-21-310	Cabinet
TA-21-311	Cabinet
TA-21-320	Cabinet
TA-21-553	Fiber Optics Serving Area Interface

Open Shelters

TA-21-160

TA-21-402

These are canopy-type open-sided structures utilized for covered outside storage of gas tanks and equipment.

TA-21-160, built in 1945, is wood framed with concrete footings and no formal foundation or floor. There are concrete cradles still present that were used to hold gas tanks.

TA-21-402 is a pre-engineered metal structure with two bays. The end walls are of rolled steel panels attached to the steel frame. This structure has concrete footings, stem walls, and spot footings but no formal floor, only dirt and gravel.

Cooling Tower

TA-21-220

Cooling tower TA-21-220, constructed in 1964-1965, is not in use and is abandoned. It originally serviced the air cooling system in Building TA-21-155.

Sludge Drying Beds

TA-21-230

TA-21-230 is the sludge drying beds for the sewage treatment plants TA-21-227 and TA-21-229. These beds were put in place at the same time as the sewage treatment plant was constructed in 1965-1966. The beds are concrete framed with a layer of drain tiles, roofing paper, compacted earth, then crushed rock, pea gravel, followed by sand. A main sanitary sewer manhole is connected to the sludge beds.

Exhaust Stacks

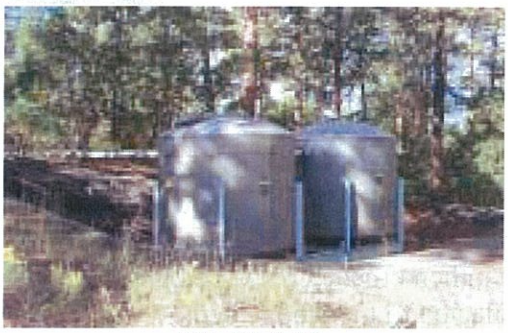
TA-21-466

These exhaust stacks are constructed of steel and range from 36 in. to 54 in. in diameter and stand 50 ft tall. They are mounted on reinforced concrete pads and are connected to particular buildings by ductwork. The stacks release treated filtered air from the laboratory buildings back into the environment.

TA-21-322 (connected to Building TA-21-152)
TA-21-323 (connected to Building TA-21-152)
TA-21-388 (connected to Building TA-21-155)
TA-21-466 (connected to Building TA-21-209)

Tanks and Vessels

TA-21-335

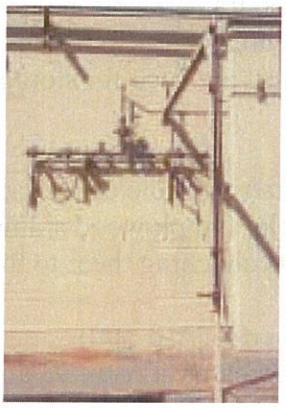


TA-21-346

TA-21-335 is a 6,000-gallon containment vessel designed to receive any liquids discharged from the vault building, TA-21-21, in the event of an emergency release. It is constructed of light gauge steel and is approximately 9 ft diameter by 16 ft long and is mounted on a steel cradle that holds the tank above a concrete pad.

TA-21-346 is a set of two 3,000-gallon stainless steel acid pumping station tanks connected to acid sump TA-21-223. Each tank is approximately 9 ft in diameter and 9 ft high. Both are mounted on steel legs above the surface of an asphalt-lined berm in which they are situated. The tanks were sited at their current location in 1979.

Gas Manifold



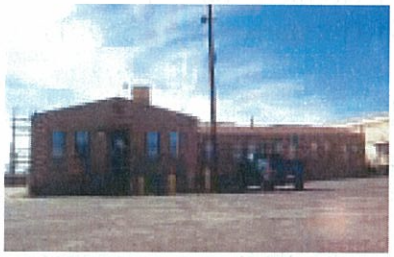
Example of small gas manifold

A gas manifold is a compressed gas distribution system. It is a centralized location where there are compressed gases (gas cylinders) connected to pipes and valves that distribute the gas to various locations.

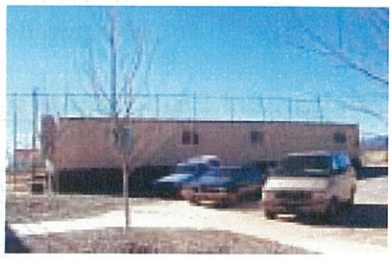
TA-21-468 is a gas manifold.

Trailers-portables

TA-21-353



TA-21-361 and TA-21-365



TA-21-369

TA-21-414

TA-21-450

TA-21-454 and TA-21-455

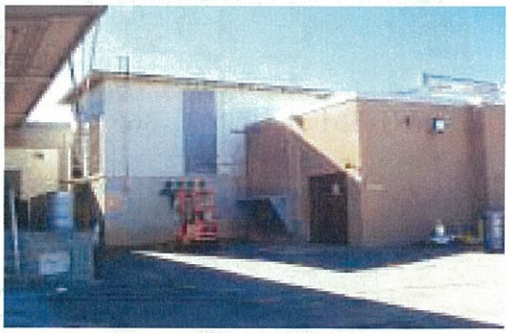
Transportable trailers vary from small "over the road" type utility vans/storage trailers, to small, prefabricated, single-wides to larger, factory-built, double-wide transportable office facilities. The "over the road" type vans/trailers are factory built with metal frames and metal "skins." There are no footings or foundations associated with these vans/trailers. These vans/trailers have their wheels and tires in place, but will require some maintenance before relocation. They are currently used for storage or are abandoned/vacant.

The small single-wide trailers have wood frames and aluminum siding and skirts and rest on concrete block supports or on their tires, frame jacks, and tongue jacks. The "A" frame and hitch are in place on several of these trailers and appear to be serviceable. Additionally, the wheels and axles are still in place. These trailers are used for storage, field shops, shower/change rooms, or office space.

The large factory built, double-wide, transportable office facilities are built on steel frames, with wood joist floors and wood framed walls and plywood siding. These trailers rest on concrete piers with metal straps and anchor bolts attaching them to the piers.

TA-21-353 (sited 1962) (formerly TA-0-500)
TA-21-355 (acquired 1974) (formerly TA-0-593 and TA-21-319)
TA-21-359 (acquired 1984)
TA-21-361 (sited 1985)
TA-21-365 (sited 1985)
TA-21-369 (acquired 1984) (formerly TA-3-1548)
TA-21-414 (acquired 1981) (formerly TA-21-358, TA-52-119, TA-0-738)
TA-21-443 (acquired 1975, current siting 1992) (formerly TA-53-543 and TA-0-606)
TA-21-450 (acquired ~1992)
TA-21-454 (acquired 1991) (formerly 3-535 and TA-54-30)
TA-21-455 (acquired ~1974) (formerly TA-3-534, TA-53-493, TA-0-626, TA-53-447, and TA-0-544)
TA-21-456 (acquired ~1991) (formerly 60-97)
TA-21-461 (acquired ~1979) (formerly TA-53-569, TA-0-719, TA-35-235)

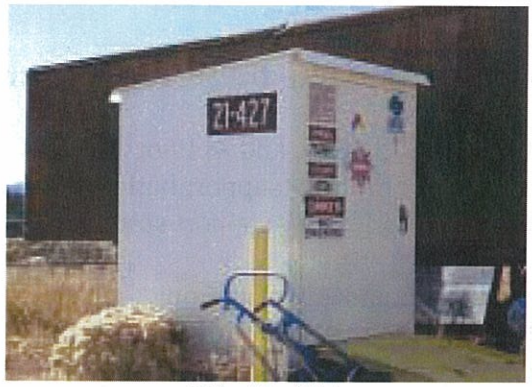
Mechanical Equipment Building



TA-21-370

TA-21-370 is a new mechanical equipment building for a laboratory building, TA-21-152. It was constructed in 1985 of stuccoed concrete masonry units. New air handling equipment is housed in the building that includes a filter plenum, a heat exchanger, a process water evaporative cooler, and a louver.

Chemical Storage Shed



TA-21-427

TA-21-427 is a small portable steel shed utilized for chemical storage.

Transportainers

TA-21-462

TA-21-470

Transportainers are factory-built, heavy-duty steel containers of the type typically used for truck or ship transport. TA-21-462 measures 8 ft by 40 ft and is situated on wood beam sleepers, whereas TA-21-470 measures 8 ft by 20 ft and is situated directly on the ground surface.

TA-21-462
TA-21-470 (formerly TA-33-258 and TA-16-1414)

5.0 SUMMARY TABLE

Summary of Properties (Table Format) with Construction Date, Property Type, Associated Context(s), Associated Significant Theme(s), Integrity Evaluation, National Register Eligibility Recommendation, and Core Property Designation.*

Codes Used in the Summary Table:
CW = Cold War
MP = Manhattan Project
NES = Not Exceptionally Significant
Core Properties = Eligible buildings or structures that are key representatives of their associated theme(s).
Integrity Codes = 1) Excellent, 2) Good, 3) Fair, and 4) Poor
1st Tier (for support properties only) = primarily support buildings
2nd Tier (for support properties only) = primarily support structures

*Significant Themes by Theme Number and Abbreviation:
1) Plutonium Processing at DP West (1945–1977) (**Pu Processing**)
2) Uranium Processing and Recovery at DP West (1950s–1984) (**U Processing**)
3) Initiator Research and Development at DP East (1945–1955) (**Initiator Research**)
4) Nuclear Material Stockpile Issues (1945–1977) (**Nuclear Stockpile**)
5) Non-Weapons Research (1945–1990)
- Nuclear Chemistry at DP West (Americium-241) (**Am-241**)
- Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels) (**Pu Fuels**)
- High Temperature Research at DP East (Project Rover) (**Project Rover**)

6) Health and Safety (1945–1977) (**H & S**)

TA-21 Site Summary Table

Property Number	Date Built	Property Type/SubType	Context(s)	Theme(s)	Integrity Status	National Register Eligible?/Criteria	Core?
21-1	1945	Administration/Office	MP/CW	Pu Processing	4	No - poor integrity	N/A
21-2	1945	Lab-Processing/Plutonium	MP/CW	Pu Processing, Nuclear Stockpile, Am-241, and H & S	3	Yes/A	Y
21-5	1945	Lab-Processing/Plutonium	MP/CW	Pu Processing, Nuclear Stockpile, and Pu Fuels	3	Yes/A	Y
21-14	1946	Support/Power Plant, Shop	MP/CW	Pu Processing	2	Yes/A (1st Tier)	N
21-21	1946	Security/Vault	MP/CW	Pu Processing, U Processing, and Nuclear Stockpile	1	Yes/A & C (1st Tier)	Y
21-30	1946	Support/Paint Shop	MP/CW	Pu Processing	3	Yes/A (1st Tier)	N
21-31	1948	Support/Cold Work Shop, Cables, & Electronics	CW	Pu Processing	2	Yes/A & C (1st Tier)	Y
21-42	1945	Support/Oil Pump House	MP/CW	Pu Processing	1	No - NES (2nd Tier)	N/A
21-46	1947	Support/Diesel Power Plant, Warehouse	CW	Pu Processing	2	Yes/A (1st Tier)	N
21-59	1945	Support/Storage	MP/CW	?	4	No – poor integrity	N/A
21-61	1950	Lab-Processing/Nuclear Propulsion?	CW	Hydrogen Bomb? Project Rover?	3	Not determined – further research needed	?
21-65	1950	Support/Storage	CW	?	3	No – NES (1st Tier)	N/A
21-66	1950	Support/Cylinder Storage	CW	?	3	No - NES (2nd Tier)	N/A
21-116	1950-N 1/2 1958-S 1/2	Support/Restroom, Equipment Warehouse, Conference Room	CW	Pu Processing	2	Yes/A (1st Tier)	N
21-144	1958	Support/Infrastructure (passage)	CW	Pu Processing	3	No - NES (2nd Tier)	N/A
21-149	1962	Support/Infrastructure (corridor)	CW	Pu Processing	2	No - NES (2nd Tier)	N/A
21-150	1962	Lab-Processing/Plutonium	CW	Pu Processing and Pu Fuels	2	Yes/A	Y
21-152	1945	Lab-Processing/Polonium and High Temperature	MP/CW	Initiator Research and Project Rover	2	Yes/A	Y
21-155 (and 21-206 and 21-207)	1949 (1964 and 1965)	Lab-Processing/Polonium and High Temperature	CW	Initiator Research and Project Rover	2	Yes/A	Y
21-166	1945	Support (1st Tier)/Equipment Building	MP/CW	Initiator Research and Project Rover	2	Yes/A (due to association with 21-152)	Y

TA-21 Site Summary Table (Con't.)

Property Number	Date Built	Property Type/Sub Type	Context(s)	Theme(s)	Integrity Status	National Register Eligible?/Criteria	Core?
21-167	1945	Support (1st Tier)/Equipment Building.	MP/CW	Initiator Research and Project Rover	2	Yes/A (due to association with 21-152)	Y
21-209	1965	Administration and Lab-Processing/High Temp.	CW	Project Rover	2	Yes/A	Y
21-210	1964	Administration and Lab-Processing/Plutonium	CW	Pu Processing and H & S	2	Yes/A	Y
21-212	1964	Lab-Processing/Plutonium	CW	Pu Processing and Nuclear Stockpile	2	Yes/A	Y
21-213	1964	Support/Supply Warehouse	CW	Project Rover	2	No - NES (1st Tier)	N/A
21-227	1966	Support/Sewage Treatment	CW	All Themes – Site Wide Utility	1	No - NES (1st Tier	N/A
21-228	1966	Support/Warehouse	CW	Pu Processing	2	No - NES (1st Tier)	N/A
21-229	1966	Support/Sewage Control Building	CW	All Themes – Site Wide Utility	1	No - NES (1st Tier)	N/A
21-254	1966	Security/Guard Station	CW	Pu Processing	2	Yes/A	N
21-257	1967	Support/Waste Management	CW	All Themes – Site Wide Utility	1	No - NES (1st Tier)	N/A
21-258	1948	Support/Water Tower	MP/CW	Pu Processing and H & S/ Site Wide Utility	2	Yes/A (1st Tier)	Y
21-286	1968	Security/Vault, Warehouse	CW	Pu Processing	1	Yes/A (1st Tier)	N
21-312 and 21-18	1971 and 1945	Support/ Infrastructure (passage)	MP/CW	Pu Processing	2	No - NES (2nd Tier)	N/A
21-313	1971	Support/Infrastructure (corridor)	CW	Pu Processing	2	No - NES (2nd Tier)	N/A
21-314	1971	Support/Infrastructure (corridor)	CW	Pu Processing	2	No - NES (2nd Tier)	N/A
21-315	1971	Support/Infrastructure (corridor)	CW	Pu Processing	2	No - NES (2nd Tier)	N/A
21-328	1973	Support/Receiving Building	CW	Pu Processing	2	No - NES (1st Tier)	N/A
21-342	1976	Support/Water System	CW	None – too recent	2	No - NES (1st Tier)	N/A
21-357	1984	Support/Heating –Steam System	CW	None – too recent	2	No - NES (1st Tier)	N/A

PART 2: The Remaining Nine Tracts

1.0 INTRODUCTION

Volume 1 of this report has been divided into two parts. Part 1 contains a multiple property documentation assessment of the TA-21 Site tract. Part 2 contains the documentation for the remaining nine tracts:

- DP Road Tract
- DOE Los Alamos Area Office Tract
- Airport Tract
- White Rock Site
- Rendija Canyon Site
- White Rock Y Site
- Site 22
- Manhattan Monument Tract
- TA-74 Tract

Historic properties were identified in six of the nine tracts. The properties in these tracts do not meet the multiple property documentation requirements described in Part 1, and, therefore, were not evaluated in the same manner as the TA-21 Site properties. Rather, these properties were dealt with on a case-by-case basis. Brief historical background information for each tract is included at the beginning of each tract description. For in-depth LANL historical background/context, see Part 1, Sections 2.0 and 3.0.

We are in the process of developing a LANL Cultural Resource Management Plan that will identify site-wide historical contexts. Any eligible properties identified in Part 2 will later be linked to contexts developed in this management plan.

In this part of the report, properties in each tract will be discussed separately. Detailed property descriptions are located in Appendix A. Eligibility recommendations for all properties documented in Part 2 will follow the tract descriptions (Section 11.0). Properties that lack any qualities to be considered significant historic properties, based on initial reviews, are exempt from further review because of the type, function, and construction date of the property. These exempted properties will also be listed and discussed in Section 11.0. Maps showing the locations of the properties are in Volume 2, Appendix B. The Historic Building Inventory Forms, photographs, and building plans are in Volume 2, Appendix C.

2.0 DP ROAD TRACT

2.1. Provenience and Environmental Setting

Location: TA-21, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Buildings are located in:
Section 15
SW ¼, SW ¼, NE ¼

Maps: USGS Guaje Mountain 87.5 Minute Series (Appendix B, Map 2)

Topography: DP Mesa

Nearest Drainage: DP Canyon to the northeast and Los Alamos Canyon to the southwest

Elevation: 2206.75 to 2209.8 meters (7240 to 7250 feet)

Current Land Use: Developed western portion of TA-21

2.2 DP Road Tract Historical Background

The DP Road Tract is part of TA-21. It is a small portion of the TA located at its western end. This tract contains the LANL Records Center and Archives (Vault) (Figures 1–3) and a warehouse building that houses the LANL subcontractor, Johnson Controls Northern New Mexico (Figure 4), Morgan™ sheds, a back flow building, and an old portable guard station. At one time this portion of TA-21 also contained LANL fueling facilities, a trailer park, and playground area. The LANL Records Center and Archives will be linked with the administration theme. The warehouse building will be looked at in relationship to a site-wide Laboratory general maintenance shops and operations theme including material procurement and distribution of supplies. Both of these will be discussed in the future site-wide cultural resource management plan.

2.3 Description of Properties

Eleven buildings and structures exist in the DP Road Tract. Three buildings were evaluated for historic significance (TA-21-345, TA-21-1001, TA-21-1002). Eight buildings and structures lack any qualities to be considered significant historic properties and were exempt from review (TA-21-1003, TA-21-1004, TA-21-1005, TA-21-1006, TA-21-1007, TA-21-1008, TA-21-1009, and TA-21-1010) (see Section 11.3).

Photo courtesy of the Los Alamos Historical Society, P1990-40-1-3049

Figure 1. Aerial view of TA-21-1002 and TA-21-1002 under construction, 1946.

Figure 2. LANL Records Repository, 1950.

Photo courtesy of Los Alamos Historical Society, P1989-13-1-3403

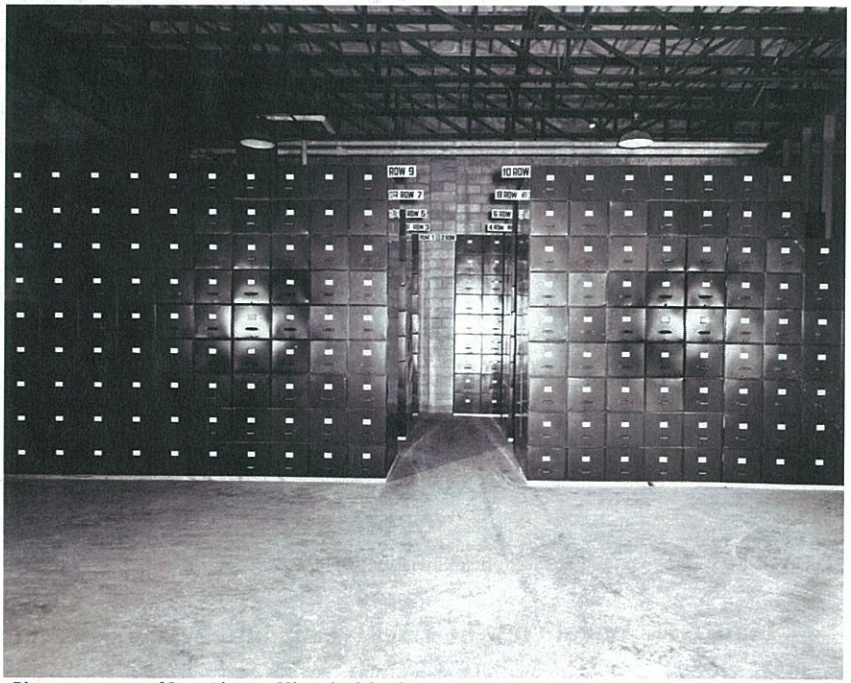


Photo courtesy of Los Alamos Historical Society, P1989-13-1-3402

Figure 3. LANL Records Repository, 1950.

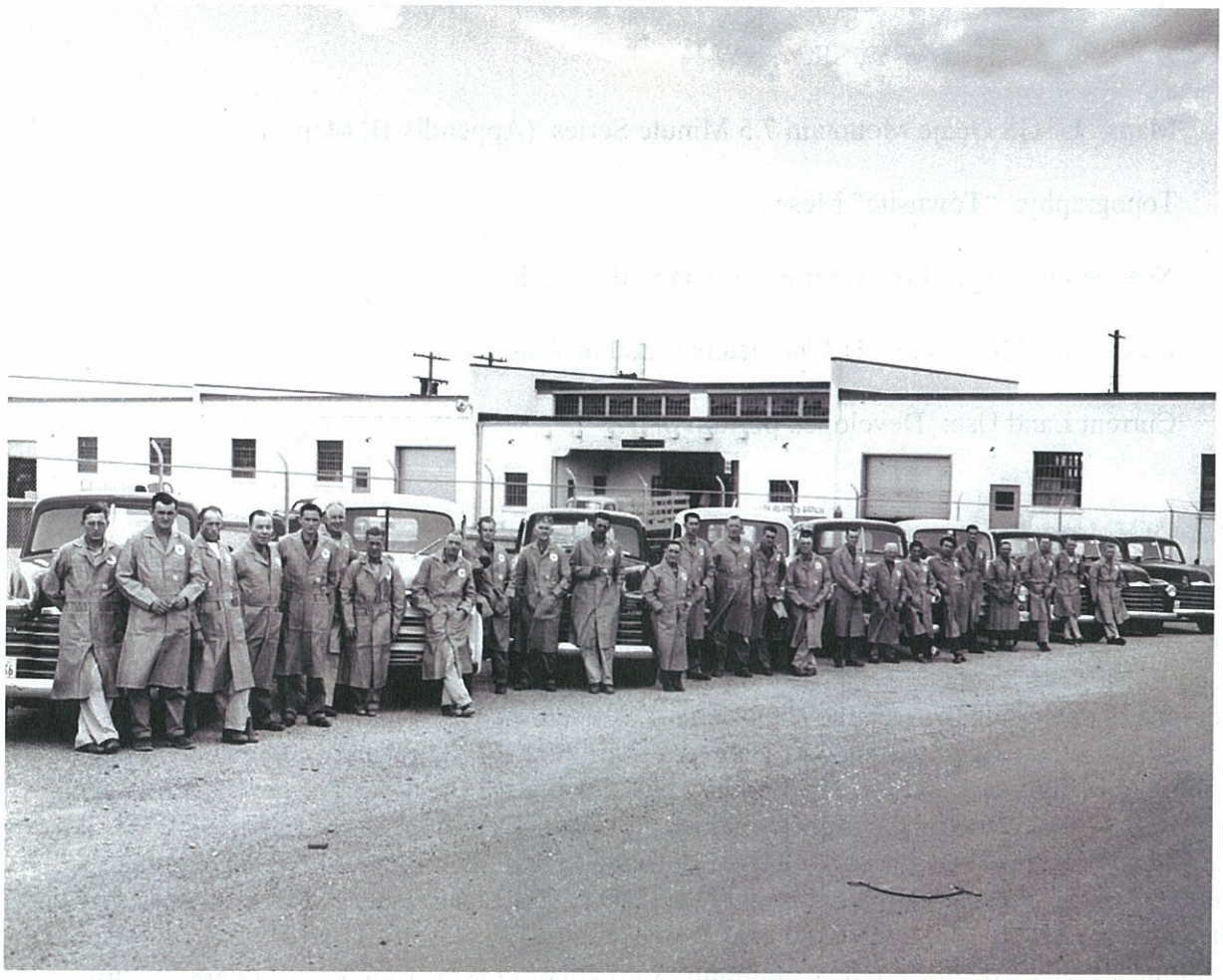


Photo courtesy of Los Alamos Historical Society, (EL) 1011i/74.141

Figure 4. TA-21-1002, Zia Company Maintenance Shop, 1951

3.0 DOE LOS ALAMOS AREA OFFICE SITE

3.1 Provenience and Environmental Setting

Location: TA-43, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East

Buildings are located in:
Section 16
NE ¼, SW ¼, NW ¼
NW ¼, SE ¼, NW ¼

Maps: USGS Guaje Mountain 7.5 Minute Series (Appendix B, Map 3)

Topography: "Townsite" Mesa

Nearest Drainage: Los Alamos Canyon to the south

Elevation: 2202.48 to 2218.94 meters (7260 to 7280 feet)

Current Land Use: Developed portion of TA-43

3.2 DOE Los Alamos Area Office Site Historical Background

The DOE Los Alamos Area Office (LAAO) Site is located in TA-43. This tract contains the DOE LAAO Building (TA-43-39), an abandoned steam plant (TA-43-41) that is currently being used for storage, a concrete slab with the remaining pump house electrical utilities and equipment extending through the slab, a small wooden shed, and horseshoe pits. The DOE LAAO Building was constructed in 1949 as a dormitory for the security personnel for the Laboratory (Figures 5 and 6). The building has also housed the offices of the "federal agencies involved with overseeing the implementation of LANL's mission" (U.S. DOE 1998:14). The agencies include the AEC, Energy Research Development Administration (ERDA), and the current agency overseeing the Laboratory, the DOE. The steam plant building used to service the DOE LAAO Building, the Gold Street Apartments, Los Alamos High School, all the County buildings, Fuller Lodge, and the Community Center (what is now the Central Park Square business area). It also was connected to the Los Alamos Medical Center and the Laboratory's Health Research Laboratory (HRL) building as a backup. The steam plant building was taken out of service in the early 1980s. The DOE LAAO building and the abandoned steam plant building will be linked with the Laboratory Security and Administration themes and will be discussed in the future site-wide cultural resource management plan.

3.3 Description of Properties

Five buildings and structures exist in the DOE LAAO Site. Two buildings were evaluated for historic significance (TA-43-39 and TA-43-41). One building and two structures lack any qualities to be considered significant historic properties and were exempt from review (a small wooden shed, the remains of a pumphouse [TA-32-40], and some horseshoe game pits) (see Section 11.3).

LANL #CIC-9: LAT1511

Figure 5. TA-43-39, former Police Barracks and Atomic Energy Commission Administration Office Building, built 1948-1949.

Courtesy Los Alamos Historical Society, RL3119h

Figure 6. TA-43-39, Atomic Energy Commission, late 1960s.

4.0 AIRPORT TRACT

4.1 Provenience and Environmental Setting

Location: TA-73, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Buildings are located in:
Section 14
SW ¼, NW ¼, NE ¼
SE ¼, NE ¼, NW ¼
NW ¼, SE ¼, NW ¼

Maps: USGS Guaje Mountain 7.5 Minute Series (Appendix B, Map 4)

Topography: "Townsite" Mesa

Nearest Drainage: Pueblo Canyon to the north

Elevation: 2176.27 to 2182.37 meters (7140 to 7160 feet)

Current Land Use: Developed portion of TA-73

4.2 Airport Tract Historical Background

The Airport Tract is located in TA-73. This portion of TA-73 used to be a landfill for the Laboratory as well as the County. "Since 1948, the airport tract has been primarily used for commercial air transportation" (U.S. DOE 1999:11-1). The tract includes the airport terminal building, a storage building converted from a former Laboratory incinerator, a Morgan™ shed, a gas meter station, and plane hangars. Currently, Los Alamos County operates the airport. The county leased the land from the DOE (U.S. DOE 1999). The incinerator building will be linked with the administration theme and possibly with a waste management theme that will be discussed in the future site-wide cultural resource management plan.

4.3 Description of Properties

Four buildings exist in the Airport Tract. Three buildings were evaluated for historic significance (TA-73-1, TA-73-2, TA-73-5). One building lacks any qualities to be considered significant historic property and was exempt from review (TA-73-3) (see Section 11.3).

5.0 WHITE ROCK SITE

5.1 Provenience and Environmental Setting

Location: TA-54, LANL

Land Manger: DOE

Legal Description: Township 19 North, Range 7 east
Buildings are located in:
Unplatted land

Map: USGS White Rock 7.5 Minute Series (Appendix B, Map 5)

Topography: Cañada del Buey

Nearest Drainage: Cañada del Buey to the south and west

Elevation: 1947.67 meters (6390 feet)

Current Land Use: Undeveloped portion of TA-54 that is a buffer between LANL operations and White Rock.

5.2 White Rock Site Historical Background

The White Rock Site is a portion of LANL TA-54, however it is "separated from the developed portions of (the area) by elevation" (U.S. DOE 1999:14-1). The tract contains an electrical substation, water pump station, and a visitor center that is operated by the Los Alamos Chamber of Commerce. The site acts as a buffer area between the residents of White Rock and LANL operations.

5.3 Description of Properties

Two buildings and one structure exist in the White Rock Site tract. One building was evaluated for historic significance (TA-54-75). One building and one structure lack any qualities to be considered significant historic properties and were exempt from review (the White Rock Visitors Center and the White Rock Substation) (see Section 11.3).

6.0 RENDIJA CANYON SITE

6.1 Provenience and Environmental Setting

Location: TA-0, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Buildings are located in:
Section 2
NW ¼, NE ¼, SW ¼

Map: USGS Guaje Mountain 7.5 Minute Series (Appendix B, Map 6)

Topography: Rendija Canyon and Cabra Canyon

Nearest Drainage: Rendija Canyon to the north and Cabra Canyon to the northwest

Elevation: 2121.41 meters (6960 feet)

Current Land Use: Recreational use by the general public. The Los Alamos Sportsmen's Club is located in the canyon.

6.2 Rendija Canyon Site Historical Background

Within the Rendija Canyon Site there used to be a firing site for military ordnance. The Los Alamos Sportsmen's Club, a rifle and pistol shooting range, an archery range, picnic shelter, clubhouse, storage building, the caretakers double-wide trailer home, and transportainers are located in this tract. These facilities are located on land that has been leased from the DOE to the County (U.S. DOE 1999:5-3). The majority of this tract is used for recreational use by the general public.

6.3 Description of Properties

Six buildings and structures exist in the Rendija Canyon Site. One building was evaluated for historic significance (TA-0-1078). Two buildings and three structures lack any qualities to be considered significant historic properties and were exempt from review (the Los Alamos Sportsmen's Club clubhouse building, the caretaker's double-wide house trailer, a picnic shelter, and two unnumbered transportainers) (see Section 11.3).

7.0 WHITE ROCK Y SITE

7.1 Provenience and Environmental Setting

Location: TA-72, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 7 East
Buildings are located in:
Section 20
NW ¼, NW ¼, NE ¼

Map: USGS White Rock 7.5 Minute Series (Appendix B, Map 7)

Topography: Sandia Canyon

Nearest Drainage: Sandia Canyon to the north

Elevation: 1975.10 meters (6480 feet)

Current Land Use: Mainly this tract is an undeveloped portion of TA-72. This tract, however, does contain portions of several roads.

7.2 White Rock Y Site Historical Background

The White Rock Y Site tract is located largely within the undeveloped portion of TA-72. This tract contains part of the county water supply system (water reservoirs, a booster pump station, water well, a chlorinator station, a sand trap, and a fluoride station). It also contains portions of State Road 502 (East Road), the original access route to Los Alamos, State Road 4, and East Jemez Road. Currently, this tract remains a vital part of the Laboratory in terms of transportation and utilities.

7.3 Description of Properties

Seven buildings and structures exist in the White Rock Y Site tract. One building was evaluated for historic significance (TA-72-1). Four buildings and two structures lack any qualities to be considered significant historic properties and were exempt from review (TA-72-2, TA-72-3, TA-72-4, TA-72-5, TA-72-53, and TA-72-57) (see Section 11.3).

8.0 SITE 22

8.1 Provenience and Environmental Setting

Location: TA-41, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Section 15

Map: USGS Guaje Mountain 7.5 Minute Series (Appendix B, Map 8)

Topography: "Townsite" Mesa

Nearest Drainage: Los Alamos Canyon to the south

Elevation: Median elevation 2194.56 to 2212.85 meters (7200 to 7260 feet)

Current Land Use: Undeveloped portion of TA-41, on north rim of Los Alamos Canyon, adjacent to buildings in Los Alamos townsite.

8.2 Site 22 Historical Background

Site 22 is a small portion of TA-41 that is adjacent to buildings in Los Alamos townsite. The DOE currently uses this area as a buffer zone. This tract contains an air monitoring station and is informally used by the public as a vehicle parking area (U.S. DOE 1999). The developed portion of TA-41, which is located in Los Alamos Canyon to the south of the Site 22, contains offices, machine shops, and an air sampling station.

8.3 Description of Properties

No buildings are located in this tract that were evaluated for historical significance.

9.0 MANHATTAN MONUMENT TRACT

9.1 Provenience and Environmental Setting

Location: TA-0, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Section 16

Map: USGS Guaje Mountain 7.5 Minute Series (Appendix B, Map 9)

Topography: "Townsite" Mesa

Nearest Drainage: Los Alamos Canyon

Elevation: Median elevation 2231.14 meters (7320 feet)

Current Land Use: This tract is situated just south of Ashley Pond, north of Trinity Drive, in Los Alamos townsite. The public uses this area for recreational purposes.

9.2 Manhattan Monument Tract Historical Background

Manhattan Monument Tract is considered "a contributing element of the Los Alamos Scientific Laboratory National Historic Landmark" (U.S. DOE 1999:8-1). Situated near Ashley Pond in Los Alamos townsite, the tract designates the location of the site of the original Laboratory, TA-1. Historically, this area was the location of the machining shops, when the Laboratory was located around Ashley Pond. The site contains a small pavilion that covers a plaque "commemorating the location of the Los Alamos Ranch School Ice House. During the first stages of research and development of the atomic bomb, components for the bomb were inspected and assembled in the Ranch School icehouse" (U.S. DOE 1999:8-1). The site was listed as an historic landmark in 1966. The Landmark also contains Fuller Lodge, the Los Alamos Historical Museum, five private residences that comprise "Bathtub Row," Ashley Pond, and a few associated buildings and structures. The Manhattan Monument was constructed on the site of the Los Alamos Ranch School icehouse—out of stones from the icehouse (Hoagland 1998).

9.3 Description of Properties

No buildings are located in this tract that were evaluated for historical significance.

10.0 TA-74 TRACT

10.1 Provenience and Environmental Setting

Location: TA-74, LANL

Land Manager: DOE

Legal Description: Township 19 North, Range 6 East
Section 13
Township 19 North, Range 7 East
Sections 7, 8, 9, 16, 17, 18, 20, 29, and 30

Maps: Guaje Mountain 7.5 Minute Series
Puye 7.5 Minute Series
White Rock 7.5 Minute Series (Appendix B, Map 10)

Topography: Pueblo Canyon, Los Alamos Canyon, Bayo Canyon, Barrancas Canyon, Otowi Mesa

Nearest Drainage: Pueblo Canyon, Bayo Canyon, Barrancas Canyon, Los Alamos Canyon

Elevation: 1859.28 to 2255.52 meters (6100 to 7400 feet)

Current Land Use: TA-74 is an undeveloped portion of the Laboratory.

10.2 TA-74 Tract Historical Background

This tract is currently being utilized as a safety buffer zone for the Laboratory. It contains a water well house, electrical transformers, portable trailers, a transportainer, and a large vehicle/equipment storage garage. The trailers, transportainer, and the garage are located in a Santa Fe County Highway Department road maintenance yard. Formerly, the site also contained an emergency landing strip for the Los Alamos County Airport.

10.3 Description of Properties

Seven buildings and structures exist in the TA-74 Tract. All seven buildings and structures lack any qualities to be considered significant historic properties and therefore were exempt from review (TA-74-1, TA-74-2, TA-74-3, a garage, a storage trailer, an office trailer, and an unnumbered transportainer) (see Section 11.3).

11.0 ELIGIBILITY RECOMMENDATIONS AND LISTING OF EXEMPT PROPERTIES

11.1 Overview

Forty-three buildings and structures exist in the nine tracts discussed in Part 2. Eleven buildings were evaluated for historical significance. These buildings are described in Volume 1, Appendix A. Thirty-two buildings and structures lack any qualities to be considered significant historic properties and therefore were exempt from review. Exempt properties are described in Section 11.3

Volume 2, Appendix B contains maps showing the locations of the buildings located in the tract. Appendix C contains the Historic Building Inventory Forms, photographs, and building plans of the evaluated buildings.

11.2 Eligibility Summary

Based on the information gathered during this building survey, five properties (TA-21-1001, TA-21-1002, TA-43-39, TA-43-41, and TA-73-2) of the eleven evaluated are eligible for nomination to the National Register of Historic Places. The remaining six properties (TA-0-1078, TA-21-345, TA-73-1, TA-73-5, TA-54-75, and TA-72-1) lack qualities to be considered significant historic properties.

All five eligible properties are 50 years old or older and are associated with significant Manhattan Project and Cold War events.

Criteria A and C

The archives building (TA-21-1001) is important for its administration function. It was the Laboratory's central records repository and it holds early Laboratory records. Even though it has been slightly modified by the addition of a vault room and other upgrading of security features, this remodeling has been consistent with the original function of the building. The exterior of the building looks virtually as it did originally with minor exceptions of several pedestrian door placements. The interior portion of the building where the archive stacks are located, basically looks as it did in the 1950s, with original shelving, file cabinets, and equipment.

The current DOE LAAO Building (TA-43-39) is important for both its original function as the dormitory "Police Barracks" for the Laboratory's security personnel and for its current function as the administration office building for the federal agencies that have had the responsibility for overseeing the operations of the Laboratory. The modifications that have taken place to this building also have been in keeping with its security and later solely administration functions. The dormitory rooms were modified into offices (individual room faucets and plumbing were removed, counters were placed over the sinks, and door openings between rooms were made). The basement was remodeled into a photo lab for the security office, and lounge areas were converted into conference rooms. Even though the central windows in the entrance area were replaced, the building exterior looks as it did at the time of construction.

The abandoned steam plant (TA-43-41) is important for its association and support of the DOE LAAO Building and for its additional support of other buildings within the community/townsite of Los Alamos. This steam plant, also known as the "Western Steam Plant," serviced the Gold Street Apartments, Los Alamos High School, all the County buildings, Fuller Lodge, and the Community Center (what is now the Central Park Square shopping area). The steam plant was taken out of service in the early 1980s. Since that time the building has been used for storage and currently is abandoned. Even though this building is abandoned the boilers were not removed when the building was taken out of service and engineering records indicate that no modifications have taken place on the building since the time of its construction in 1949.

Criterion A

The permanent warehouse building (TA-21-1002) utilized by Johnson Controls Northern New Mexico, the Laboratory's current maintenance contractor, as a maintenance shop/warehouse was built off the same plans as the archives building (TA-21-1001). It is important based on its function as a general maintenance warehouse for the Laboratory. The warehouse building also has not had many modifications, however, one of the changes constituted the walling up of one of the recessed areas on the front (south elevation) of the building, making it flush with the majority of the south face. Within the other recessed area on the front of the building a small shed type structure has been added. Building TA-21-1002 has always functioned as a warehouse type building since its construction in 1949. The Zia Company, a former Laboratory maintenance contractor, originally occupied the building, then it was leased for commercial use by the private sector. The current Laboratory's maintenance contractor is again using the building as a maintenance shop/warehouse. Even though the exterior has been slightly modified and minor modifications have occurred to the interior of the building its function has not changed.

The old incinerator building (TA-73-2) is important for its Laboratory administration function as an incinerator for classified documents from the Laboratory and the federal agencies responsible for overseeing the implementation of LANL's mission. This incinerator was also utilized later by Los Alamos County and burned all types of trash. Modifications have been made to this building slightly changing its exterior appearance, and the incinerator equipment and exhaust stack have been removed. All of the windows have been covered with metal plates, and one of the roll-up garage type doors located on the front (south elevation) of the building has been walled up with concrete masonry units. This building is currently being used as a storage building by Los Alamos County and the airport.

Criteria B and D

None of the properties in the nine tracts discussed in Part 2 met the requirements for eligibility under Criterion B, associations with historically significant persons, or Criterion D, research potential.

Ineligible Properties

Two of the six ineligible properties are less than 50 years old (TA-73-1, the airport terminal and TA-54-75, a water pump station). Neither of the properties are exceptionally significant and as such do not meet the requirements of Criterion Consideration G. Three ineligible properties are 50 years old or older (TA-73-5, a gas metering station; TA-0-1078, a shed/warehouse; and TA-72-1, a water booster station). These properties are minor support facilities that have not played a significant role in the history of LANL. The remaining ineligible property (TA-21-345, a portable building used as a guard station) is of unknown age and has been utilized at several locations within the Laboratory. Although this building originally functioned as a portable guard station when it was located in the TA-18/TA-54 area, it has not been utilized as a guard station at

TA-21. Even if this property is 50 years old it has lost its original association, setting, and function and is no longer significant.

11.3 Buildings and Structures Exempt from Review

The 32 other buildings or structures lack any qualities to be considered significant historic properties and based on initial reviews are exempt from further review because of the type, function, and construction date of the property. Exempt property types, documented during this survey, played a minor support role in the history of LANL. These include Morgan™ sheds, various small buildings/sheds housing water system equipment, transformers, water reservoirs, water well houses, portable trailers, double-wide trailers, transportainers, a large equipment storage shed, a Los Alamos County Visitors Center, an electrical substation, an open shelter, and the Los Alamos County Sportsmen's Club clubhouse building.

Morgan™ Sheds

TA-21-1008

TA-73-3

Morgan™ sheds are a type of prefabricated, or factory built, wood-framed storage shed with metal siding. The sheds, present in the land tracts proposed for conveyance and transfer, range in size from 8 ft by 16 ft to 12 ft by 18 ft and they either have a gambrel roof or a pitched roof line.

TA-21-1004 (acquired before 1990) (formerly TA-2-77)
TA-21-1005 (acquired before 1990) (formerly TA-2-78 and TA-0-1282)
TA-21-1006 (acquired before 1990) (formerly TA-2-79 and TA-0-1274)
TA-21-1007 (acquired before 1990) (formerly TA-2-80 and TA-0-1277)
TA-21-1008 (acquired before 1990) (formerly TA-2-81 and TA-0-1279)
TA-21-1009 (acquired before 1992)
TA-73-3 (acquired ~1989)

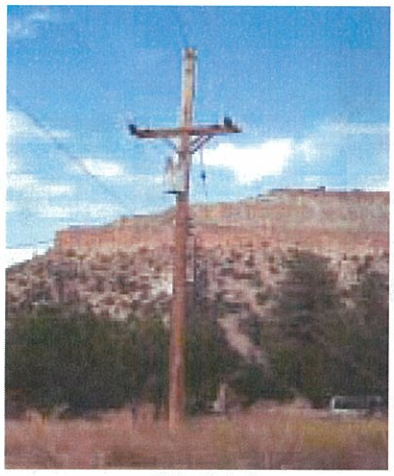
Back Flow Buildings

TA-21-1003

Building TA-21-1003, built in 1967, is a small concrete utility building/shelter housing back flow prevention equipment and a water meter. This building is approximately 9 ft by 12 ft by 9 ft.

TA-21-1003 (formerly TA-2-76 and TA-0-187)

Transformers

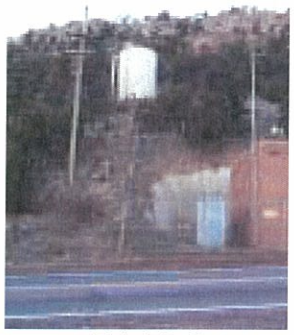


TA-74-1

The style of transformers present are small cylindrical pole-mounted transformers. They are "used to transfer energy, usually that of an alternating current, from one circuit to another, . . . that affect such a transfer with a change in voltage, current, phase, or other electric characteristic" (American Heritage Dictionary 1985:1287).

TA-74-1 (pole-mounted transformer – pole #1359)
TA-74-2 (pole-mounted transformer – pole #1354A)

Surface-Mounted Water Reservoir



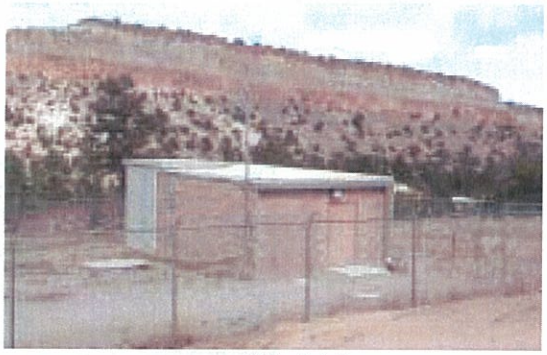
TA-72-2

TA-72-57

TA-72-2 and TA-72-57 are two surface-mounted water storage reservoirs. TA-72-2 is an approximately 75,000- to 100,000-gallon tank. TA-72-57 is a 200,000-gallon tank (Otowi Well #1 tank) and was built in 1995 to 1996.

Water Well Houses

TA-72-4



TA-74-3

Well houses are small buildings built over water well pumping equipment.

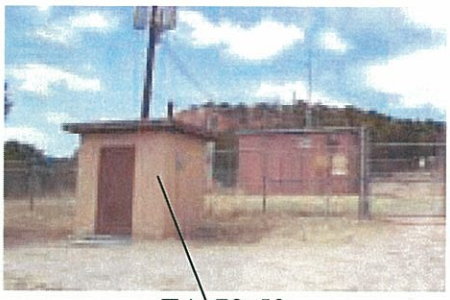
TA-72-4 is a small building constructed of concrete masonry units that have been painted rust in color. It is mounted on a reinforced concrete slab foundation and is approximately 13 ft 4 in. by 18 ft by 9 ft 4 in.

TA-74-3 is a small building also constructed of a type of concrete masonry unit and is mounted on a reinforced concrete slab foundation.

The remains of TA-43-40, a former pump house, are still present in the DOE LAAO Site tract. What remains is a concrete slab with electrical utilities and equipment extending through the slab.

TA-72-4 (built 1966) (formerly TA-0-383) (Pajarito Well House #1)
TA-74-3 (built between 1988 and 1994) (Otowi Well House #1)
TA-43-40 (built ~1989, superstructure removed in 1997)

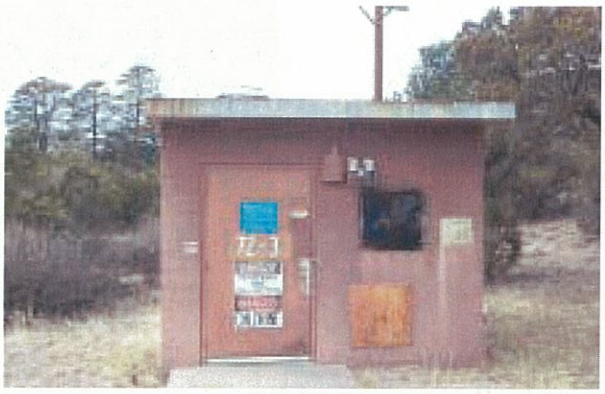
Fluoride Station



TA-72-53

TA-72-53, built in 1958, is a small building constructed of concrete masonry units that have been painted tan in color. This building is also part of the water well system and is associated with Pajarito Well #1. It contains fluoride treatment equipment for the water well system of Los Alamos County and the Laboratory.

Chlorinator Building



TA-72-3

TA-72-3, built in 1968, is a small building constructed of concrete masonry units that have been painted rust in color. This building is also part of the water well system and is associated with Pajarito Well #1. It contains chlorinator equipment for the water well system of Los Alamos County and the Laboratory.

Sand Trap

TA-72-5

TA-72-5, built in 1970, is a small (9 ft by 12 ft by 10 ft) ribbed steel-framed building. This building is also part of the water well system and is associated with Pajarito Well #1. It contains sand filter equipment also known as a building sand trap for the water well system of Los Alamos County and the Laboratory.

Trailers-portable

"Over the Road" utility van/storage trailer

Double-wide office trailer

There are no building designation numbers on any of these trailers. Santa Fe County owns the two trailers pictured above.

Transportable trailers vary from "over the road" type utility vans/storage trailers to prefabricated large, factory-built, double-wide transportable office facilities and trailer homes. The "over the road" type vans/trailers are factory built with metal frames and metal "skins." There are no footings or foundations associated with these vans/trailers.

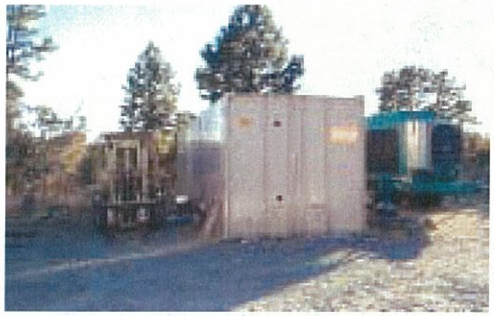
The large factory built, double-wide, transportable office facilities and trailer homes are built on steel frames, with wood-joist floors and wood-framed walls and plywood siding. These trailers rest on concrete piers with metal straps and anchor bolts attaching them to the piers.

"Over the road" utility van/storage trailer - located in the TA-74 Tract at the Santa Fe County Highway Department road maintenance yard.

Double-wide office trailer (sited 1999) - located in the TA-74 Tract at the Santa Fe County Highway Department road maintenance yard.

Double-wide trailer home - located in the Rendija Tract. It is the Sportsmen's Club caretaker's home, a private residence.

Transportainers (metal storage containers/sheds)



TA-21-1010

Highway Department Transportainer

Transportainers are factory-built, heavy-duty steel containers of the type typically used for truck or ship transport. They have steel walls and steel roofs. TA-21-1010 measures 8 ft by 20 ft and is situated directly on the ground surface. There are three other transportainers that do not have building designation numbers. Santa Fe County and Los Alamos County own these. One is located in the TA-74 Tract. It is at least as large if not larger than transportainer TA-21-1010 and is situated on wood "sleepers" and has a poured concrete step leading up to the doors. The other two are located in the Rendija Canyon Tract and are smaller than the above mentioned transportainers and are situated directly on the ground.

TA-21-1010
Transportainer – located in the TA-74 Tract at the Santa Fe County Highway Department road maintenance yard

Two Transportainers – located in the Rendija Canyon Tract near the Los Alamos County Sportsmen's Club storage building (TA-0-1078) and the picnic shelter.

Large Metal Vehicle/Equipment Garage

Highway Department Vehicle/Equipment Garage

There is no building designation number on this building. Santa Fe County owns it. This is a pre-engineered metal building, built on a metal frame with metal siding. It has three large garage type roll-up vehicle/equipment doors and is located in the TA-74 Tract at the Santa Fe County Highway Department road maintenance yard.

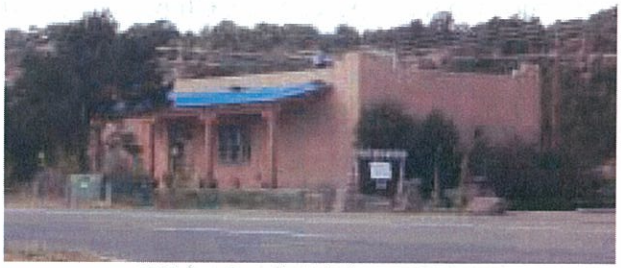
Shed

Shed - Located at TA-43

There is no building designation number on this building.

This small shed is constructed on a wood frame with wood-plank siding and has a slightly sloping roof. There are two hinged doors on the front (east elevation) of the building. At one time the wood siding was painted green. The wood-plank roof originally was covered with rolled asphalt roofing material. From its appearance this shed appears to have possibly been utilized as a storage shed for lawn maintenance equipment. This building is located in the DOE LAAO Site tract.

White Rock Visitors Center



White Rock Visitors Center

There is no number designation on this structure. It is owned and operated by Los Alamos County Chamber of Commerce.

The Los Alamos County Visitors Center, located in the White Rock Site tract, was built around 1990. It is a stuccoed concrete masonry unit building.

Substation

White Rock Substation

There is no number designation on this structure.

Electrical substations are mounted on reinforced concrete pads. There is no information regarding the specifics of this substation that is located in the White Rock Site tract.

Open Shelter

Open Shelter at Los Alamos County Sportsmen's Club

There is no building number designation on this structure. Los Alamos County owns it.

This is a canopy-type open-sided structure used as a covered shelter for picnic tables and an outdoor grill at the Los Alamos County Sportsmen's Club. It is wood framed with concrete footings but no formal floor, only dirt and gravel. It is located in the Rendija Canyon Site tract.

Sportsmen's Club Clubhouse Building

Los Alamos County Sportsmen's Club Clubhouse

There is no building number designation on this structure. Los Alamos County owns it.

The Los Alamos County Sportsmen's Club clubhouse is a pre-engineered ribbed metal building with a slight pitched roof and a canopy over most of the entrance side (east elevation) of the building. It is located in the Rendija Canyon Site tract.

Horseshoe Game Pits

Horseshoe Game Pits

There is no number designation on this structure.

Horseshoe pits are small rectangular sandpits bounded on three sides by wood planks. These game pits are located in the DOE LAAO Site tract.

12.0 SUMMARY TABLE FOR THE REMAINING NINE TRACTS

Property Number	Date Built	Property Type	Context(s)	Theme(s)	Integrity Status	National Register Eligible?/Criteria
TA-21-345	Unknown	Security/Guard Station	CW ?	Laboratory Security	4	No – NES, poor integrity
TA-21-1001	1947	Administration Office	CW	Laboratory Administration	1	Yes/A & C
TA-21-1002	1947	Support/Maintenance Warehouse	CW	General Laboratory Maintenance	2	Yes/A
TA-43-39	1948-1949	Security/ Administration Office	CW	Laboratory Security/Laboratory Administration	1	Yes/A & C
TA-43-41	1949	Support/Steam Plant	CW	Laboratory Security/Laboratory Administration/General Laboratory Maintenance	1	Yes/A & C
TA-73-1	1970-1971	Airport Terminal	N/A	None – too recent	2	No - NES
TA-73-2	1947	Support/Incinerator	CW	Laboratory Administration/ possibly Laboratory Waste Management	3	Yes/A
TA-73-5	1950	Support/Gas Metering Station	CW	Possible Laboratory Utility Theme	2	No - NES
TA-54-75	1962	Support/Water Pump House	N/A	Possible Laboratory Utility Theme	2	No - NES
TA-0-1078	1949	Support/Warehouse	CW	Possible Laboratory General Maintenance, Storage	4	No - NES
TA-72-1	1948	Support/Water Booster Station	CW	Possible Laboratory Utility Theme	2	No – NES

NES = Not Exceptionally Significant

Integrity Codes = 1) Excellent, 2) Good, 3) Fair, and 4) Poor

CW = Cold War

RECOMMENDATIONS FOR PART 1 AND PART 2

Through documentation and research, it has been determined that 24 properties are eligible for the National Register of Historic Places. Thirteen properties are 50 years old or older and are eligible under Criterion A due to their association with significant historical events during the Manhattan Project and early Cold War years at Los Alamos. Six properties, although less than 50 years old, are also eligible under Criterion A. This determination was made because of their association with events of exceptional importance during the Cold War years at Los Alamos (Criterion Consideration G; properties that have achieved significance within the last 50 years) (U.S. DOI 1991). Five properties are eligible for the National Register under both Criteria A and C. In order to be eligible under Criterion C, a property should be distinctive for artistic or architectural reasons. Twenty-five buildings and structures, although documented in this report, are not eligible for the National Register because they lack the qualities necessary for historical significance. One laboratory building, TA-21-61, is of undetermined eligibility pending additional research.

Federal Register 36 CFR part 800, revised May 18, 1999, states that the "transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance is an adverse effect to an historic property." Further consultation to resolve the adverse effects of the transfer of the eligible properties discussed in this report must be conducted before the transfer of the tracts. Resolution options can include additional documentation such as taking large-format photos and producing HABS/HAER quality drawings, or entering into protective convenants stating that the attributes that make the historic properties eligible for the National Register of Historic Places are retained.

The New Mexico State Historic Preservation Officer is requested to comment on the eligibility determinations contained in this report. As a result of this survey, this project complies with the National Historic Preservation Act of 1966 (as amended).

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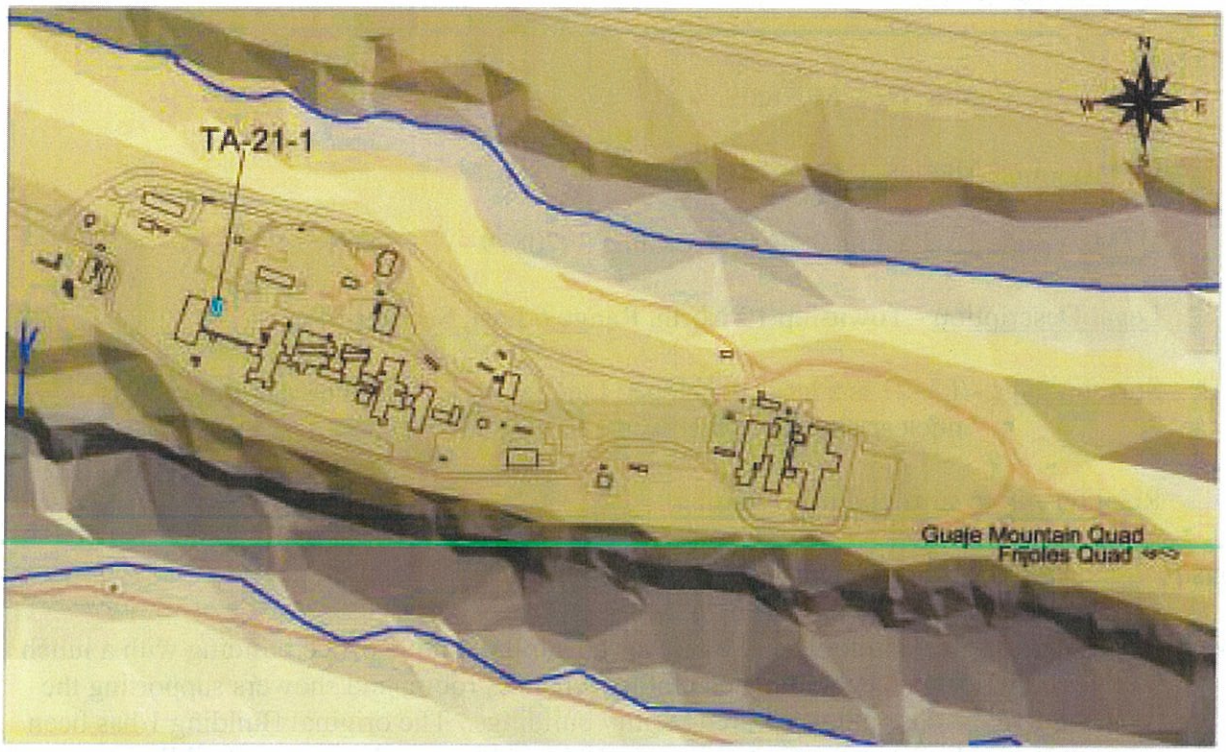
APPENDIX A

Property Descriptions for Part 1



TA-21-1 South and East Elevations

TA-21-1

Building Name: TA-21-1 Office Vault Building
Original Name: DPW-1

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384643 Northing 3970879

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1945, 1949, and 1968

Original Use: The original Building TA-21-1 was an administrative office building with a lunch room, lockers, contaminated clothes (change) room, and showers supporting the DP West plutonium research facility buildings. The original Building 1 has been removed. What remain today are a 1949 addition to the original building and a 1968 addition to the 1949 addition.

Use History: Building TA-21-1 was the original administrative building for the plutonium research and processing facility. The 1949 addition housed a vault, a records vault room, a quality control office, and the Section Head's office. The 1968 addition consisted of an office and restrooms.

Use at Time of Survey: TA-21-1 is currently used solely as office space for a DP West maintenance coordinator and custodial staff. The vault rooms are currently abandoned. Building TA-21-210 replaced the original TA-21-1 as the administration building for the plutonium processing facility.

Condition at Time of Survey: Fair to good

Building Description: (see also Appendix C)

Building style - The original building was constructed of metal lath covered with plaster. A 1949 addition was constructed from a steel tube frame with plaster in fill between the tubes and wood stud walls. Exterior wall surfaces are concrete masonry units with stucco finish. Interior walls are gypsum board and some painted concrete masonry units. Another addition was added in 1968 after the original portion of the building was removed, which was sometime between 1963 and 1968. It was also constructed of

concrete masonry units. When the 1968 addition was added the roof was changed from a pitched roof to a flat roof. Only the additions remain today.

Foundation material - Concrete slab and footings

Wall material/surface - The walls are concrete masonry units that have a stucco finish. The 1948 and 1968 additions remain today. They are also constructed of concrete masonry units.

Architectural features - The original portion of Building TA-21-1 had a gabled roof. The 1949 addition's roof matched that of the original building, and the 1968 addition had a flat asphalt roof (asphalt roll roofing). At the time of construction of the 1968 addition the gable of the 1949 addition was removed to match the new flat roofline. This roof is slightly V-pitched to eliminate water ponding.

The main entrance is on the south elevation of the building. This entrance is reached by a set of concrete steps rising approximately 2 ft above the ground surface. The door is a metal pedestrian door with a large glass window. To the east of the door are three four-paned hinge-open windows.

The east elevation of the building has an exterior pedestrian door leading to metal framing and a platform. This doorway was used as a walkway connecting the building to a portable office trailer that was sited in this location between 1983 and 1992 and has since been removed. There currently remain three four-paned hinge-open windows. A 1983 floor plan of the building shows that there were four windows on this side of the building, one on the south side of the pedestrian door, and three on the north. A 1995 floor plan shows five windows on this side of the building. Currently there are only three windows on this side of the building. The top portion of the center window of the grouping of three has been utilized as a vent for an exterior air conditioning unit.

The north elevation of the building also has a metal framing platform and walkway. This led to another portable office trailer that was sited in this location in 1971. An interior wall was moved creating a north/south hallway the length of the building sometime between the construction of the 1968 addition and the siting of the trailer in 1971. An exterior door and metal walkway (mentioned above) were also added. There are three four-paned hinge-open windows on this side of the building.

The west elevation of the building is void of windows and doors. There are several air vents located on this side of the building.

By 1983 the building is identified as an "Office Vault Building." There are three entrances to the building. The current east entrance was the original entrance to the 1949 addition.

The 1949 and 1968 additions are all that currently remain of TA-21-1.

Remodeling History: The original north/south portion of the building was 30 ft by 130 ft and its eastern extension was 67 ft by 40 ft. The corridor (TA-21-18) that linked Building 1 to Building 2 extended east from this portion of the building.

A 30-ft 4-in. by 35-ft addition was added to the north end of the building in 1949. It housed a vault, a records vault, quality control office, and the Section Head's office.

By 1955 three rooms and a loading dock had been added to the eastern extension of the building. They appear to be small equipment rooms totaling 316 sq ft.

Internal modifications were made to the counting room in 1956. In 1960 modifications were made to the shower room. In 1963 an exterior door was installed off the southern side of the eastern extension of the building.

Building drawings made for a 1968 office and restroom addition show that the original portion of Building TA-21-1 had been removed (sometime between 1963 and 1968) and that only the 1949 addition remained. The new office and restroom addition was to be added to the south side of the building where the original portion of the building used to be situated. At this time, the pitched roof of the 1949 addition was replaced by a flat roof matching the new 1968 addition.

In 1971 a portable office trailer was relocated to the north side of the building. Interior walls were moved to create a hallway, and a metal exterior pedestrian door was installed in the north side of the building for access to the trailer. The trailer was connected by a short exterior metal ramp/walkway.

In 1979 interior modifications were made to what is designated as the computer room (the original quality control office); windows were installed in the interior walls.

Between 1983 and 1992 a portable office trailer was sited on the east side of the building. A short, covered metal walkway connected the building to the portable office trailer.

A 1995 floor plan of Building TA-21-1 depicts both metal walkways on the north and east sides of the building and indicates the trailer numbers that they extend to. Currently the metal walkways are still in place but the trailers were removed sometime during 1996.

Associated Buildings: TA-21-2, -3, -4, -5, -150, corridors TA-21-312/18, -313, -314, -315, -149, and the rest of TA-21 (DP West). Building TA-21-1 was the administrative building for the DP West plutonium research facility. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

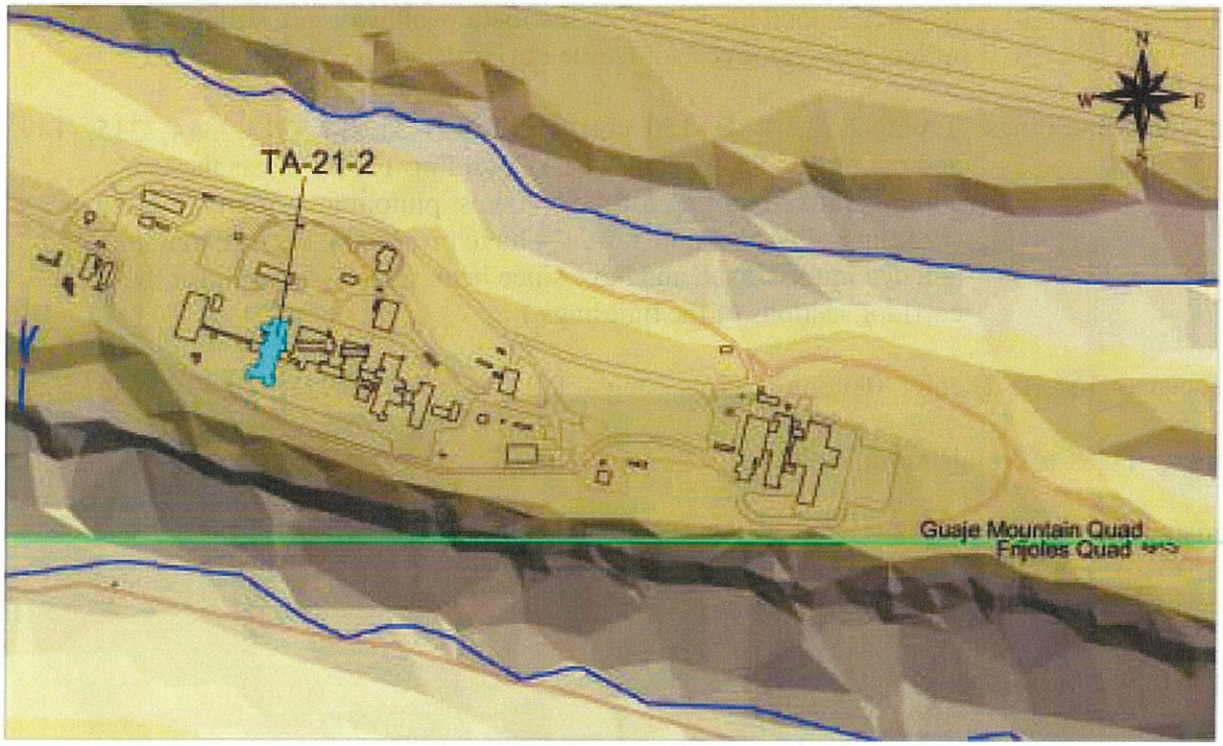
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Administration Building

Contamination History: None

Integrity: Poor

Eligibility: Not Eligible



TA-21-2 North and West Elevations

TA-21-2

Building Name: TA-21-2
Original Name: DPW-2

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384698 Northing 3970828

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/1/1945 to 9/1/1945

Original Use: TA-21-2 was originally a plutonium processing laboratory containing tank shelters, gas cylinders, and other equipment for the main plutonium facility.

Use History: Building TA-21-2 was used as a plutonium processing and recovery laboratory from 1945 to the 1970s. Early ether extraction operations were conducted in this building. Plutonium-239 and plutonium-241 processing, plutonium waste storage activities, and americium-241 recovery operations were also conducted in this building. In December 1958, the Cecil Kelley criticality accident occurred in the south part of TA-21-2. Decontamination and decommissioning activities were carried out from 1978 to 1981 after the transfer of the plutonium processing operations to the new facility at TA-55. Following the decontamination and decommissioning activities the building was occupied by the Environmental Studies Group (LS-6) of the Laboratory Life Sciences Division. The building contained a mezzanine, a chemical storage area, an emergency battery room, a monitoring lab, an incinerator, equipment rooms, fan rooms, a pit, and other various laboratories. The south wing was mainly used for storage during the above mentioned occupations.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Deteriorating

Building Description: (See also Appendix C)

Building style - The original building was a pre-engineered, steel-framed, rectangular warehouse type building with exterior ribbed metal panel siding. Since construction, additions were added as needed. Inside there is a

mezzanine with a metal grating floor. The building contains floor trenches and firewalls. The original building was identical to Buildings TA-21-3, -4, and -5. Buildings TA-21-3 and -4 have previously been decontaminated and decommissioned and all vestiges of the buildings have been removed except for the center portions that connect with the main DP West east/west corridors.

Foundation material - Reinforced elevated concrete slab, stem walls, and footings

Wall material/surface - The walls are plaster on metal lath over the steel frame. The exterior walls are covered with ribbed metal panel siding. The exterior surfaces of additions to the building are corrugated metal siding.

Architectural features - The building is a composite of various elevations and roof slopes with a high bay in the center of the building. Exterior elevations are of metal siding with a metal roof. Multi-ply composite roofing material is used in other sections of the building. The building elevations are void of any predominant window penetrations other than those at various exterior personnel doors. There is a large double door opening at the center high bay on the north side of the building, presumably for equipment access. Heating, ventilation, and air conditioning ducting runs along the top of the outside walls with penetrating ducts from the building interior to the outside. There is an access stair on the outside of the southeast wall of the building with access to the high bay. This building houses rooms that were the site of the 1958 Cecil Kelley criticality accident.

According to the engineering drawings, there were to be a row of windows located on the upper portion of the east and west elevations, however, there are no windows in these areas. The original window openings were covered with metal panels and some of the spaces are used for vent or pipe openings.

There is a set of large equipment double doors in the center of the north elevation. The hollow metal doors are also a Dutch design, and there is a pedestrian door located within the west side door. There is a louver on either side of the doors. In the pediment of the north elevation there is a set of pedestrian-size hollow metal doors that lead to the mezzanine.

On the east elevation of the north wing there is a set of double doors with a three-pane wire glass window. One of the windows has been covered with a metal panel. Next to the double doors is a metal canopy. South along the east elevation there is a firewall that goes across the building east to west and extends beyond the

exterior walls. There is another set of hollow metal double doors with three-pane glass windows along this side of the building. On the south side of the doors a room was added to the original building. On the east elevation of this addition there is a set of hollow metal double doors. The addition is connected to the main portion of the building on its west elevation and is connected to corridor TA-21-313 on its south elevation.

On the east elevation of the south wing, south of connecting corridor TA-21-313, there are two sets of hollow metal double doors. Both sets of doors have three-pane wire glass windows. Some of the panes have been painted over. Continuing south there is another firewall that goes across the building. Two pedestrian doors are situated south of the firewall. Near the south end of the east elevation there are two sets of hollow metal double doors with three-pane wire glass windows. On the southeast corner of the building several rooms have been added. The addition is designated as an equipment room. On the north elevation of this equipment room there are two sets of hollow metal double doors. There is a sash-type window and stairwell leading down on the east elevation of the addition.

A portion of the above addition also exists on the south elevation of the building. Next to this addition there is a set of large equipment sized Dutch doors. A pedestrian door is located within one of the equipment doors. Above the doors, there is a metal landing and a set of pedestrian size double doors that lead to the mezzanine area. A metal ladder extends down from the landing along the west side of the main building doorway. On the west end of the south elevation there is another room addition, also designated as an equipment room.

This equipment room addition is also connected to the west elevation of the building. On the west elevation of this addition there is a set of hollow metal double doors located on a small concrete landing. At the south end of the landing there are concrete steps. On the north end there is a single hollow metal pedestrian door and another set of concrete steps. This door opens into another room, which was also added to the original building. This room is one of the rooms where the 1958 criticality accident occurred. On the north elevation of this room addition there is a set of hollow metal double doors with single-pane glass windows. These doors are located on a concrete slab.

Along the west elevation of the original portion of the building there is a set of hollow metal double doors with single-pane wire glass windows. Further north along the west elevation the south

firewall can be seen extending beyond the wall. Beyond the firewall there is a small room only accessible from the interior. North of this room there is a set of hollow metal double doors with three-pane wire glass windows. A room was added north of these double doors, adjacent to the connecting corridor TA-21-18/312. This room was designated as a monitoring lab. On the west side of this addition there is a set of hollow metal double doors situated on a concrete slab. The north elevation of the monitoring lab addition is attached to the corridor. The east elevation of the addition is connected to the west elevation of the original portion of the building.

To the north of the corridor there is a small room addition that can only be accessed from the exterior of the building. On the main portion of the building there is a set of hollow metal double doors, a small room, the north firewall, and another room addition identified as a chemical storage addition. On the north elevation of the chemical storage addition there is a concrete pad and a pedestrian door, the only access into this addition.

Remodeling History: In 1950 a room was added on to the west elevation of the south wing. The addition was constructed on a concrete slab. The exterior walls were made of aluminum siding. This addition has a sloping aluminum roof. On the north side of the addition there is a set of metal double doors. The east elevation is connected to the original portion of the building. A hollow metal pedestrian door is located at the west end of the south elevation. This door provides access to another later room addition.

Interior room modifications were made in 1951. These modifications included the installation of access ladders for the two 1,000-gallon tanks located in the room.

In 1952 Room 201 was subdivided into four small rooms. The sidewalls were constructed of sheet metal siding. In the northeasternmost new room there was an incinerator.

In 1953 an addition constructed of corrugated transite siding was added to the north elevation of a previously added room on the southeast elevation of the building. The exterior surfaces were then painted to match the rest of the building. On the north elevation of the addition there are two sets of double doors. The bottom panels of each door are louvered. A silica treatment box was also installed in 1953.

Between 1955 and 1958 several interior modifications were made. Old dry boxes (original name for what are now called gloveboxes) were removed and replaced with new ones. Mixer settler equipment was also installed. A steel wall was cut and a balcony was installed on the interior

of the building above Room 201. Gas cylinder sheds with racks were also added to the east and west sides of the building. The sheds were constructed of aluminum siding.

A monitoring room addition was constructed in 1959. In another room several dry boxes were also replaced. The addition, made of corrugated sheet metal siding, has three windows each with six individual glass panes on the south elevation. Several stainless steel tanks were installed. The floor had to be lowered during the installation, pits had to be put in, and stainless steel pans had to be installed. Once these alterations were completed the tanks were installed and new concrete walls were added in the room.

In 1960, a chemical storage area was added to the west elevation of the north wing. In order for the addition to be installed, a pit was filled in with compacted sand, the top of the tunnel access was removed, and the opening was bricked-in. The new addition contained cylinder racks and steel shelves. Some dry boxes were also replaced.

Health and safety modifications were made in 1961. New doors were added to the north elevation, piping was relocated, and a platform and metal ladder were added to the south elevation. Access doors to the fan rooms and interior attic were also modified.

Between 1964 and 1969, interior walls were added in a room forming a small "repackaging enclosure." Gloveboxes were upgraded, and a three-ton jib crane was installed for the material handling system. Modifications were also made to the supply air system.

In 1970, the room exhaust system was modified. Modifications were carried out inside and outside the building and on the roof. Exhaust stacks were added on the outside of the building. Modifications were also made to the fan rooms.

Interim upgrading occurred between 1971 and 1972. The following items were upgraded: the mezzanine, the exhaust system, air locks, steam and condensate piping, high-efficiency particulate air (HEPA) filters, and the supply air system. The wooden floors were replaced with metal flooring, a sprinkler system was installed, and the fire alarm detection system was rezoned. In addition to the above upgrading, a nitric acid storage tank was installed and connected to the building on the south wing of the west elevation. In 1973, modifications were made to the alpha alarm system. A sprinkler system was added in 1974.

In 1982 the Environmental Research Laboratory was modified.

Associated Buildings: TA-21-3, -4, -5, -150, corridors TA-21-312/18, -313, -314, -315, -149, and the rest of TA-21 (DP West). (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

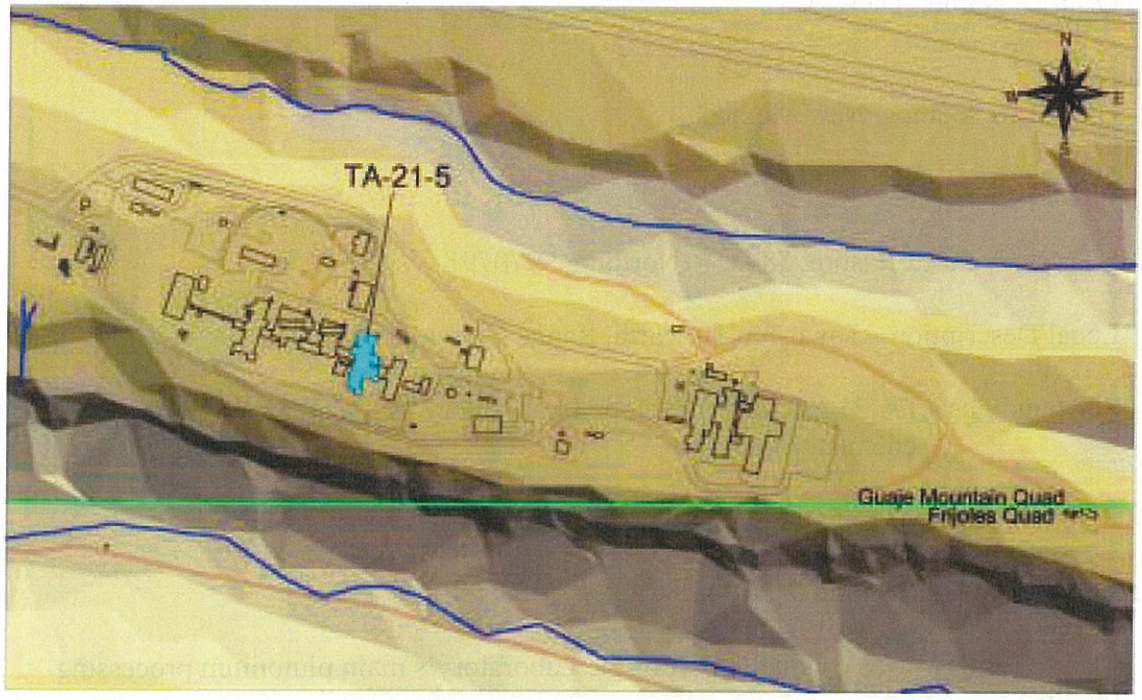
Associated Historic Themes: Plutonium Processing at DP West (1945–1977);
Nuclear Material Stockpile Issues (1945–1977);
Non-Weapons Research (1945–1977),
Nuclear Chemistry at DP West (Americium-241Research);
Health and Safety (1945–1977)

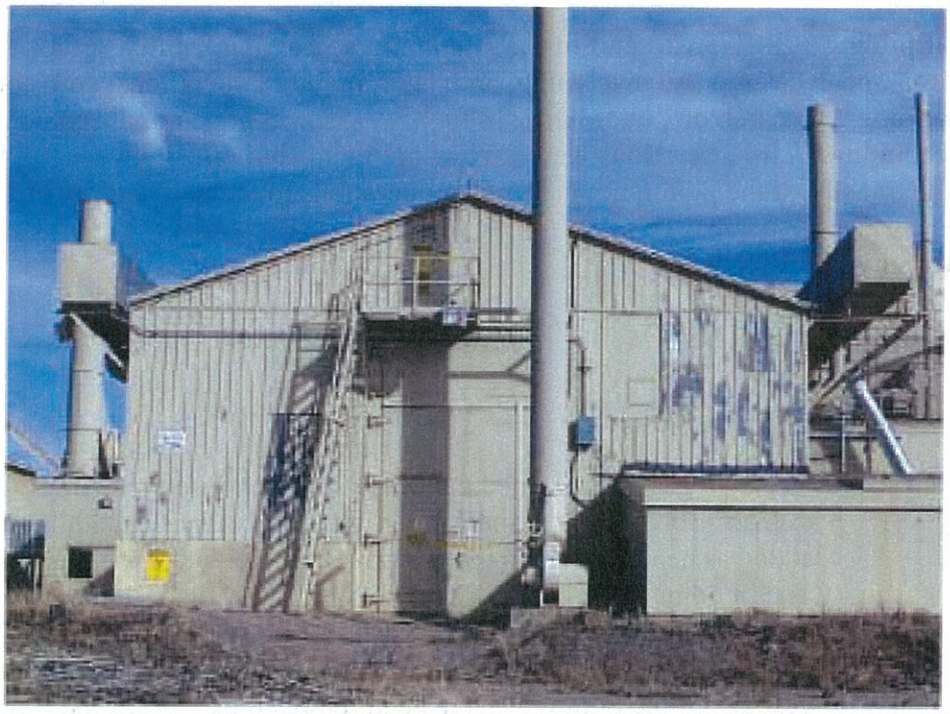
Property Type: Laboratory/Processing Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Fair

Eligibility: Eligible under Criterion A. The interior of this building has been extensively modified as a result of decontamination activities. The building has little or no interior integrity. However, the exterior of the property still retains its historic feeling and character and would be recognizable to a contemporary.





TA-21-5 South Elevation

TA-21-5

Building Name: TA-21-5
Original Name: DPW-5

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384816 Northing 3970791

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/1/1945 to 9/1/1945

Original Use: TA-21-5 was originally part of the Laboratory's main plutonium processing facility.

Use History: Building TA-21-5 was part of the plutonium processing facility. Fluoride reduction, metal casting and machining, and, later, uranium operations were conducted in this building. Research on plutonium-238 fuels was also conducted. Decontamination and decommissioning operations were carried out in this building between 1978 and 1981 after the transfer of the plutonium processing operations to the new facility at TA-55.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - TA-21-5 is a steel-framed, rectangular warehouse type building with exterior ribbed metal panel siding. Since construction, additions were added as needed. Inside there is a mezzanine with a metal grating floor. The building contains floor trenches and firewalls. The original building was identical to Buildings TA-21-2, -3, and -4. Buildings TA-21-3 and -4 have previously been decontaminated and decommissioned and all vestiges of the buildings have been removed except for the center portions that connect with the main DP West east/west corridors.

Foundation material - Reinforced elevated concrete slab and footings

Wall material/surface - The walls are plaster on metal lath over the steel frame. The exterior walls are covered with ribbed metal panel siding. The exterior surfaces of additions to the building are corrugated metal siding and concrete masonry units.

Architectural features - The original Building TA-21-5 has a pitched roof. The additions that were constructed at different times vary in size, roof types, and use. On the east and west elevation of the main portion of the building there is a row of evenly spaced openings. From the original drawings the openings appear to have been for window installation. Instead of installed windows metal panels cover the openings. Some of the openings are used for vents or pipes.

On the north elevation there is a set of large Dutch style equipment doors. Contained within one of the doors is a single pedestrian door. Above the doors there is a set of hollow metal double doors that lead to the mezzanine area. The north elevation of an addition is flush with the north elevation of the main portion of the building. On the north elevation of the addition there is a pedestrian door with a canopy located on a small concrete dock. Also there appears to be a vent opening that has been covered with a metal plate.

There is a set of hollow metal double doors with three-paned wire glass windows on the west elevation of the addition. The south wall of this addition is flush with the north firewall that extends beyond the walls of the building east to west. Further south along the west elevation of the main building, there is another addition. This addition also has a set of hollow metal double doors with three-paned wire glass windows on the west elevation. Beyond the addition is corridor TA-21-315. This corridor connected Building TA-21-5 to Building TA-21-4. On the south wing of the west elevation there are two small rooms only accessed from inside the building. The rooms are located on either side of a set of hollow metal double doors with three-paned wire glass windows. Further south of the small rooms is the south wing firewall, which also extends beyond the width of the building. South of the firewall, on the west elevation, is another set of double doors.

On the south elevation of TA-21-5 there is a set of large Dutch style equipment doors with a pedestrian door contained within one of the doors. On the west side of the doors there is a metal ladder. The ladder goes up to a metal landing and set of hollow metal pedestrian double doors that are located above the main building doorway. The doors lead to the mezzanine of the building. There is an addition that extends south off of the south

elevation. On the east elevation of the addition there is a set of concrete stairs leading down to a single pedestrian door. There is another later addition connected to the first room addition on the south side of the building. These additions make up the south east corner of TA-21-5. There is a pedestrian door on the north elevation of the later addition.

On the east elevation of the main portion of the building, there is a set of hollow metal double doors with three-paned wire glass windows. Next to the doors there is a platform made of metal grating with a set of stairs leading down. Further north on the east elevation there is another set of hollow metal double doors with three-paned wire glass windows. On the north side of the firewall there is an addition that contains several rooms. There are two sets of double doors and a single pedestrian door on the south elevation of the addition. On the east elevation of the addition there is a set of stairs leading down to the basement. The north elevation of the addition adjoins corridor TA-21-149, which connects TA-21-5 to TA-21-150. The west elevation of the addition is attached to the east elevation of the main portion of the building. North of the corridor there is another room addition. A louver is located on the east elevation of the addition. On the north elevation there is a set of double doors and a ladder. North of the addition on the east elevation of the main building there is also a set of hollow metal double doors with three-paned glass windows. North of the doors, there is the north wing firewall. Beyond the firewall is a set of double doors with three-paned wire glass windows.

Remodeling History: In 1950, several permanent wall partitions were constructed in the north wing. The ceiling over the partitioned area was also dropped. Between 1953 and 1955 several modifications were made to TA-21-5 including the installation of a new furnace and the upgrading of the exhaust system in the metal fabrication area. An addition was added to the north wing along the west elevation of the building. The addition was constructed of aluminum siding and the roof was made of four-ply built-up roofing materials. There are double doors along the west elevation of the building and a louver on the north elevation.

Modifications to the lighting, heating, wiring, and ventilation systems were made in 1956. A one-ton monorail and hoist was added at this time. A solvent shed with a slanted roof was also added along the east elevation.

Several modifications were made to TA-21-5 between 1957 and 1960. Included in these modifications was the addition of a four-ton hoist on the east side of the building. The ventilation system was upgraded. In the center of the building a balcony and stairs were added.

In 1963 an electrorefining lab was added to the north wing along the west elevation. The addition consisted of a poured concrete floor, a five-ply built-up roof with gravel, and concrete masonry unit walls, which were later covered with siding. New dry boxes and exhaust stacks were also added in 1963. They were installed for a new special recovery system. Later in 1963 another room was added. This addition was constructed of concrete masonry units. As part of upgrading the ventilation system, a dry air system was also installed.

Between 1966 and 1968 exhaust and supply air modifications were made to the isotope preparation facility. Dry boxes were also installed. On the south wing of the east elevation a storage room was added. In the winter of 1968, another addition was added to the south elevation. The addition was constructed of reinforced concrete masonry units and a four-ply built-up roof. Contained in the addition were an assembly area, welding box, and a filtering hood. In the basement there was an equipment room containing a compressor and dehumidifier.

In 1969, a two-story addition (Special Fabrication and Assembly Facility) was made to the south wing. The addition contained offices, an assembly area, a storage area, a clean room, and a fabrication room. Two fan rooms and a mechanical equipment room were also added and are located on the second story of the addition. This addition is constructed on a reinforced concrete slab and has insulated steel paneling and a built-up tar and gravel roof.

In 1970 the existing wooden equipment room located at the southeast corner of the building was torn down and rebuilt with galvanized metal.

Interim upgrading occurred between 1971 and 1973. New dry boxes were installed to replace old ones. Miscellaneous equipment was removed from the building. The exhaust system, air locks, steam and condensate piping, HEPA filters, and supply air system were all upgraded during this time. Between 1984 and 1988, the security fence was modified and power upgrades were made in the basement area.

Associated Buildings: TA-21-2, -3, -4, -150, corridors TA-21-312/18 -313, -314, -315, -149, and the rest of TA-21 (DP West). (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

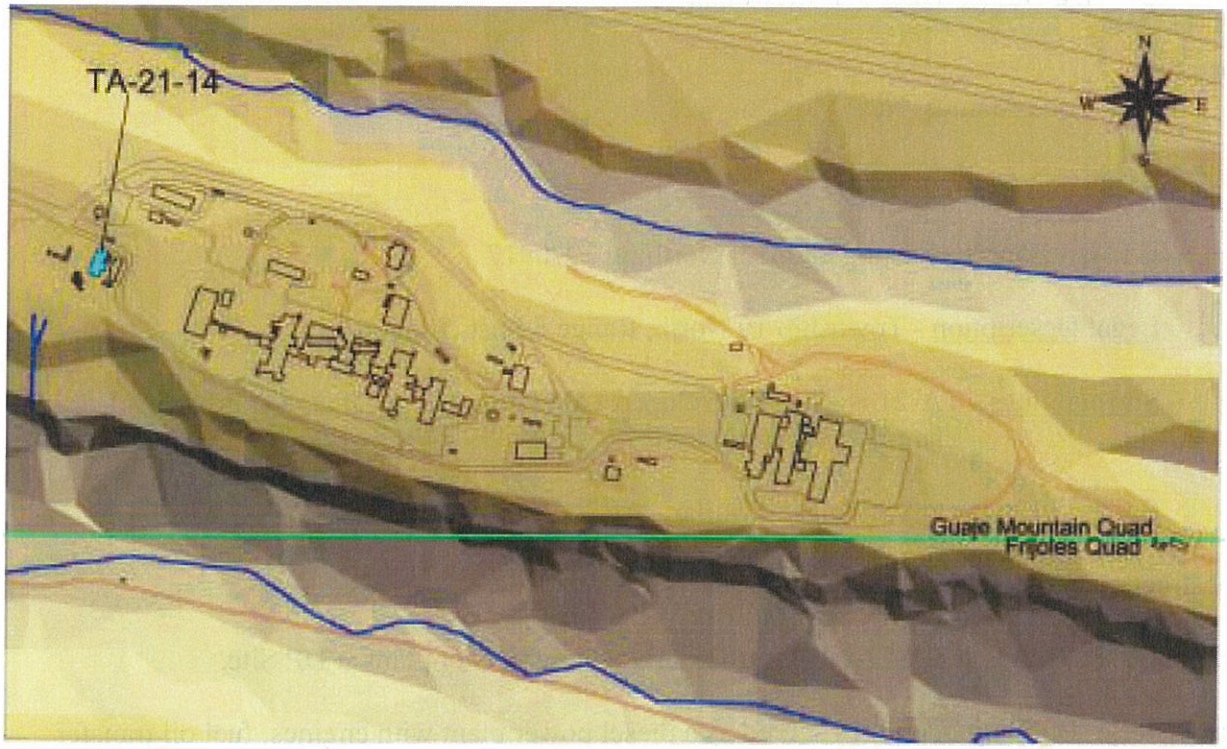
Associated Historic Themes: Plutonium Processing at DP West (1945–1977);
Nuclear Materials Stockpile Issues (1945–1977); and
Non-Weapons Research (1945–1990),
Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels)

Property Type: Laboratory/Processing Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Fair

Eligibility: Eligible under Criterion A. The interior of this building has been extensively modified as a result of decontamination activities. The building has little or no interior integrity. However, the exterior of the property still retains its historic feeling and character and would be recognizable to a contemporary.



TA-21-14 North and West Elevations

TA-21-14

Building Name: TA-21-14 DP Zia Shop (Instrument Building)
Original Name: DP-14 (Power Plant)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384513 Northing 3970917

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1946

Original Use: Building TA-21-14 was originally a diesel power plant at DP Site.

Use History: Building TA-21-14 served as a diesel power plant with engines, fuel oil transfer pumps, fuel unloading pumps, compressors, and other equipment. Sometime between 1948 and 1985 the building's identification and function changed to the DP Zia Shop – general maintenance shop. Zia Company was the maintenance contractor to the Laboratory at that time.

Use at Time of Survey: Johnson Controls of Northern New Mexico (the Laboratory's current maintenance contractor) currently uses TA-21-14 as a general maintenance shop. It is used to "house fitters, welders, painters, electricians, and tinners (sheet metal workers) to support all of Construction Area 2 (S-Site, TA-53, TA-42, TA-2, TA-21, and townsite)" (LANL 1991:3–8).

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - The building is constructed of a steel post and beam structural framework with a stuccoed concrete masonry unit veneer. The asphalt and gravel roof is sloped slightly from the east to the west for water drainage.

Foundation material - Concrete slab, stem walls, and footings

Wall material/surface - The walls are constructed of concrete masonry units that have been stuccoed on the exterior surface.

Architectural features - The building is a 2,956-sq-ft single-story high-bay structure. The main entrance has double metal pedestrian doors and is located on the west side of the building. There are seven metal-framed awning-type windows with four individual glass panes on the west side.

The north side of the building currently has one window with two individual panes of glass and, where the third, center pane of glass should be, is a room air conditioner. Also can be seen is the location where the door that shows in the 1985 plans was walled up.

The east side of the building has six metal-framed windows. Three are awning-type with 18 individual glass panes. Two windows are awning-type with nine individual glass panes. The remaining window is fixed and has 12 individual panes of glass. There are two metal pedestrian doors on the east side. The southernmost appears to have been installed in an area where a window was walled up. A room was added on to this side of the building, and there are two three-paned windows, covered with wood boards on the east side of the addition. There are no windows or doors on the north side of the addition. On the south side there is a single pedestrian door.

On the south side of the building there is a large double door for equipment access.

There is a "pipe" trench in the floor along the west side of the building; and there is a "conduit" trench in the floor along the east side of the building.

Several large electrical conduits run along the outside of the building along with some miscellaneous ductwork. There are five large mechanical ventilators symmetrically located on the roof.

Remodeling History: Originally the building had only three rooms, the main room where the engines were, a restroom, and an office. In 1947, a 22-ft 8-in. by 12-ft storeroom was planned for addition to the east side of the building. In 1948 this concrete masonry unit addition was constructed measuring 22 ft 2 in. by 12 ft 8 in. This addition has two three-pane windows on the east side and one pedestrian door on the south side. The addition is stuccoed to match the original portion of the building.

Based on 1985 floor plans, modifications were made to the building's interior between 1948 and 1985. The diesel engines and other equipment were removed. A partial wall constructed out of chainlink fencing material was installed in the main room, dividing it into two spaces (an electrical shop and a fitter shop). The original office was enlarged, and two smaller offices were constructed for the Electrical Foreman and the Fitter Foreman. The restroom became the women's room, and the 1948 store room addition was now designated as the men's room. The building name now says it is a DP Zia Shop.

Based on 1996 floor plans, a window was walled up and a door was installed in the same vicinity on the east side of the building from the room that was designated as the women's room.

Associated Buildings: TA-21-46, directly to the east of TA-21-14, was also originally a diesel power plant for TA-21 and it is currently being used as a warehouse/maintenance shop.

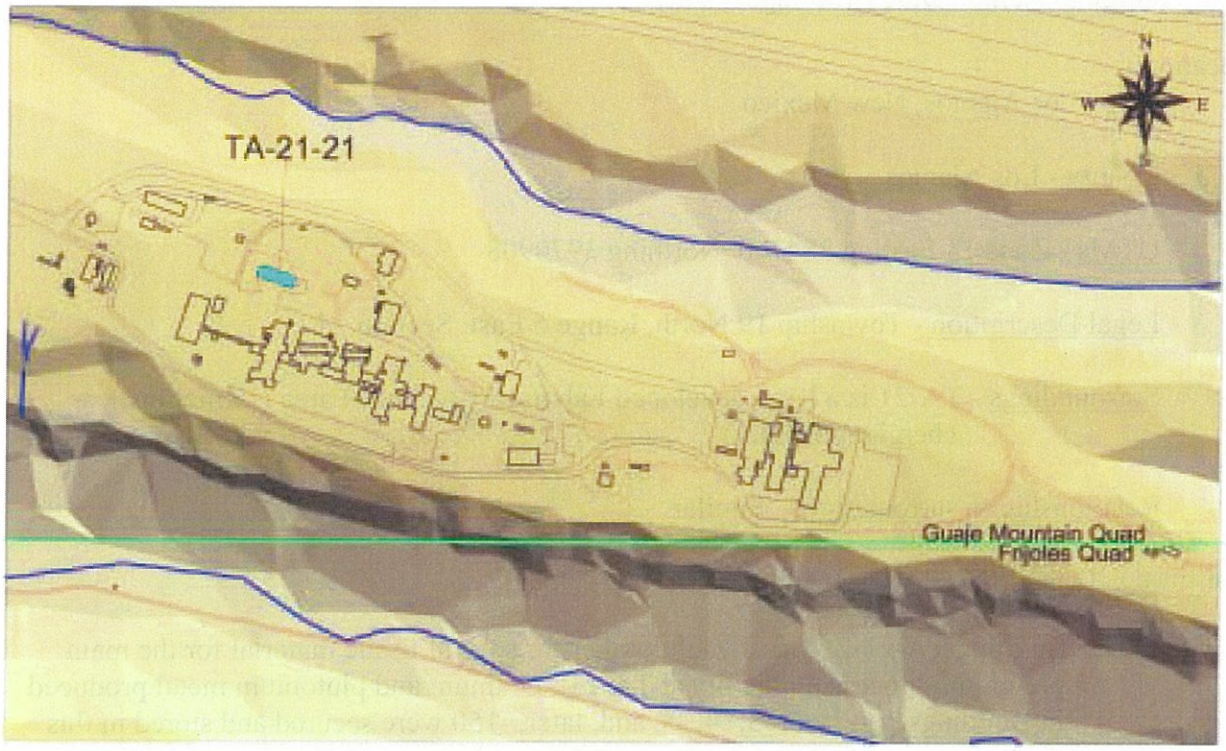
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-21 South and East Elevations

TA-21-21

Building Name: TA-21-21
Original Name: DP-21 (Storage Vault)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384700 Northing 3970908

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1946

Original Use: Building TA-21-21 was a vault/bunker for special fissile material for the main plutonium processing facility at TA-21. Uranium and plutonium metal produced in Buildings TA-21-2, -3, -4, -5, and, later, -150 were secured and stored in this vault.

Use History: Building TA-21-21 always served as a vault for special fissile material for the main plutonium processing facility at TA-21.

Use at Time of Survey: Abandoned, but some original shelving and vault doors still exist.

Condition at Time of Survey: Adequate but aging

Building Description: (See also Appendix C)

Building style - Utilitarian, functional, single-level, reinforced concrete vault

Foundation material - Reinforced concrete slab

Wall material/surface - Reinforced concrete

Architectural features - TA-21-21 is a 2,967-sq-ft reinforced concrete building, void of window openings, with a flat roof. The roof is constructed of multi-ply composite roofing material (felt, tar, and gravel). There is galvanized steel flashing around the roof.

The building has a loading dock and awning on almost all of the length of the south side (the front of the building) approximately 3

ft 10 in. above the ground surface. There are steps leading up to the dock on both the east and southwest ends.

There are no windows on any side of this building. On the south side of the building there are four single metal pedestrian doors and one set of double metal pedestrian doors. Two of the doors only lead into the equipment rooms at either end of the building. Another single door leads into the airlock room built in front (south) of the mid-1946 room addition, on the west end of the building, and the fourth door leads into the empty container storage room. There are pedestrian doors on the east and west sides of the airlock that leads into the hallway of the eastern portion of the building that was added in 1959/1960.

There are interior combination lock vault doors in the main hallways of both the western and eastern portions of the building, and leading into the room added in mid-1946. Also, there is a rail and hoist in the unloading room.

A metal ladder, attached to the building, provides access from the ground to the roof. Conduits carrying electrical service for the building are also attached to the outside walls wrapping around the building.

Remodeling History: The original building had eight rooms—an equipment room, unloading room, finished product storage rooms, nitrate storage room, and a room for empty containers—and several hallways.

In mid-1946 a room was added to the west side of the building—its entrance and floor at ground level. The dock was not extended in front of this room.

Additional space was added to the east side of the building almost doubling its storage capacity in 1959/1960. Six storage rooms, an equipment room, and a hallway were added. The loading dock on the south side of the building was extended, and two additional pedestrian doors were added, one of which is a combination lock vault door similar to the other combination lock type doors on the original portion of the building. There are no windows in this addition.

In 1972 airlocks (rooms enclosing the exterior vault doors) were planned to be added around the entrance to the new storage rooms on the east end of the building and around the entrance to the 1946 addition on the western end of the building.

The proposed reinforced concrete masonry block airlocks were added in 1973, and the dock and stairs on the western end of the building were

reconfigured to face the south instead of the west. The original location of the stairs was filled with concrete to the level of the dock.

There were plans, made in 1977, to enlarge the airlock on the eastern portion of the building creating two additional rooms on the loading dock area. However, based on the most recent floor plan of the building (1983), this addition was never constructed.

Associated Buildings: TA-21-2 and TA-21-5 the remaining buildings of the main plutonium processing facility

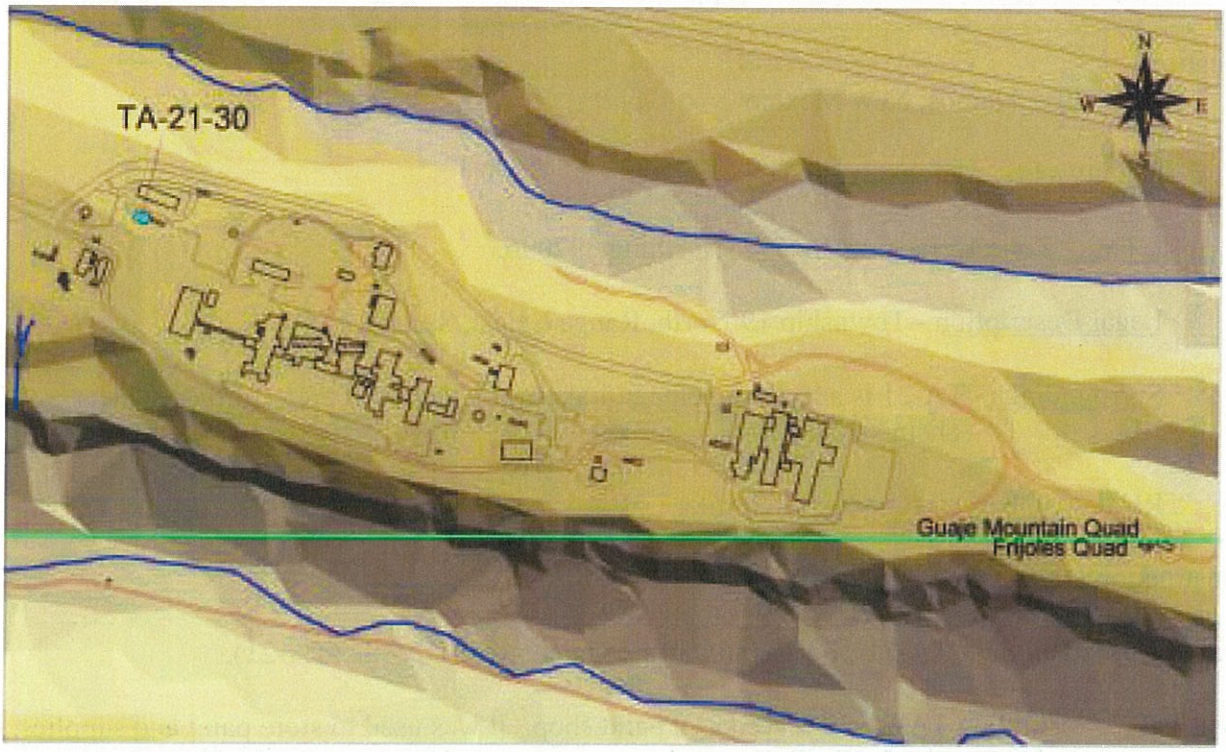
Associated Historic Themes: Plutonium Processing at DP West (1945–1977); Uranium Processing and Recovery at DP West (1950s–1984); and Nuclear Material Stockpile Issues (1945–1977)

Property Type: Security Building

Contamination History: Plutonium, Uranium, and Americium

Integrity: Excellent

Eligibility: Eligible under Criteria A and C



TA-21-30 South Elevation

TA-21-30

Building Name: TA-21-30
Original Name: DP-30 (Paint Shop)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384572 Northing 3970963

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 4/1/1946 to 5/10/1946

Original Use: Building TA-21-30 was built as a paint shop for DP Site (TA-21).

Use History: Building TA-21-30 served as a paint shop. It was used to store paint and supplies. Also, monitoring instruments that were used in the processing buildings by the radiological technicians were sometimes painted in this building. Most recently the building was used as a maintenance shop.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair to Good

Building Description: (See also Appendix C)

Building style - Utilitarian, functional concrete and metal lath building

Foundation material - Concrete slab, footings, and stem walls

Wall material/surface - Concrete and metal lath covered with plaster and stucco

Architectural features - TA-21-30 has stuccoed concrete walls with a flat roof that slightly slopes from the south to the north for drainage purposes. The roof overhangs the building four feet in front and less on the other three sides of the building. The roof is a built-up roof with gravel. On the roof there are several exhaust vents from the fume hoods in the room designated as the spray room. The second room in the building is designated as an office and storage room. All the windows in the

building are identical awning-type windows with nine individual glass panes.

The south elevation of the building has two sets of metal double doors and one window. One set of the doors is wider for the movement of equipment. There is also one awning-type window with nine individual glass panes.

The west elevation has two windows.

The north elevation has two windows, both of which are located on the west half of this elevation. On the east half of the elevation there is a small room that extends to the north. This room has a single pedestrian door and several concrete steps down to the ground level.

On the east elevation there is one window.

Remodeling History: The small room on the eastern half of the north elevation of the building was added sometime between 1946 and 1963.

In 1985 modifications were made to the cooling and vent system in the room designated as the spray room. New ducts from the vent hoods were installed through the ceiling to the roof of the building.

New fume hoods were installed in 1986.

Associated Buildings: TA-21-31, another maintenance type shop building located to the north of TA-21-30, and the rest of TA-21

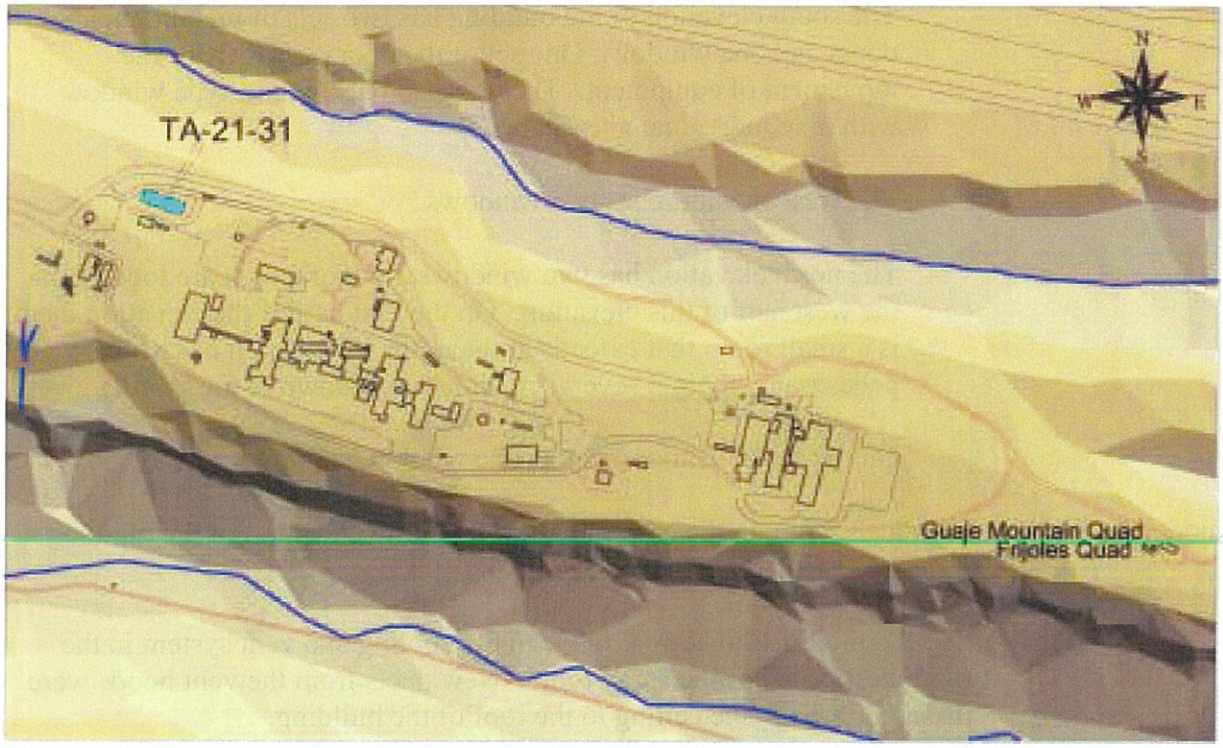
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, and Americium

Integrity: Fair

Eligibility: Eligible under Criteria A



TA-21-31 South and East Elevations

TA-21-31

Building Name: TA-21-31
Original Name: DP-31 (Cold Work Shop)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384588 Northing 3970985

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/15/1948 to 12/1/1948

Original Use: Building TA-21-31 was originally designated as a cold work shop, (i.e., a maintenance shop). The rooms were originally designated as a carpentry shop, electrical shop, a plumbing and welding shop, a storage room, a restroom, and a "rewind" shop.

Use History: Building TA-21-31, besides being a maintenance shop, was designated as an electronics buildings in 1989, and later a maintenance workshop and crafts building.

Use at Time of Survey: Johnson Controls of Northern New Mexico (one of the Laboratory's contractors) is currently using TA-21-31 as a maintenance shop.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Concrete one-story building with a basement. The basement is accessed from the exterior of the north elevation and the ground floor from the south (front) elevation of the building.

Foundation material - Concrete slab footings and columns

Wall material/surface - Concrete covered with stucco

Architectural features - TA-21-31 is a rectangular building of approximately 8,050 sq ft with

a slightly sloping (south to north) flat roof that overhangs the perimeter of the building. The roof is a multi-ply composite roof with gravel and a sheet metal flashing around the edge. The most interesting feature of this building is the wood truss overhang around the perimeter of the building. There are exposed wood trusses in the interior and along the exterior south roof elevation. The dock on the south side of the building is protected by an extension of the wood truss roof system, which is braced to the south wall. Underneath the overhang are a series of exterior lights with lampshades.

All of the building windows except four are the same sized metal-framed, awning-type windows with eight individual panes of glass. The four center panes tilt open. These windows are only on the south and north elevations of the building.

All of the doors are metal except for a set of large wooden double doors and a single pedestrian door on the western end of the south elevation and a set of half-sized double doors on the southern end of the west elevation.

On the front (south) elevation only the ground floor level of the building is visible. There is a dock with steps along most of the length of the building on this elevation, except at the western end. At the western end of the south elevation there is a set of large wooden double doors. They are positioned so that trucks can backup directly to the building for loading and unloading of equipment and/or supplies. To the east of the double doors there is a wooden pedestrian door that has a wooden ladder attached to the building leading up from the ground level to the door. There are eleven awning-type windows described above on this elevation. There is also one small metal-framed, awning window with two panes of glass, to the west of two single metal pedestrian doors that are located towards the center of the elevation. Both single doors have a window at the top with six individual glass panes. Further east on the elevation, there are four sets of double pedestrian doors, each with windows that have six individual panes of glass. Above each set of double doors there are four-paned fixed windows.

The west elevation of the building at the basement level has one set of half-sized wooden double doors. At the ground floor level there is one sash-type window, six over six.

On the north elevation the basement wall is exposed and there is a dock with a metal retaining wall along its length. Three sets of double doors and two single pedestrian doors lead into the building at the basement level. One of the single pedestrian doors has louvers over the entire surface. At the window level of the ground floor

there are 15 awning-type windows described above. There is also a sash-type window, six over six panes at the western end.

The east elevation has a dock, steps leading up to the dock, and one sash-type window, four over four.

Remodeling History: The roof trusses were repaired in 1950.

The retaining wall on the north side of the building was rebuilt using interlocking steel sheet pilings in June 1962. Sometime after the original construction and by 1962 the western end of the building, which was originally an open area covered by an extension of the roof, was enclosed as an additional room of the building. This original open area was used as a storage area for lumber.

From the existing drawings it appears that the original building did not have a fully enclosed basement but was set up on concrete columns with only one small, enclosed basement room, a boiler room. When the western end of the building was enclosed another basement room was created underneath this new enclosed space.

Between 1948 and 1962 a small interior room was created on the ground floor and an exterior entrance to this room was made out of one of the original window openings. Also, several interior walls were removed.

A restroom was added in 1978.

Another small interior room was created in the western portion of the ground floor level between 1962 and 1989. Also by 1989 exterior basement walls were constructed, enclosing the foundation and support columns underneath the building. Several interior walls, dividing the basement area into four large rooms, were constructed.

By 1994 interior half-walls were constructed in the southeastern corner of the building.

Associated Buildings: TA-21-30, another maintenance shop building located to the south of TA-21-31 and the rest of TA-21.

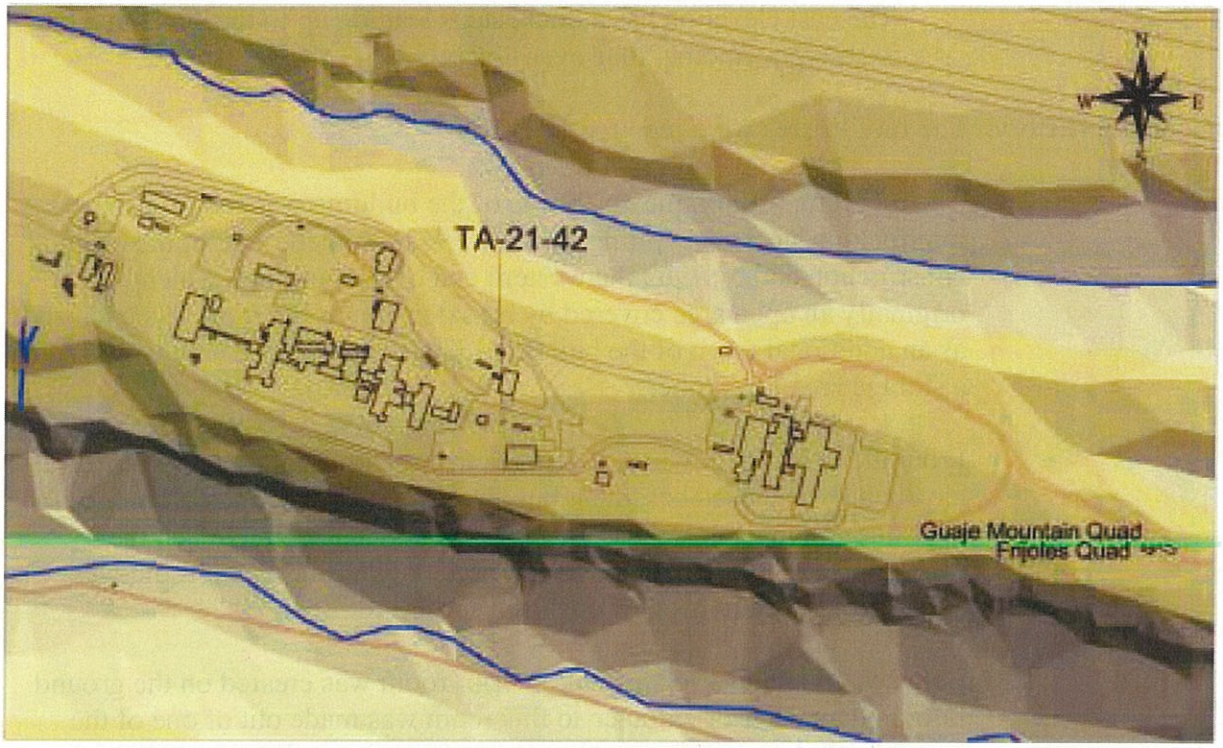
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criteria A and C



TA-21-42 North and West Elevations

TA-21-42

Building Name: TA-21-42 Pump House
Original Name: DPW-42

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384936 Northing 3970755

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1945

Original Use: TA-21-42 is an oil pump house for TA-21. It pumps oil into tank TA-21-57 that supplies the steam plant, TA-21-357, as a reserve/emergency backup if the natural gas that is being used goes out.

Use History: TA-21-42 has always served as an oil pump house for TA-21. It originally served the former steam plant and now it serves the currently existing steam plant at TA-21.

Use at Time of Survey: TA-21-42 still functions as an oil pump house for the TA-21 steam plant.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Utilitarian, concrete masonry unit and wood frame building with a flat, slightly pitched roof.

Foundation material - Concrete slab and footings

Wall material/surface - Wood frame covered with stucco

Architectural features - The building is approximately 64 sq ft. There is a pedestrian door located on the north elevation. The door has a four-paned glass window. The east, west, and south elevations are void of doors or windows.

Remodeling History: There are no engineering drawings or plans for this building, however it does not appear that any remodeling has occurred.

Associated Buildings: Steam plant, TA-21-357, oil storage tank, TA-21-57, and the rest of TA-21

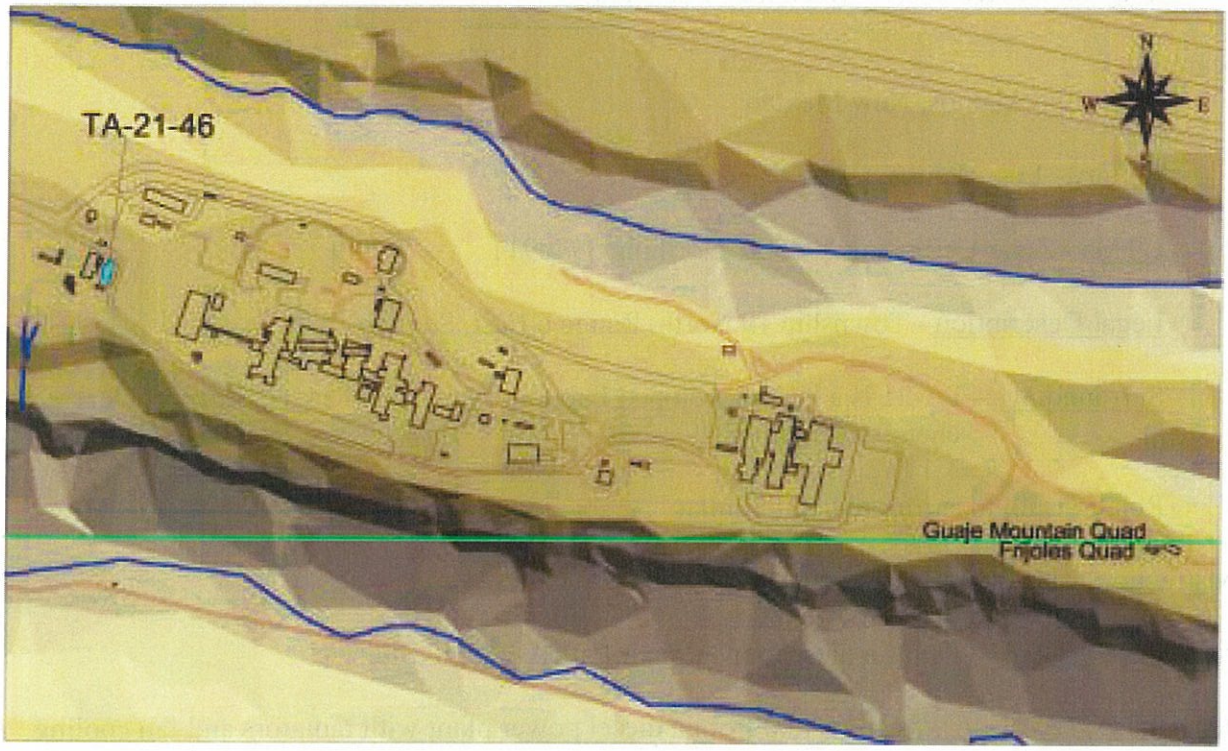
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

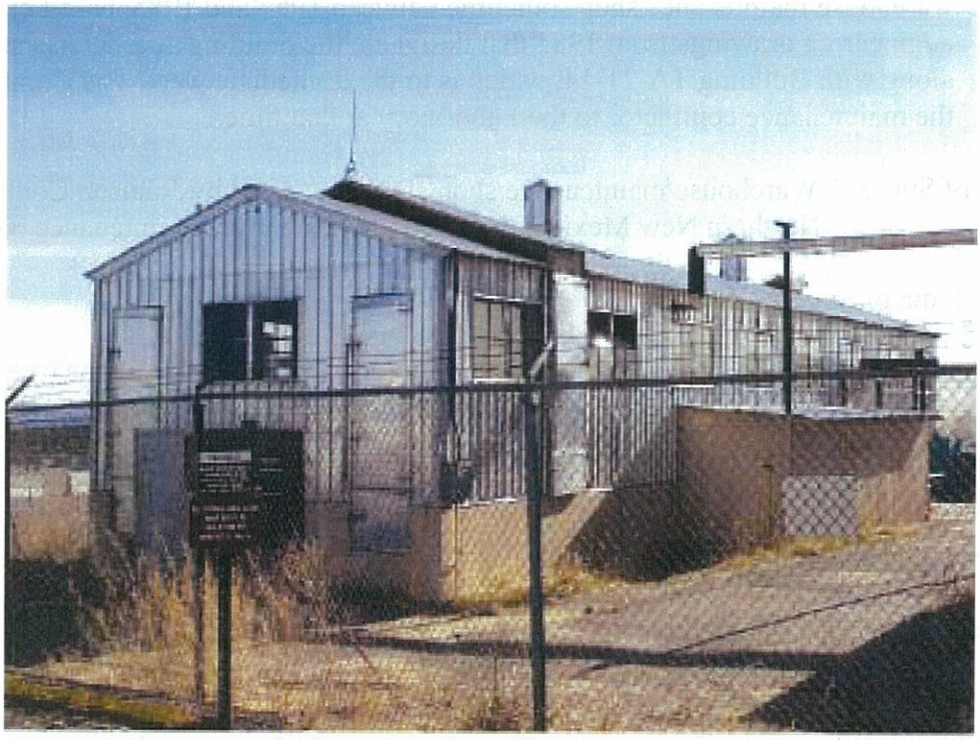
Property Type: Support Building

Contamination History: None

Integrity: Excellent

Eligibility: Not Eligible





TA-21-46 North and West Elevations

TA-21-46

Building Name: TA-21-46
Original Name: DP-46 (Diesel Power Plant)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384530 Northing 3970911

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: June 1947

Original Use: TA-21-46 was a diesel power plant for TA-21, DP Site.

Use History: TA-21-46 was converted from a diesel power plant with radiators and fan cooling systems, generators switch gear, and air filters, to a general warehouse/maintenance shop sometime between 1957 and 1985, based on existing engineering drawings from 1985 that designate the building as a DP Zia shop, along with Building TA-21-14, which is to the immediate west. Zia Company was the maintenance contractor to the Laboratory at that time.

Use at Time of Survey: Warehouse/maintenance shop/storage utilized by Johnson Controls of Northern New Mexico, the Laboratory's current maintenance contractor.

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - Industrial, pre-engineered steel frame building with concrete base walls and metal siding

Foundation material - Reinforced concrete slab and floor

Wall material/surface - Four-foot concrete base walls with metal siding and some concrete masonry units

Architectural features - The west and east elevations are similar except for placement of pedestrian doors along the walls and ventilation louvers and roof

monitors towards the south end of the building, on the east side only. There are vent louvers and roof monitors on both west and east sides towards the northern end of the building. There are eight awning-type windows, each composed of two side-by-side frames with four individual wire glass panes on both the east and west elevations.

Originally, the north and south ends of the pre-engineered building were void of doors, windows, and louvers. However, these elevations were modified during construction. The north and south elevations are also similar except for the presence of only one ventilation louver on the south end and two on the north end. There is a set of double doors on both the north and south ends with two wire glass awning windows above the doors.

Remodeling History: When the building was constructed the north and south ends of the pre-engineered structure were modified to include doors, windows, and louvers. In 1949 a small lean-to shed was installed adjacent to the west side of the building to cover an overflow tank. Between the time of construction and the present (1999) the ventilation louvers on all sides of the building have been covered with operable metal panels.

Associated Buildings: TA-21-14, directly to the west of TA-21-46, was also originally a diesel power plant and is now being used for a maintenance shop and warehouse.

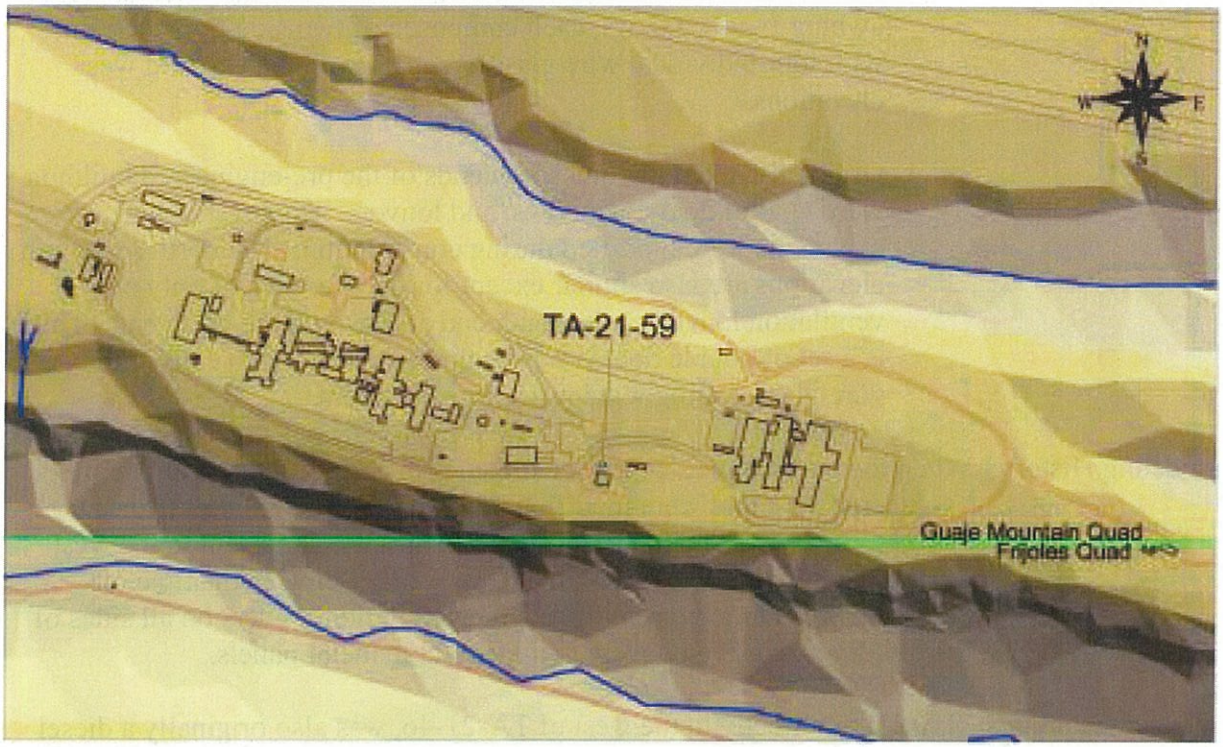
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: None

Integrity: Fair

Eligibility: Eligible under Criterion A



TA-21-59 East and North Elevations

TA-21-59

Building Name: TA-21-59
Original Name: DPW-59 (formerly designated as Building 54B)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385039 Northing 3970710

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1945

Original Use: Building TA-21-59 was designated as a "laboratory" building on early TA-21 site plan maps, and later it has been designated as a general storage building.

Use History: Building TA-21-59 served as a general storage building.

Use at Time of Survey: Abandoned. Engineering records indicate that the building was to be disposed of per memo from the DOE Los Alamos Area Office dated 10/14/1969. (The date may possibly be 1960 instead of 1969 based on a note in a LANL engineering database for Building TA-21-61). It appears to be a small makeshift storage shed without any utilities.

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - Wood frame with primarily corrugated metal siding with a sloping metal roof

Foundation material - Concrete slab and footings

Wall material/surface - Most of the wall surfaces are corrugated metal panels. However, the east (front) elevation is two-thirds tongue-and-groove wood siding, which was originally painted, with large wooden equipment-type double doors.

Architectural features - TA-21-59 is a small, nondescript wood frame building primarily covered with corrugated metal panels.

The east elevation is the front of the building with a large set of wooden double doors. Above the doors there is a wooden louver for ventilation.

The north and south elevations are entirely covered by corrugated metal panels.

The west elevation is also covered with corrugated metal panels, and there is a wooden louver, towards the roofline, directly across from the louver on the east wall.

Remodeling History: None

Associated Buildings: TA-21-65 and TA-21-66

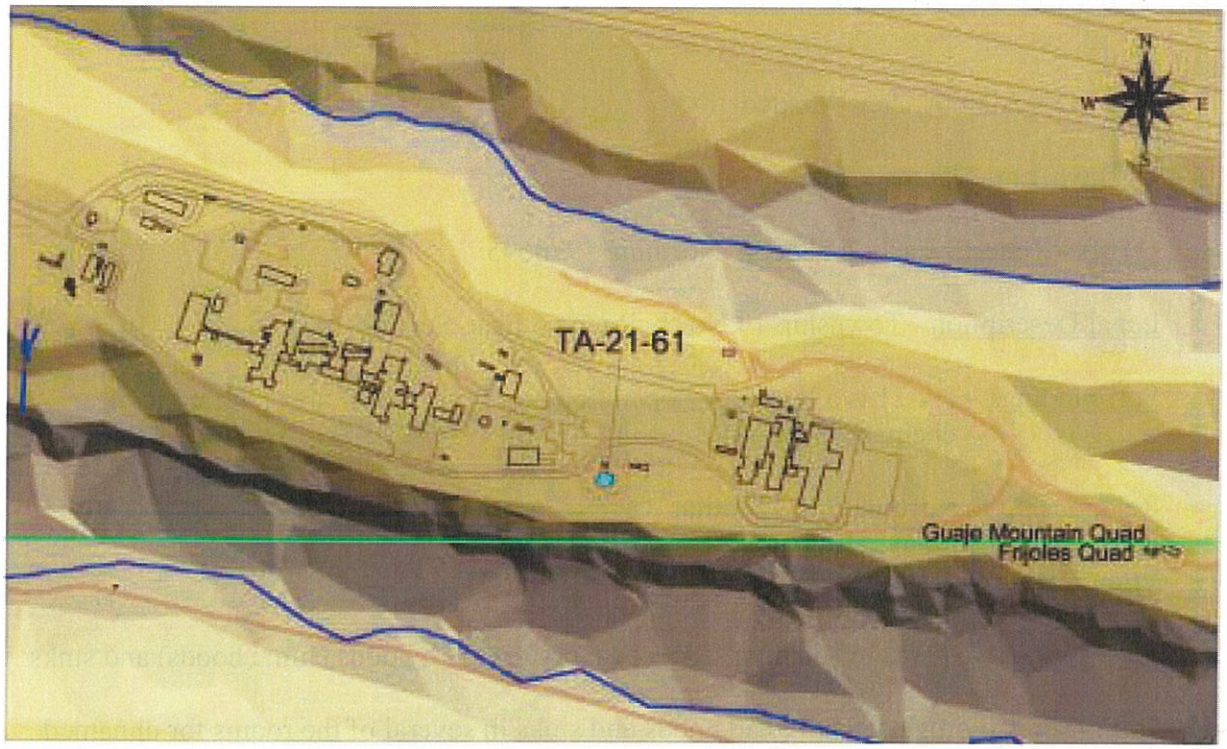
Associated Historic Theme: Unknown

Property Type: Support Building

Contamination History: No known radiological contamination

Integrity: Poor

Eligibility: Not Eligible



TA-21-61 North and West Elevations

TA-21-61

Building Name: TA-21-61
Original Name: DPW-61

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385038 Northing 3970695

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 7/11/1950 to 9/30/1950

Original Use: TA-21-61 was originally used as a laboratory with hoods (fume hoods) and sinks.

Use History: The building originally had hoods and sinks in several of the rooms for unnamed laboratory work. In 1958 the nuclear propulsion program (Project Rover) used the building (LANL Engineering drawing C-18465, and LANL 1991) and large furnaces were installed in the eastern portion of the building. Beginning in 1978 the building and an earthen pad located to the east of the building were used to store capacitors and transformers containing polychlorinated biphenyl (PCB) oil, PCB-contaminated pumps, and drums of PCB-contaminated waste oil, solvents, and trash. Use of the bare earth pad for storage of PCB-contaminated materials continued until October 1981 when part of the area was paved with asphalt and bermed. TA-21-61 and the asphalt storage pad continued to be used for storage of PCB-contaminated materials until August 1989 when the PCB storage area was moved to TA-54-39 (LANL 1991:14–16).

Use at Time of Survey: Abandoned. Engineering records indicate that the building was to be disposed of per a memo from LAAO dated 10/14/1960. (The date may possibly be 1969 instead of 1960 based on note in a LANL engineering database for Building TA-21-59).

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - Industrial, pre-engineered, steel frame building with metal siding and a pitched roof

Foundation material - Concrete slab

Wall material/surface -Metal siding

Architectural features - TA-21-61 is a rectangular steel frame building with ribbed metal siding. The pitched roof is constructed of corrugated metal and has several vents penetrating the roof from the interior. The building was used as a laboratory and contained several fume hoods and sinks.

The north elevation has a metal lean-to with a pedestrian door attached to the center of this façade. To the east of the lean-to there are two metal awning windows and to the west there are four. There is a louver vent at the western end of the north elevation.

On the west elevation there are three sets of metal double pedestrian doors. There is a concrete pad in front of this side of the building. The center set of doors has two-paned glass windows in the top half of each door. Along this elevation of the building there is a concrete loading dock with several steps leading up to it from the ground surface. There is a series of copper lines, running horizontally on the outside walls, that lead into the building, which may have been used to provide laboratory gases/liquids into the building. Mechanical equipment is located on the roof that appears to have been disconnected and left in place. There is also a metal louver on the west side of the building.

There are no doors on the south elevation, only windows. There are four metal awning windows towards the east end and three towards the west end.

The east elevation of the building has one set of metal double pedestrian doors and two metal awning windows on each side of the doors.

Remodeling History: Several interior walls were removed and new ones installed in different locations, interior doors were relocated, and a small lean-to with a set of double doors was attached to the south elevation of the building in 1952. The lean-to is located in front of a portion of the windows at the eastern end of the wall. On the east and the west sides of the lean-to there are louver vents.

1958 engineering drawings identify the building with the propulsion program work being conducted at TA-21.

The hand-operated hoist and trolley, located in the southeastern portion of the building was removed and replaced with a new power operated hoist and trolley in 1962.

Associated Buildings: TA-21-65 and TA-21-66

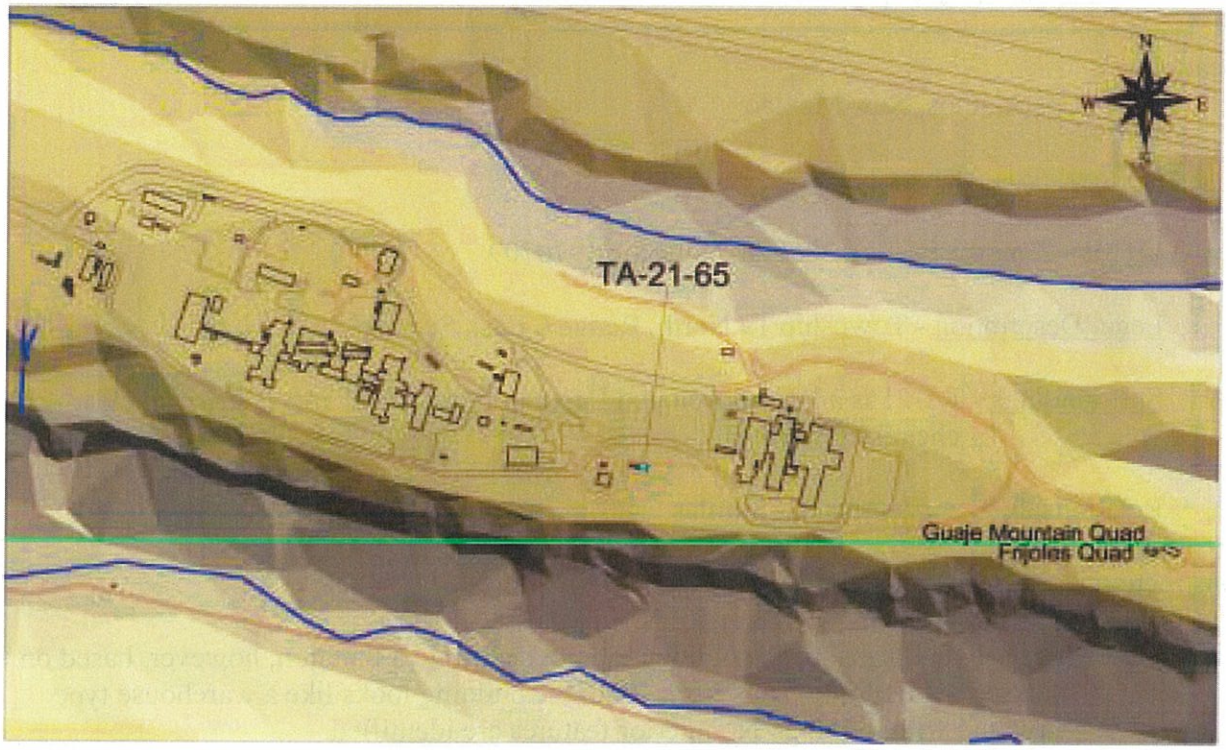
Associated Historic Theme: Possibly Hydrogen Bomb, Project Rover

Property Type: Laboratory/Processing Building

Contamination History: No known radiological contamination

Integrity: Fair

Eligibility: Eligibility undetermined at this time pending further research



TA-21-65 North Elevation

TA-21-65

Building Name: TA-21-65
Original Name: DPW-65

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385078 Northing 3970709

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: December 1949 to February 1950

Original Use: The original plans for the building do not designate a function, however, based on the original building plans from 1950, the building looks like a warehouse type structure with lighting. No interior features are identified.

Use History: On 1958 plans of nearby Building TA-21-61, this building, TA-21-65, is also designated as being part of the nuclear propulsion program. On the 1983 floor plan the building is designated as an "experimental" building. Later this building was used for general storage.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Poor

Building Description: (See also Appendix C)

Building style - TA-21-65 is wood framed with tongue-and-groove siding and a pitched roof

Foundation material - Concrete slab and footings

Wall material/surface - Wood (tongue-and-groove siding)

Architectural features - TA-21-65 is a small approximately 360-sq-ft wood building with tongue-and-groove siding. The original exterior paint on the siding is deteriorating. The pitched roof is composed of rolled asphalt-roofing material. The interior of the building is not finished; the wood frame work and roof trusses are exposed. Light fixtures were suspended from the roof.

The north elevation is symmetrical in its layout; a single wood pedestrian door is centered and two wood framed six-paned windows are centered on either side of the door. At the time of this survey this door was no longer there. The windows are hinged at the bottom and tilt open with check chain and catch.

On the west elevation there is a set of wooden double doors that at one time would have had glass windows. At the top of the pediment there is a metal-framed louver that replaced the original wood louver.

The south elevation has four wood framed, hinged windows with check chain and catch. At the time of this survey the window on the eastern end of this elevation was boarded closed from the inside.

On the east elevation there is a large relief damper that was added to the southern portion of the wall sometime after construction. To the north of this, in the center of the wall is a single wood pedestrian door with a four-paned window. On the northern portion of this wall there is a wood framed six-paned hinged window with check chain and catch. Also, at the top of the pediment there is a wood louver opposite that of the louver on the west elevation of the building.

Remodeling History: A large relief damper was added to the east elevation sometime after initial construction.

Associated Buildings: TA-21-61, a metal "laboratory" building, and TA-21-66, an open three-sided shed.

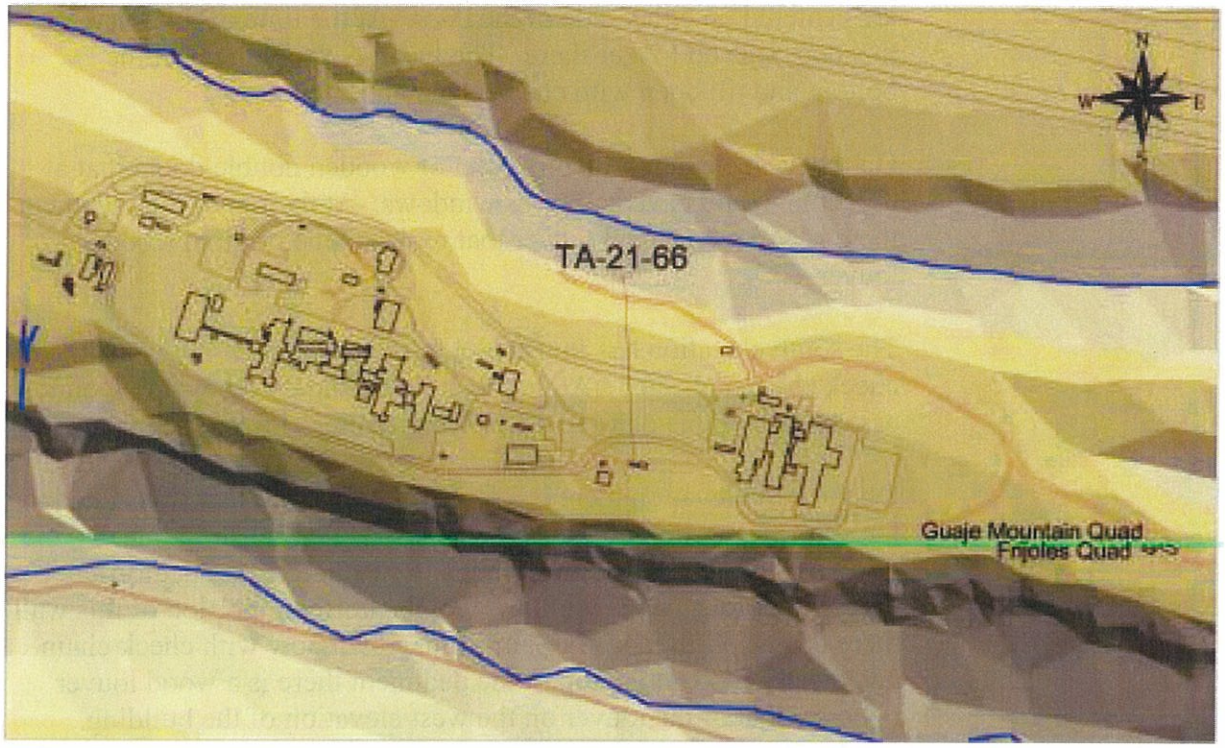
Associated Historic Theme: Unknown, possibly Project Rover

Property Type: Support Building

Contamination History: No known radiological contamination

Integrity: Fair

Eligibility: Not Eligible



TA-21-66 North and West Elevations

TA-21-66

Building Name: TA-21-66
Original Name: DPW-66 (Cylinder Storage)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385067 Northing 3970710

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar in that the structure is constructed of wood as is TA-21-59 and TA-21-65.

Construction Date: 11/24/1950 to 12/12/1950

Original Use: Building TA-21-66 was used as a cylinder storage shed.

Use History: Building TA-21-66 has always served as open storage, originally for gas cylinders, then later for general storage.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Deteriorating but fair

Building Description: (See also Appendix C)

Building style - Three-sided wood framed open storage shed with a sloping roof

Foundation material - Concrete slab

Wall material/surface - Aluminum siding with wood support posts

Architectural features - TA-21-66 is a wood frame three-sided open storage shed. The sloping roof is constructed of aluminum roofing material.

The north elevation is open with corner posts and three support posts across this side.

The east, south, and west elevations have no distinguishing features.

Remodeling History: None

Associated Buildings: TA-21-61 and TA-21-65

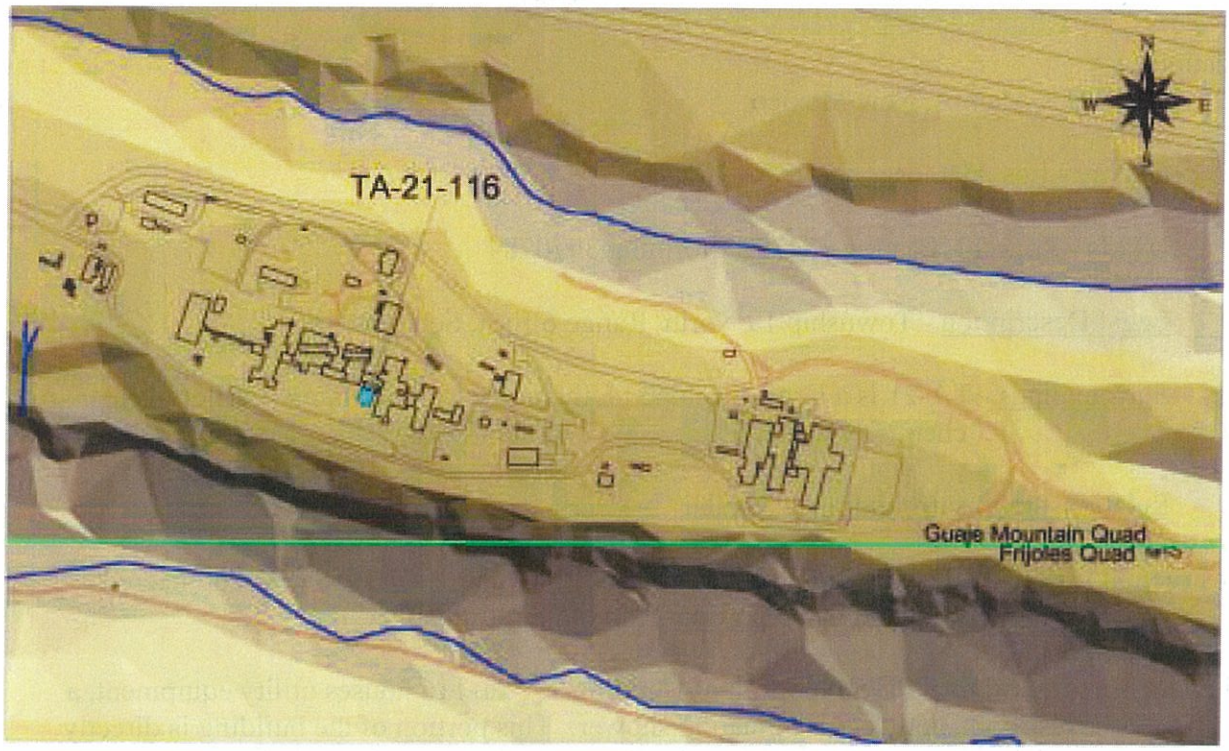
Associated Historic Theme: Unknown

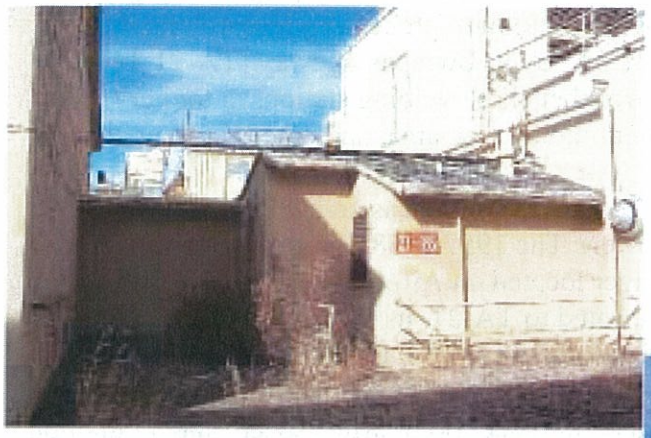
Property Type: Support Building

Contamination History: No known radiological contamination

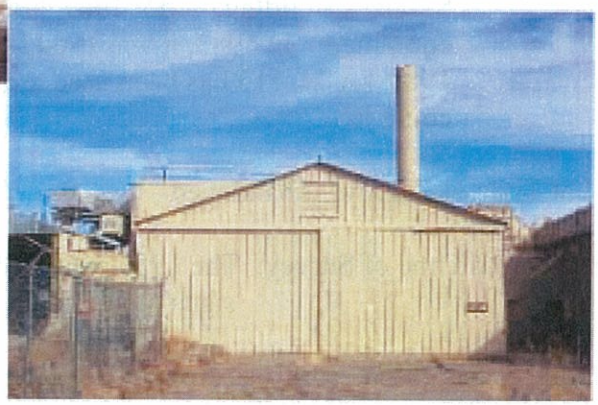
Integrity: Fair

Eligibility: Not Eligible





TA-21-116 South and East Elevations of 1950 Portion



TA-21-116 South Elevation of 1957/1958 Portion

TA-21-116

Building Name: TA-21-116 Equipment Warehouse
Original Name: DP-116 (Plant Service Building)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384792 Northing 3970784

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility)

Relationship to surroundings - Similar

Construction Date: 1950 (wood frame and plaster portion) and 1957/1958 (pre-engineered corrugated metal portion - "an old airport hanger")

Original Use: The original (1950) portion of Building TA-21-116 houses utility equipment, a restroom, and decontamination shower. This portion of the building is directly adjacent to corridor TA-21-315. The 1957/1958 portion initially served as the TA-21 Plant Services Building for the plutonium processing/research facility. It is also connected to corridor TA-21-315 by its own passageway (TA-21-144). This portion originally contained workbenches, welding stations, a tool crib, a janitor equipment area, an equipment monitoring area, and other equipment areas.

Use History: The original portion of TA-21-116 has always served as an equipment building, restroom, and decontamination shower. The 1957/1958 portion of Building TA-21-116 was formerly an airport hanger located on Airport Road at the Los Alamos Airport. Once the building was relocated to TA-21, its first use was as the Plant Services Building. After 1967 and before 1983, TA-21-116 stored audio system equipment. In 1983, it was used as a general equipment storage facility. Since 1983 TA-21-116 has been used as a conference room, office space, and a radiation count lab.

Use at Time of Survey: Abandoned

Condition at Time of Survey: The 1950 portion of the building is deteriorating and showing signs of age. The 1957/1958 portion is in fair to good condition.

Building Description: (see also Appendix C)

Building style - The original portion is a pre-engineered, wood framed building with a plastered exterior and one pedestrian door and one window. The 1957/1958 portion is constructed of a pre-engineered steel frame with metal-framed, awning-type windows. Each window has nine individual glass panes. TA-21-116 also has pedestrian and sliding doors. The north side of the building is connected to corridor TA-21-144, which connects the building to TA-21-315. TA-21-315 is the passageway between TA-21-4 and TA-21-5 of the plutonium facility.

Foundation material - Concrete slab and footings

Wall material/surface - The exterior wall surface of the original portion of the building is plaster over a wood frame. The 1957/1958 portion is corrugated aluminum siding with insulated reinforced asbestos paper. The interior walls are made of masonite.

Architectural features - The original portion of TA-21-116 is approximately 440 to 500 sq ft, has a pitched roof, and is connected to corridor TA-21-315 on the north side. On the south side of the building there is one pedestrian door and one wood-framed sash-type window. Also on the south side of the building are stairs leading to a basement area that houses equipment and pipes. There are ground level air vents on the east side of the building that are covered by grating and protected by a metal railing.

The 1957/1958 portion of TA-21-116 is roughly a square building measuring 1,521 sq ft with a pitched roof. The building is located south of corridor TA-21-315 and south of corridor TA-21-144 that connects this portion of the building to the main plutonium facility.

On the south side of the building there are four sliding doors. Three of the four doors have been fixed leaving only one in operable condition. There is also a louver in the pediment on this side of the building.

On the east side of the building there are two metal pedestrian doors located at either end. There is also one metal-framed, awning-type window with nine individual glass panes.

The northwest corner of the building is connected to corridor TA-21-144 that connects this portion of the building to corridor TA-21-315. There is also a louver located in the pediment of this elevation.

On the west side of TA-21-116 there are two metal-framed, awning-type windows. Each window has nine individual glass panes.

Today only the original exterior of the 1957 to 1958 portion of TA-21-116 remains. The chainlink fencing that divided the tool crib from the workspace containing work benches, welding stations, and other equipment has been removed.

Remodeling History: There is no known remodeling conducted on the original portion of this building. The 1957/1958 portion had four sliding doors on the south side of the building, but in 1957 three of the doors were fixed so that they were no longer functional. One louver located low on the north wall was removed and the space filled with sheet metal.

In 1967 a room with three doorways was delineated. Like the tool crib, this room was separated from the other areas by chainlink fencing.

In 1983, all interior chainlink fencing walls and gates were removed creating a single large room.

Associated Buildings: TA-21-2, -3, -4, -5, -144, -150 (the plutonium facility) and the rest of TA-21 (DP West)

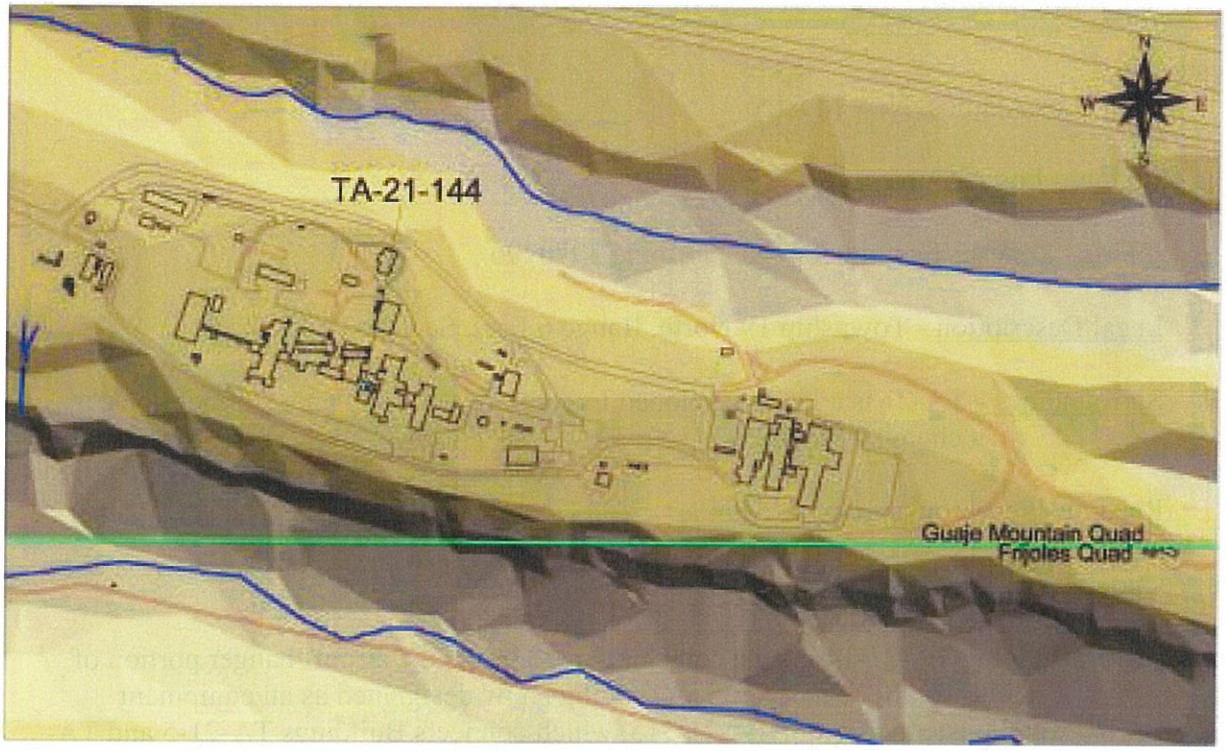
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-144 West Elevation

TA-21-144

Building Name: TA-21-144
Original Name: DP-144

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384796 Northing 3970796

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility)

Relationship to surroundings - Similar

Construction Date: 1957 to 1958

Original Use: Building TA-21-144 is the corridor that connects the airport hanger portion of TA-21-116, the "Plant Service Building" now designated as an equipment warehouse, to corridor TA-21-315, which connects Buildings TA-21-5 and TA-21-4 of the main plutonium processing/research facility at TA-21.

Use History: Building TA-21-144 has always served as a passageway for part of the main plutonium processing/research facility. TA-21-144 was incorporated into Building TA-21-116 as room number 101A, however this section of the building still has the building number placard (21-144) on the outside of the building.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - Utilitarian style structure constructed of corrugated and metal siding with a composition roof

Foundation material - Concrete slab

Wall material/surface - Exterior walls constructed of corrugated aluminum siding. The interior walls are made of gypsum board.

Architectural features - The north elevation of corridor TA-21-144 is attached to the south elevation of corridor TA-21-315.

There are no distinctive features on the east elevation.

The south elevation of TA-21-144 is connected to the north elevation of TA-21-116, the equipment warehouse.

On the west elevation of the corridor there are two twelve-pane double-hung windows.

Remodeling History: None

Associated Buildings: TA-21-116, -2, -3, -4, -5, -150, and their connecting corridors (TA-21-312, -313, -314, -315, and -149)

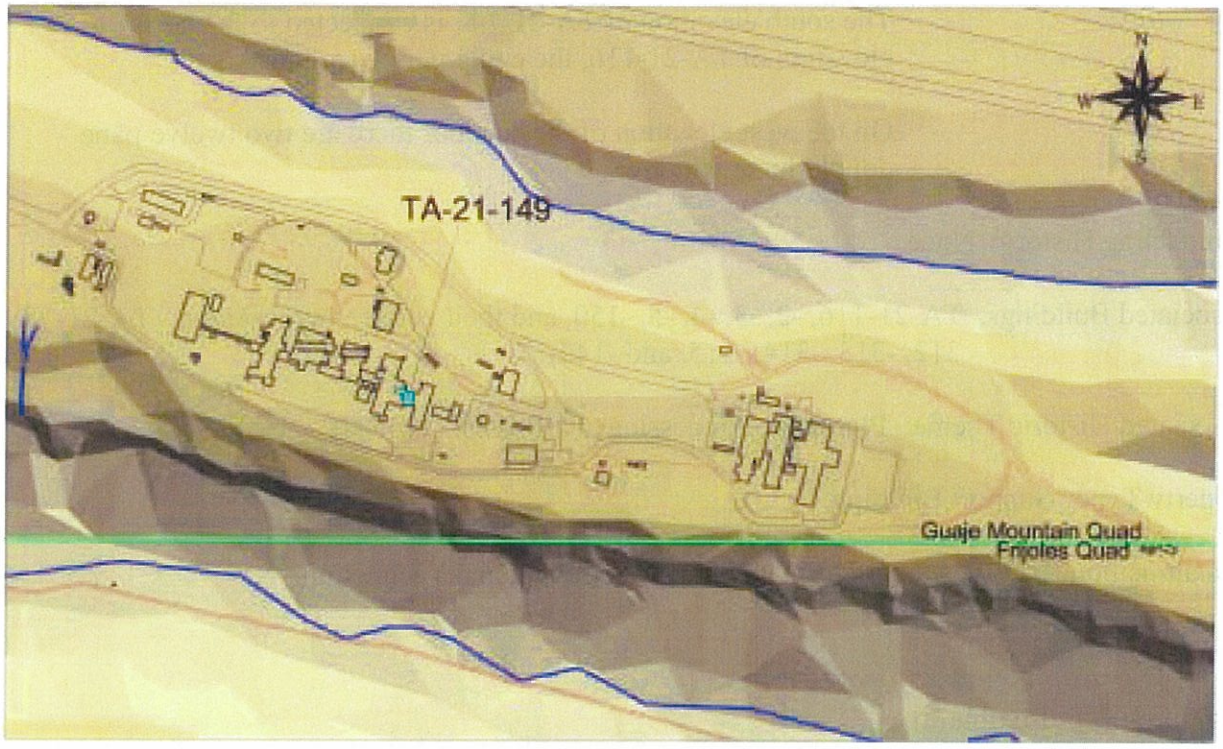
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Fair

Eligibility: Not Eligible



TA-21-149 North Elevation

TA-21-149

Building Name: TA-21-149 Corridor
Original Name: DP-149 (Passageway)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384839 Northing 3970780

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar to corridors TA-21-18/312, -313, -314, and -315

Construction Date: 5/1/1961 to 5/24/1962

Original Use: TA-21-149 was originally constructed to provide a passageway for both personnel and utilities from Building TA-21-150 to TA-21-5. It is similar to corridors TA-21-312/18, -313, -314, -315 between Buildings TA-21-210, -2, -3, -4, and -5.

Use History: TA-21-149 has always served as a corridor/passageway between Buildings TA-21-5 and -150. The first floor is the access area for personnel, with an equipment room, telephone cabinet, and men's restroom extending to the north and south off of the corridor. Overhead of the personnel corridor is a passageway for utilities that support adjacent buildings. There is a partial second floor, above the corridor, that contains two fan rooms and an equipment room.

Use at Time of Survey: Abandoned personnel corridor, however TA-21-149 is the hub for distribution of utilities, including alarms and public access systems, to Buildings TA-21-210, -2, -3, -4, and -5.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Industrial, steel-framed, post and beam structure with insulated metal siding panels and a flat built-up roof with gravel.

Foundation material - Concrete slab and stem walls

Wall material/surface - Exterior wall surface is insulated metal siding panels with hidden fasteners, and the interior wall surface is the exposed steel structure.

Architectural features - TA-21-149 is a two-story corridor with filter houses, fan plenums, and exhaust stacks on the second floor and on the roof.

On the first floor of the north elevation there is an awning-type window with a metal canopy and concrete steps, with a pipe handrail, leading to a pedestrian door with a small window. East of the door there is an exterior metal staircase with pipe railing that leads to the roof of the first floor. From the roof there is another metal staircase with railing that leads to the roof of the partial second floor. On the second floor there is a set of metal double doors.

On the first floor of the south elevation there are three sets of hollow metal double doors and one single pedestrian door. All of the doors have small glass windows. The set of double doors towards Building TA-21-150, the east end of the corridor, is located on a concrete loading dock. At the east end of the dock there are concrete steps that lead up to the dock from the ground surface level. To the west of the dock and towards the roof of the first floor there is a metal louver vent. To the west, towards Building TA-21-5, there is a single pedestrian door and two sets of double doors. On the second floor there is a metal louver and a single pedestrian door with a small window.

The east elevation of the corridor is connected to Building TA-21-150, and the west elevation is connected to Building TA-21-5.

Remodeling History: A men's restroom addition was constructed in 1966 on the north side of the corridor. The only entrance into the restroom is located inside the corridor. The addition was constructed on a concrete slab and its walls are of pumice concrete masonry units. This addition has a flat roof, four-ply pitch and gravel roof with steel flashing.

An audio system containing three loud speakers was installed in 1967. Two of the speakers are located by each of the single pedestrian doors that lead to outside the corridor on the north and south elevations. The third speaker is located in the restroom.

Two room additions were constructed in 1970, an equipment room and a telephone "cabinet," along the south side of the corridor. The equipment room can be accessed from inside the corridor and from outside through the set of double doors located on the loading dock. Another set of double doors opens into the telephone "cabinet."

The HEPA filters and exhaust system were upgraded in 1972.

Associated Buildings: TA-21-2, -3, -4, -5, -150, corridors TA-21-18/312, -313, -314, -315, and the rest of TA-21 (DP West). Building TA-21-1 was the administrative building for the DP west plutonium research facility. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

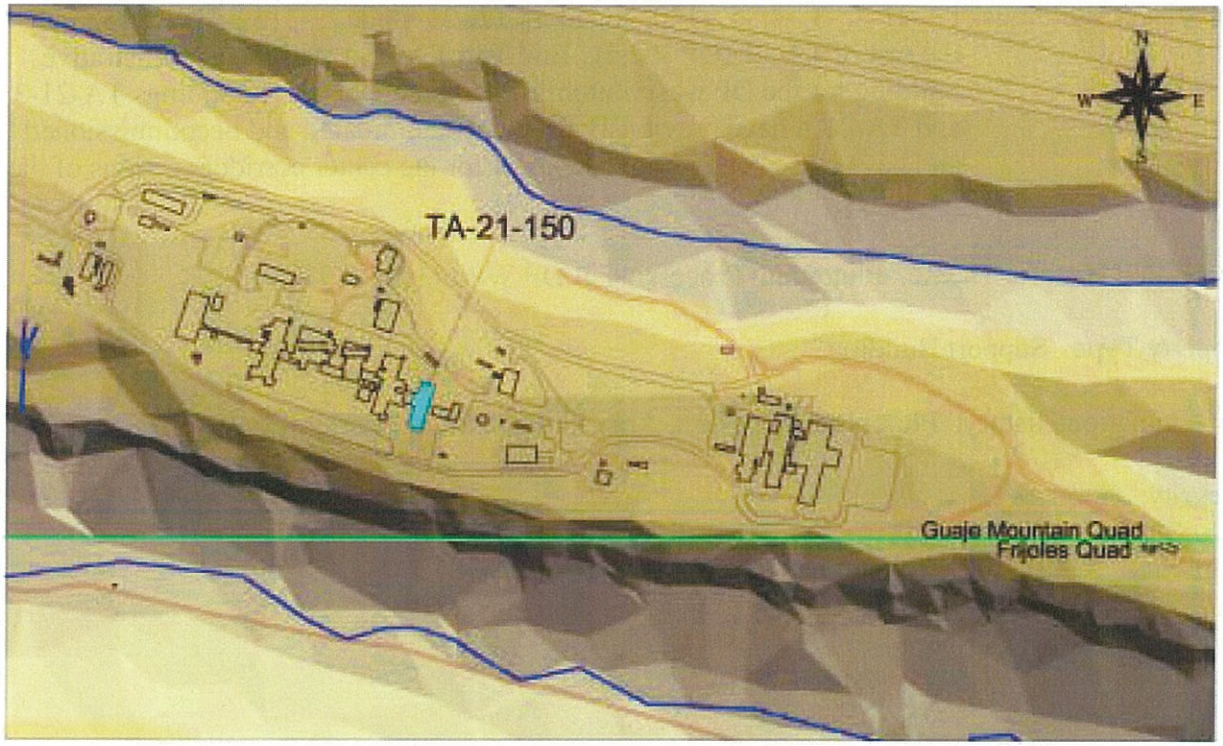
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Not Eligible



TA-21-150 East Elevation of North Wing

TA-21-150

Building Name: TA-21-150 Molecular Chemistry
Original Name: DP-150 (Plutonium Fuel Service and Development Building)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384852 Northing 3970772

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility)

Relationship to surroundings - Similar

Construction Date: 5/1/1961 to 5/24/1962

Original Use: TA-21-150 was originally built as a later addition to the main plutonium processing and research facility for the development of plutonium fuels and was named "Plutonium Fuel Service and Development Building." The building contained a laser lab, wet lab, other laboratories, offices, a sampling shed, and a janitor's closet.

Use History: TA-21-150 has also served as a non-nuclear laboratory as part of the main plutonium processing facility. Research conducted in the building included work on plutonium fuels, fast reactor fuel, artificial heart, space heat sources, and cold fusion work.

Use at Time of Survey: Abandoned with a few rooms being used for storage

Condition at Time of Survey: Fair to good

Building Description: (See also Appendix C)

Building style - TA-21-150 is an industrial style building constructed of cast-in-place concrete beams and columns that are exposed on the exterior façade of the building. The space between the columns is filled with concrete masonry units.

Foundation material - Reinforced concrete slab

Wall material/surface - The exterior walls are constructed of concrete masonry units and cast-in-place columns and beams. The interior surface of the walls is concrete masonry units that have been covered with cement plaster.

Architectural features - TA-21-150 is an approximately 15,000-sq-ft rectangular building with a roof of built-up roof material. The roof has a slight V-pitch for drainage. An external piping and conduit system is visible on all elevations of the building.

There are seven sets of hollow metal double doors located on the east elevation of the building. All of the doors are situated along a concrete dock. Three of the doors have wire glass windows and metal canopies over the doors. The remaining four doors have windows that have been painted over. Also on the east elevation are several more canopies over gas cylinder storage racks. There are two sets of concrete stairs leading up to the dock, one is located at the south end of the dock and the other is near the center of the building. There is also a set of stairs at the north end of the dock that leads down to an exterior entrance to the basement of the building. This entrance is a metal door with a small window at the top.
On the south elevation there is a set of hollow metal double doors that open into the basement level of the building. The doors are reached by a below grade ramp. A concrete retaining wall is located on either side of the ramp. There are three louvers located on this elevation. On the west end of the south elevation there is a metal ladder that leads to a landing and a hollow metal door with a small window that opens onto the mezzanine area on the south end of the building.

The west elevation of this building faces the east elevation of Building TA-21-5. These two buildings are connected by corridor TA-21-149. There are no external entrances into the building from this side. At the north end of the west elevation there is a small ribbed metal siding enclosure adjacent to the building with a metal door on the west side. This space is identified as housing a sampling device. Also, another small enclosure is located adjacent to the north side of the corridor connecting TA-21-150 to TA-21-5. This space is designated as an air inlet, and there is a metal door on the north wall of this room and a louver on the west wall. Immediately adjacent to the building on the south side of the connecting corridor and west of the building is a set of stairs that leads down to the basement.

The north elevation is void of any features except for a metal ladder, similar to the one on the south elevation, that is attached to the side of the building and leads up to a landing and hollow metal door with a small window. The door opens onto the mezzanine area at the

north end of the building. A connected exhaust stack and blower is situated to the northeast of the building.

Remodeling History: Internal modifications were made to one room dividing the space into two rooms in 1970. Other modifications made at this time include the installation of a new air supply system, duct, and grillwork.

HEPA filter plenums and exhaust system modifications were made to all the main plutonium processing buildings and their connecting corridors (TA-21-2, -3, -4, -5, -150, -312/18, -313, -314, -315, and -149) in 1972.

In 1974, sprinkler systems were added to all the main processing buildings and their connecting corridors. Existing cylinder storage racks and chainlink fencing cages were relocated in the basement.

After the decontamination and decommissioning of the late-1970s, minor modifications were made to the building in 1979 and some equipment was moved from Building TA-21-3 into this building. The equipment included magnets, heat exchangers, power supply units, computers, lab benches, refrigerators, a marble balance table, a lyophilizer, a centrifuge, and a Xerox© copy machine.

More modifications were made in the basement in 1985. Doors and walls were removed, and the existing ceiling was removed and replaced with a new reflected ceiling.

Associated Buildings: TA-21-2, -3, -4, -5, corridors TA-21-312/18, -313, -314, -315, -149, and the rest of TA-21 (DP West). Building TA-21-1 was the administrative building for the DP West plutonium research facility. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

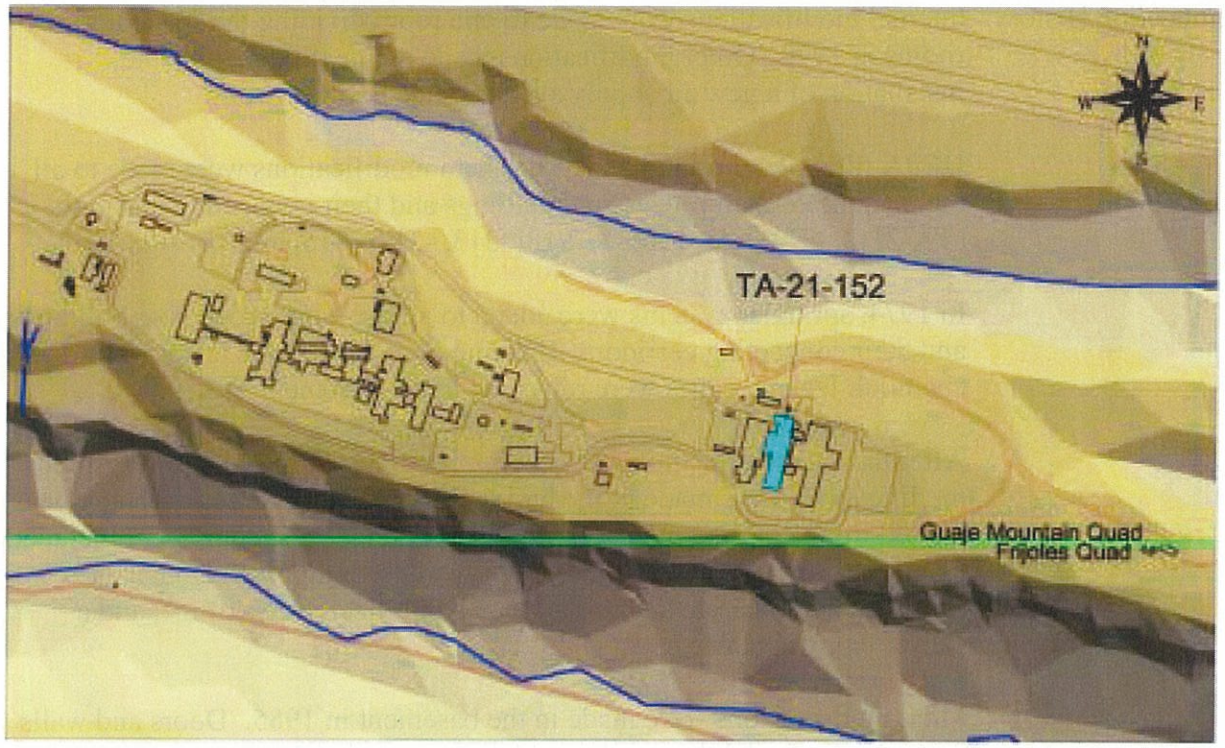
Associated Historic Themes: Plutonium Processing at DP West (1945–1977) and Non-Weapons Research (1945–1990),
Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels)

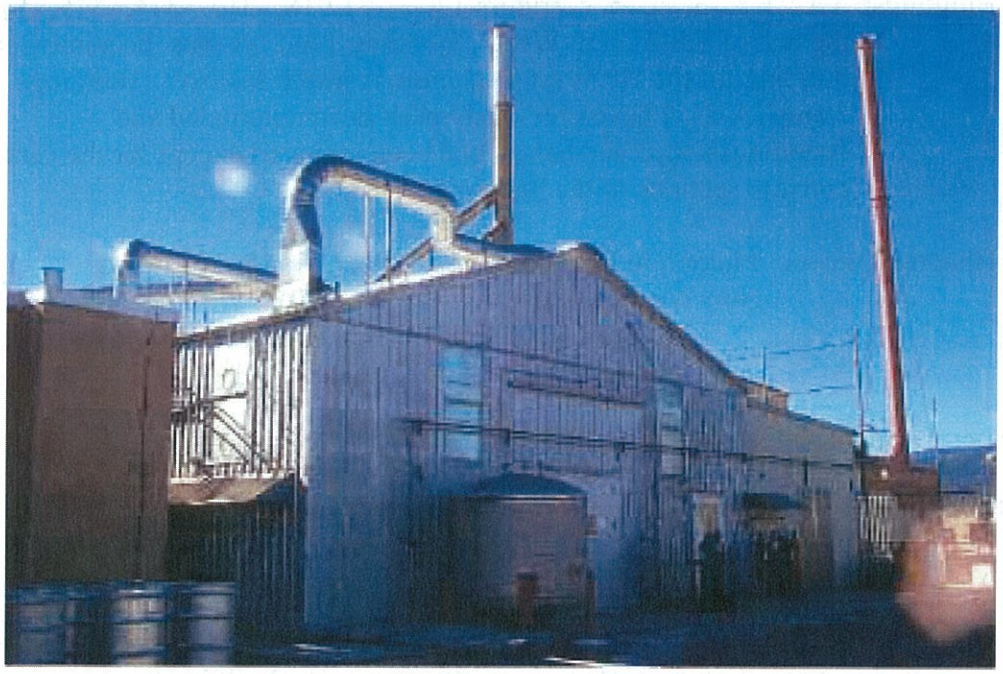
Property Type: Laboratory/Processing Building

Contamination History: Plutonium, Uranium, and Americium

Integrity: Good

Eligibility: Eligible under Criterion A. The interior of this building has been extensively modified as a result of decontamination activities. The building has little or no interior integrity. However, the exterior of the property still retains its historic feeling and character and would be recognizable to a contemporary.





TA-21-152 East and North Elevations

TA-21-152

Building Name: TA-21-152,
Original Name: DPE-152 (formerly Building 52)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385217 Northing 3970725

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/1/1945 to 9/1/1945

Original Use: TA-21-152 was originally a laboratory for polonium initiator research and production. This high temperature chemistry research continued through work on Project Rover in which the building supported the project as a production facility. The coating of all the reactor parts and the fuel elements with a refractory material for protection from high temperature hydrogen for Project Rover was conducted in this building. The building was originally designated Building 52.

Use History: TA-21-152 has always served as a high temperature chemistry laboratory—initially for initiator research and production, then Project Rover. After the shut down of Project Rover in 1972 to 1974, cold fusion work was still being conducted in the south end of the building. In 1977 the TSTA Project took over the building as a laboratory for tritium research and technology in support of the fusion program.

Use at Time of Survey: Laboratory for tritium research being conducted by TSTA for the fusion program.

Condition at Time of Survey: Fair - Good

Building Description: (See also Appendix C)

Building style - Industrial, pre-engineered metal lath and plaster building with ribbed metal siding and a pitched roof. There are underground pipe trenches at the perimeter of the building. All doors and window frames are metal.

Foundation material - Reinforced concrete slab

Wall material/surface - Ribbed metal siding and plaster covering the metal laths inside. An addition to the building is constructed out of concrete masonry units. This addition extends west from the main metal building.

Architectural features - TA-21-152 is a roughly rectangular pre-engineered metal building with pipe tunnels and utility trenches running around the perimeter of the building underneath the floor. The building has a metal pitched roof with flashing and counter flashing and exhaust ductwork along the roof ridge and on the sides of the roof.

The north elevation has a set of metal pedestrian double doors, a single door with a window, and two sash-type windows. A concrete masonry unit addition has been added to the west side of the building, and its north wall is flush with the north wall of the main metal building. There is a set of metal double doors on the west elevation of the addition.

Along the west elevation the pre-engineered metal building originally had 21 sash-type windows. These windows were closed with metal plates or portions of ribbed metal that match the building. There are large air ducts running along the edge of the roof, which are connected to the building by a series of smaller external piping and duct work that extends out of the west wall and sometimes the closed window openings.

In the center of the west elevation, another concrete masonry unit was added to the main metal building. This addition was built when the building was originally constructed to connect it to Building TA-21-151, which no longer exists. Now the concrete masonry unit addition connects Building TA-21-152 to the covered walkway that connects to Building TA-21-155. This addition also includes several equipment rooms as well as the corridor.

There is a 13-in.-thick brick firewall on the south side of the hallway that divides the building in half (north and south) and connects this building to the covered corridor and to Building TA-21-155.

The south elevation has a set of metal pedestrian double doors with windows in the top half and two building windows that have been closed with similar ribbed metal siding as the rest of the building. There is also a small lean-to shed of corrugated metal, attached to the south building wall west of the double doors. To the east of the doors there is an awning covering a gas cylinder storage rack. At the southeast corner of the building a small room constructed of corrugate metal siding and roofing was added along the east wall

making its south wall flush with the south wall of the main part of the building. The existing ductwork from the main building was revised and attached to this building addition. This room houses vacuum pumps associated with the mass spectrometer located in the adjacent room.

The east elevation originally had 20 sash-type windows like on the west side, however these windows also have been closed with metal plates or portions of ribbed metal siding that is similar to what the building is constructed out of. There are large air ducts, like on the west side of the building, running along the edge of the roof. These ducts are connected to the building by a series of smaller external piping and ductwork that extends out of the east wall and from some of the closed window openings. Originally, it appears that the east elevation had a set of double pedestrian doors in the center of this side as well as a single pedestrian door in the middle of the south wing. Since the time the building was constructed, Building TA-21-209, located to the east of TA-21-152, has been built and the two buildings are connected with a corridor as other buildings are connected. At the south end of the east elevation there is a small, corrugated metal room (mentioned above) with ductwork connecting it to the main building.

Remodeling History: A concrete masonry unit equipment room was added, in 1958, to the north west corner of the building, along the west elevation, for the propulsion program work being conducted at DP East. This room has a slightly sloping built-up roof with metal flashing around the edge. The north elevation has a set of metal double pedestrian doors. There is also an awning attached to the north wall covering a cylinder storage rack, which is located to the east of the doors. On the west side of the addition are several vent openings for air exchange, and along the south side of the addition there are two sections of cylinder storage racks. Equipment proposed for this room included an hydraulic pump/press, gas measuring equipment, catalyst chamber, and a lectrodryer for the propulsion program work being conducted.

In 1960 a small room to house vacuum pumps was added. This room is located at the southeast corner of the building along the east wall. It is constructed out of corrugated metal siding and roofing. The existing building ductwork was revised to connect to this room.

A change room and several other rooms were added to the north side of the corridor connecting this building to TA-21-155. This addition is constructed of concrete masonry units and has a slightly sloping roof of rubberoid roofing and rigid insulation on a steel deck frame. The north elevation of this addition has a pedestrian door with a louver above the door.

In the south end of the building during 1967 several vent hoods and all affiliated equipment and associated roof ductwork, one sink, and several cabinets were to be removed. In the north end some shop equipment was to be removed as well as a wall partition.

Existing contaminated ductwork connecting Building TA-21-152 to the filter house. Building TA-21-153, the filters, filter housing, fans, stacks, duct supports and the filter house itself were removed in 1969. Additionally, room exhaust systems were modified and the exhaust ducts on the roof as well as one of the exhaust stacks were removed.

Interior modifications were made in 1984 to the northern wing of the building. Interior walls and doors were removed creating a large work area. The walls at the south end of this newly created large space were extended above the ceiling to the roof height and a new exhaust stack was added to the north end of the roof.

Associated Buildings: TA-21-155, -166, -167, and -209

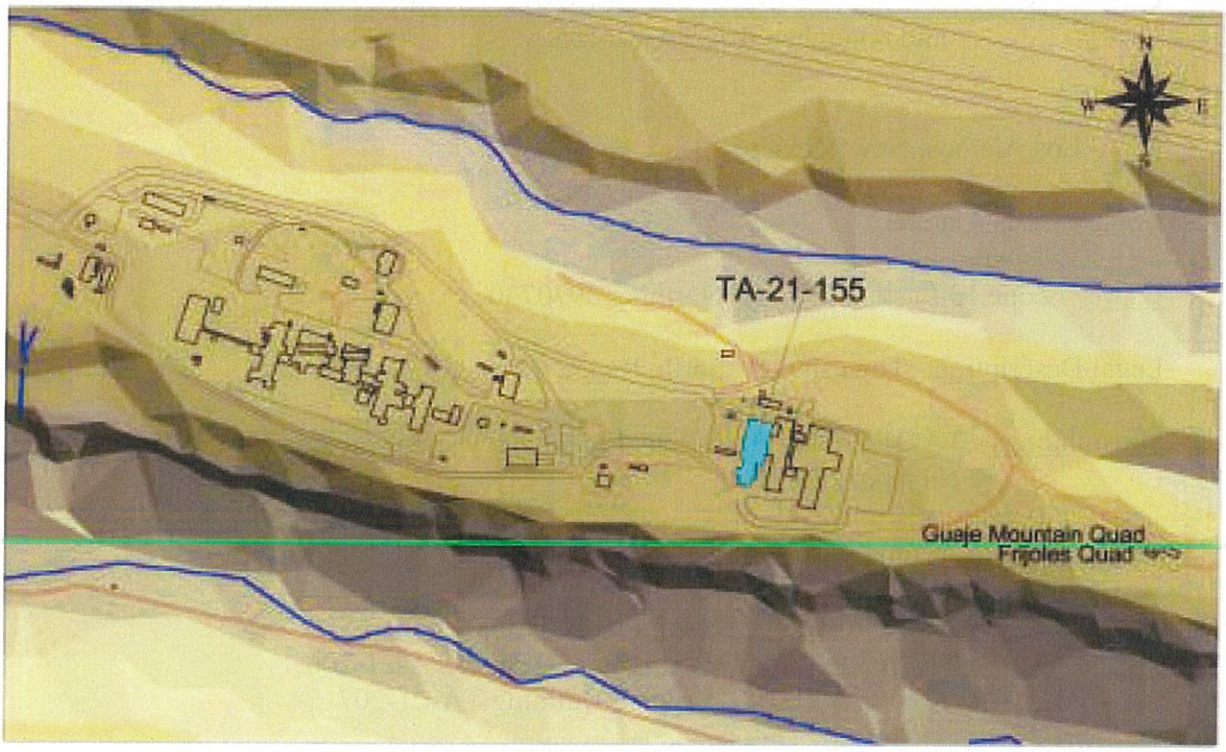
Associated Historic Themes: Initiator Research and Development at DP East (1945–1955) and Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

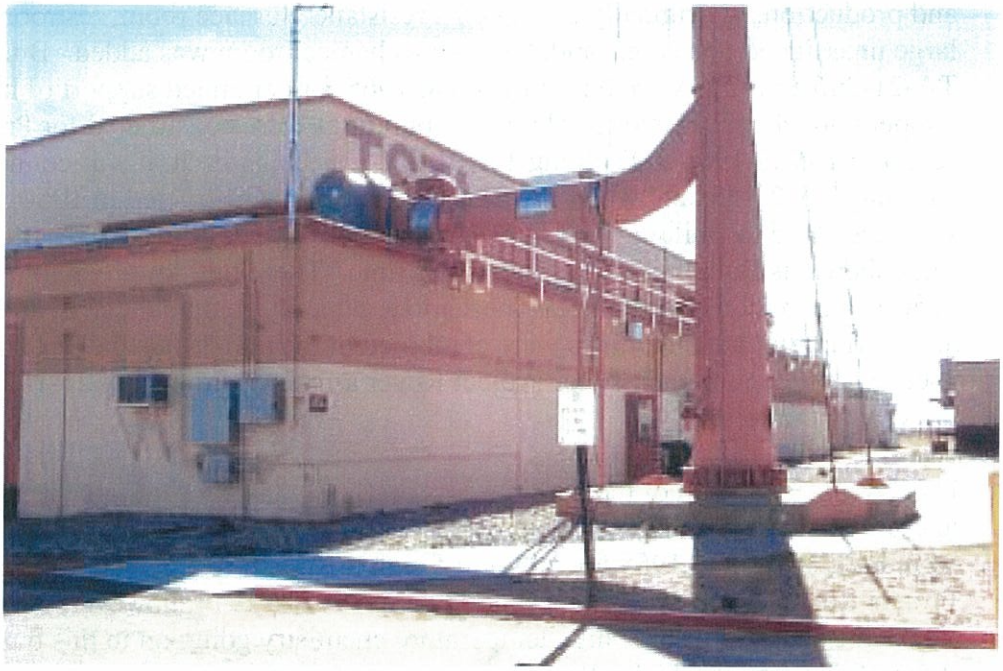
Property Type: Laboratory/Processing Building

Contamination History: Actinium from the initiator research conducted in the building. Polonium was also utilized in the initiator research but has a short half-life (138 days) and has long since decayed away.

Integrity: Good

Eligibility: Eligible under Criterion A





TA-21-155 North and West Elevations

TA-21-155

Building Name: TA-21-155
Original Name: DPE-55, DPE-206, and DPE-207 (The three buildings were later joined and renumbered as TA-21-155.)

Location:
City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385194 Northing 3970730

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 7/27/1949 to 12/5/1949 original Building TA-21-55
10/24/1963 to 7/31/1964 original Building TA-21-206
7/9/1964 to 5/21/1965 original Building TA-21-207

Original Use: TA-21-155 is the combination of three buildings, TA-21-55, TA-21-206, and TA-21-207. The original Building TA-21-55 was built in 1949 for initiator research and production. It originally contained a resistance furnace room, restroom, a large unassigned open area, and, later, a mechanical room was added. Buildings TA-21-206 and -207 were built in 1963 to 1965 for continued support of high temperature chemistry work. These two buildings were constructed for Project Rover. In 1963-1964 as Building TA-21-206 was being built, it was connected to Building TA-21-55, and when TA-21-207 was being constructed in 1964-1965, it was connected to Building TA-21-206. The combined buildings were renumbered as Building TA-21-155 at this time. These buildings contained offices, a trap room, storage area, mezzanine, pit area, equipment area, and a shop area. After the three buildings were combined in the mid-1960s the building was used as a production facility for Project Rover as was Building TA-21-152, directly to the west.

Use History: The TA-21-55 portion of the building was originally used for initiator research and production until the mid to late 1960s. The TA-21-206 and -207 portions were built in 1963 to 1965 for support of high temperature chemistry work for Project Rover. This project was shut down in 1972 to 1974, however, in the early 1970s there was still some high temperature chemistry going on in this building. After 1977 when the TSTA Project was awarded funds to conduct tritium research for the fusion program, Building TA-21-155 (all three portions) was for the most

part used as a production center. TSTA has remained as a center of tritium research and development for the Laboratory's fusion program.

Use at Time of Survey: Laboratory for tritium research being conducted by TSTA for the fusion program.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - TA-21-155 is an industrial style building that is composed of three separate buildings (TA-21-55, TA-21-206, and TA-21-207). TA-21-55 was constructed of metal siding, whereas Buildings 206 and 207 were made of concrete masonry units and reinforced concrete.

Foundation material - Reinforced concrete slab and footings

Wall material/surface - The walls are constructed of a variety of materials, metal panel siding and concrete masonry units with reinforced concrete at every other course.

Architectural features - Building TA-21-155 is the combination of three separate buildings (TA-21-55, TA-21-206, and TA-21-207). The TA-21-55 portion of the building is constructed of ribbed metal siding. The original TA-21-206 and TA-21-207 portions are concrete masonry units and reinforced concrete. Each portion of TA-21-155 has a pitched roof, but they vary in height.

On the north elevation there are two sets of hollow metal double doors. The doors toward the west side of the building are large equipment sized doors, one of which contains a single pedestrian door. Between the two sets of doors there is a covered louver. Towards the east side of the north elevation there is a metal canopy covering a gas cylinder rack.

Near the north end of the west elevation there is a metal pedestrian door with a wire glass window. On the south side of the door there are two awning windows. There is a hollow metal pedestrian door where the original Building TA-21-207 joins original Building TA-21-206, and there is another pedestrian door where Building TA-21-206 is attached to original Building TA-21-55. The TA-21-55 portion of the building is narrower than Buildings TA-21-206 and -207. Further south on the west elevation there is a hollow metal pedestrian door with a glass window, followed by two narrow sash-type windows and a horizontal slider window. Towards the south end of the west elevation there is a room addition of metal siding

with a slanted roof. On the west elevation of this addition there is a set of hollow metal double doors.

There is a single hollow metal pedestrian door located in the center of the south elevation.

On the south end of the east elevation there is an equipment-sized sliding door. North of the sliding door there is a metal pedestrian door and two horizontal slider windows. Connected to the exterior of the building there is an elevated metal landing and ladder. Some of the buildings piping system is located on the landing. On the north side of the landing there is a small addition. A pedestrian door is located on the east elevation of this addition. Further north on the main portion of the building there are three windows (two sash-type and one horizontal slider) and a set of hollow metal double doors. Another addition extends off of the south elevation of the original TA-21-206 building. On the south elevation of this addition there is a pedestrian door and a louver. There is a set of hollow metal double doors and a louver on the east elevation of the addition. Building TA-21-155 is connected to Building TA-21-152 at the center of the east elevation. At the north end of the east elevation there is a set of hollow metal double doors.

Remodeling History: The three buildings that comprise Building TA-21-155 are TA-21-207 to the north, TA-21-206 in the center, and TA-21-55 to the south. Buildings TA-21-206 and -207 are concrete masonry unit structures with pitched four-ply built-up roofs. Building TA-21-206 was originally identified as the "Development Building," and it contained an induction furnace, equipment room, pit area, and restroom. Building TA-21-207 was originally identified as a "Furnace Facility." It contained an induction furnace, mechanical room, battery room, trap room, storage area, and offices.

Several modifications were made between 1961 and 1963. In 1961, a resistance furnace addition was added to the original TA-21-55 building. During 1963 to 1965 both TA-21-206 and TA-21-207 were joined with TA-21-55 and renumbered as TA-21-155.

A bottle rack and manifold canopy were installed on the southern half of the west elevation in 1964. In 1965 pyrolytic graphite coating equipment was installed.

In 1967, the slat drum handling equipment was relocated. Hoist cover plates were removed and the internal parts were cleaned. A new frame was also installed for the ¼-ton electric hoist.
Between 1977 and 1979, several modifications were made to the building. Interior room modifications, including the installation of new doors and

walls were made in 1977. Work on the exhaust and supply air ductwork was conducted, and exhaust stack TA-21-388 was installed and connected to the building in 1978. Also in 1978 the heating and ventilating system was upgraded and work was also completed on the fans and ductwork located on the roof of the building. Minor interior changes were made, steel steps leading down to the pit area and up to the mezzanine were replaced with steel ladders. In 1979, a support column was installed for the isotope separation system and a vacuum facility for the tritium operations was also installed.

In 1981, an uninterrupted power supply and emergency power supply room was added. This addition attached to the south elevation of the original TA-21-206 portion of the building and extends past the east elevation of the original TA-21-55 portion of TA-21-155. It is constructed of corrugated metal siding. On the south elevation of the addition there is a hollow metal pedestrian door and a louver. There is a set of hollow metal double doors and a louver on the east elevation of the addition. The solid waste disposal system and the emergency tritium cleanup systems were upgraded along with the vacuum facility at this time.

Several modifications were made between 1982 and 1988. In 1982, a new fuel clean up and gas analysis system was installed in several rooms. The system included such equipment as a fuel clean-up system glovebox, a gas chromatograph glovebox, a potentiostat galvandstat, and spectrometer. A cooling system was installed in one of the building rooms. In 1985 the heating and cooling systems were modified for energy efficiency during times the building is unoccupied. In 1988 the south wing of the building was remodeled into office space.

Associated Buildings: TA-21-152, -209 and the rest of TA-21 DP East

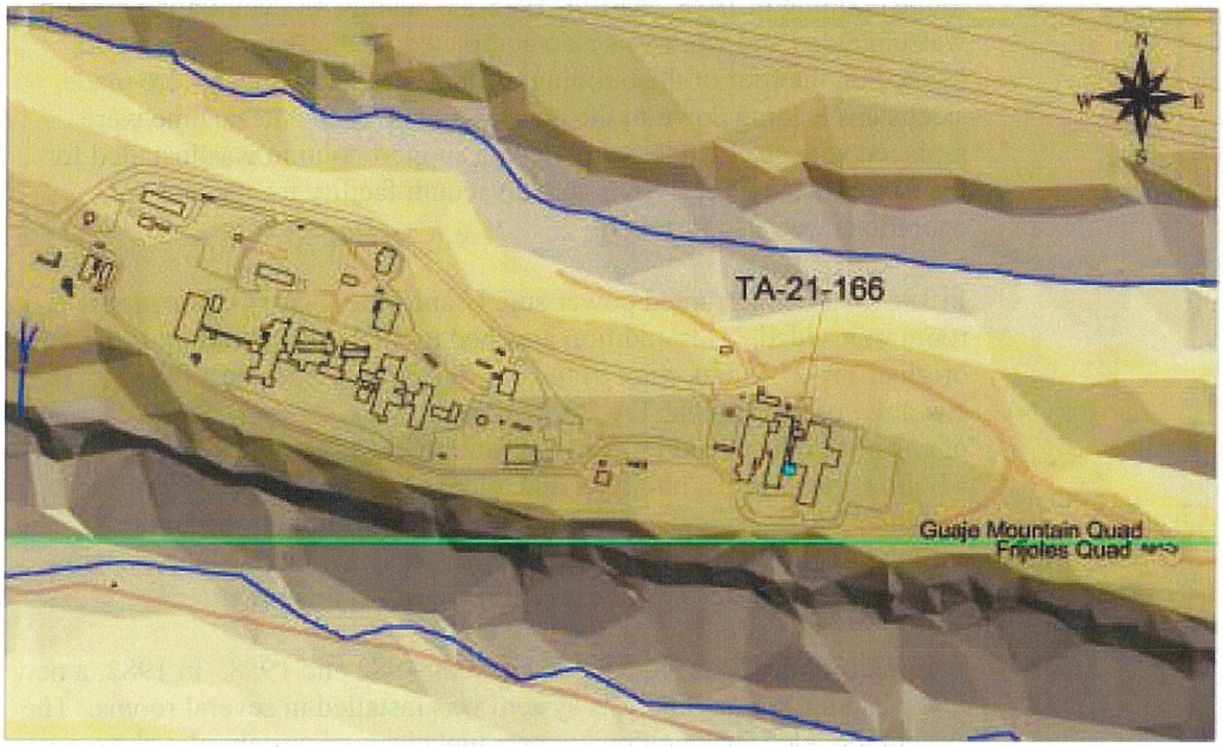
Associated Historic Themes: Initiator Research and Development at DP East (1945–1955) and Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

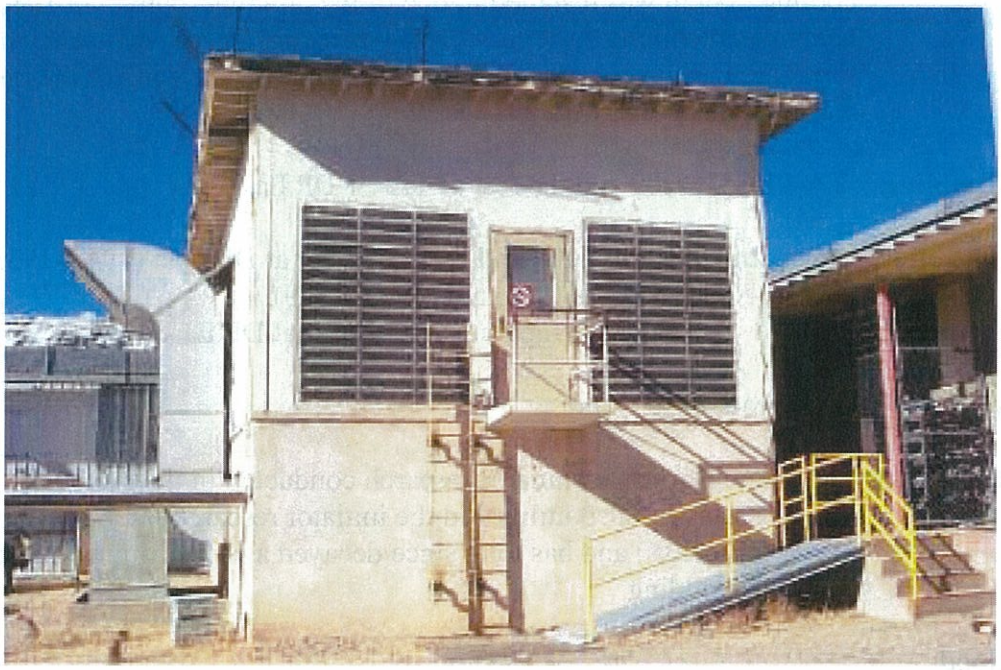
Property Type: Laboratory/Processing Building

Contamination History: Actinium from the initiator research conducted in the building. Polonium was also utilized in the initiator research but has a short half-life (138 days) and has long since decayed away. Tritium is also found in this building.

Integrity: Good

Eligibility: Eligible under Criterion A





TA-21-166 East Elevation

TA-21-166

Building Name: TA-21-166 Equipment Building
Original Name: DPE-166 (formerly 52-A)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385229 Northing 3970701

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/1/1945 to 9/1/1945

Original Use: TA-21-166 was built as a two-story equipment building (air filters, air supply fan, motor, and heating and cooling systems) for the south wing of Building TA-21-152 (DPE-152).

Use History: Building TA-21-166 has always housed mechanical equipment for the south wing of Building TA-21-152.

Use at Time of Survey: TA-21-166 is still one of the equipment buildings for the large laboratory building TA-21-152.

Condition at Time of Survey: Fair to good

Building Description: (See also Appendix C)

Building style - Building TA-21-166 is a two-story, 1,102-sq-ft structure. It is constructed of gypsum board siding and concrete masonry units. The first floor contains a pipe tunnel, a pit, an opening in the foundation for mechanical work, and an open area. A wooden staircase is situated along the north elevation with a landing in the northwest corner and continues up along the west wall to the second story.

Foundation material - Concrete slab and beams

Wall material/surface - The second-story exterior walls are gypsum board siding. The interior walls are constructed of concrete masonry units covered with two layers of gypsum board.

Architectural features - TA-21-166 is a two-story building with a slanted built-up roof that extends approximately one foot out from the building. The roof has a wood deck and is covered with layers of gravel surfaces. There are exposed wood supports underneath the wood deck. There is a continuous concrete collar that wraps around the exterior surface of the building. TA-21-166 is connected to TA-21-152 by an air supply duct that enters the attic space of Building TA-21-152.

On the second floor of the east elevation there are two metal weather louvers with screens. Located in between the louvers is a metal pedestrian door. There is also a metal ladder attached to the building leading to a concrete platform located beneath the door that leads into the second story.

On the south elevation on the first floor level there are two sash-type windows, one over one. These windows at sometime replaced the original twelve-pane awning windows. Between the windows there is a large air duct that runs up the side of the building.

On the second story of the west elevation of TA-21-167 there is an air vent duct that is connected to the attic of Building TA-21-152.

There is one sash-type window and a metal pedestrian door on the north elevation. The door is located partially below the ground surface and there is a stairwell that leads down to the door.

Remodeling History: TA-21-166 was originally constructed in 1945. In 1949 an air conditioning system was installed. An evaporative cooler was installed in the basement in 1960 and a compressed air dryer was installed in 1966.

Associated Buildings: TA-21-152 and TA-21-167

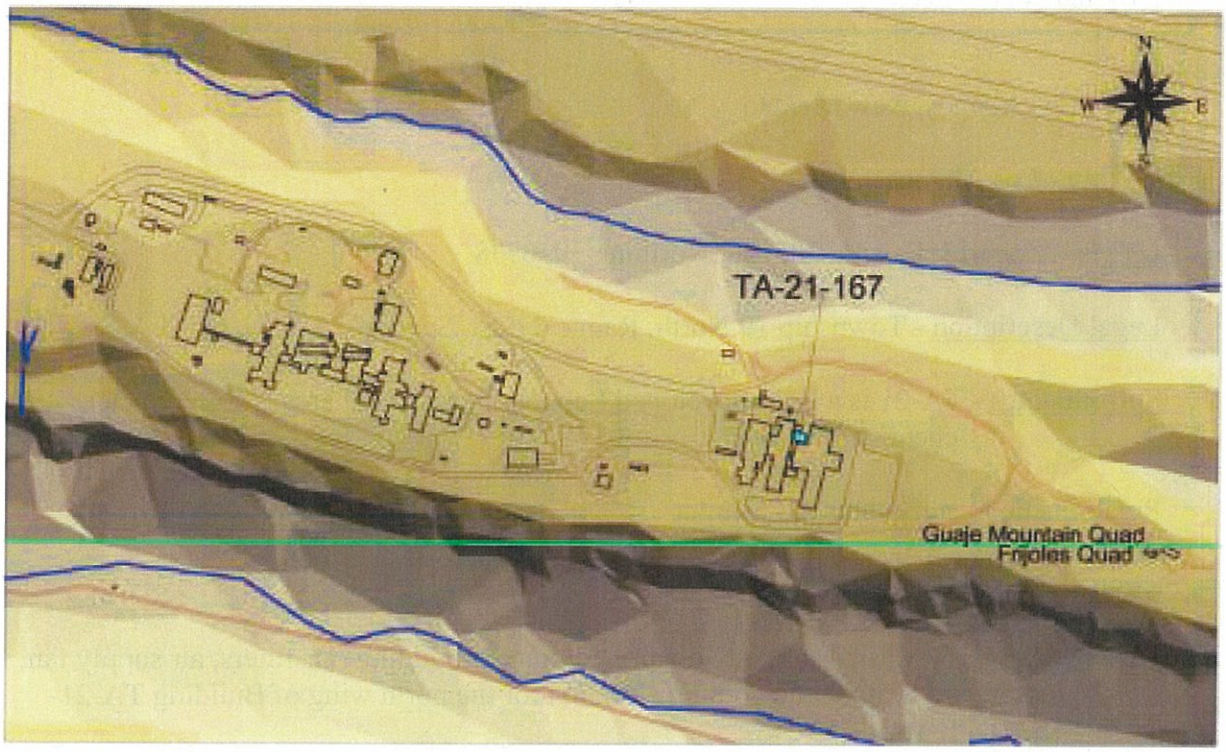
Associated Historic Themes: Initiator Research and Development at DP East (1945–1955) and Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

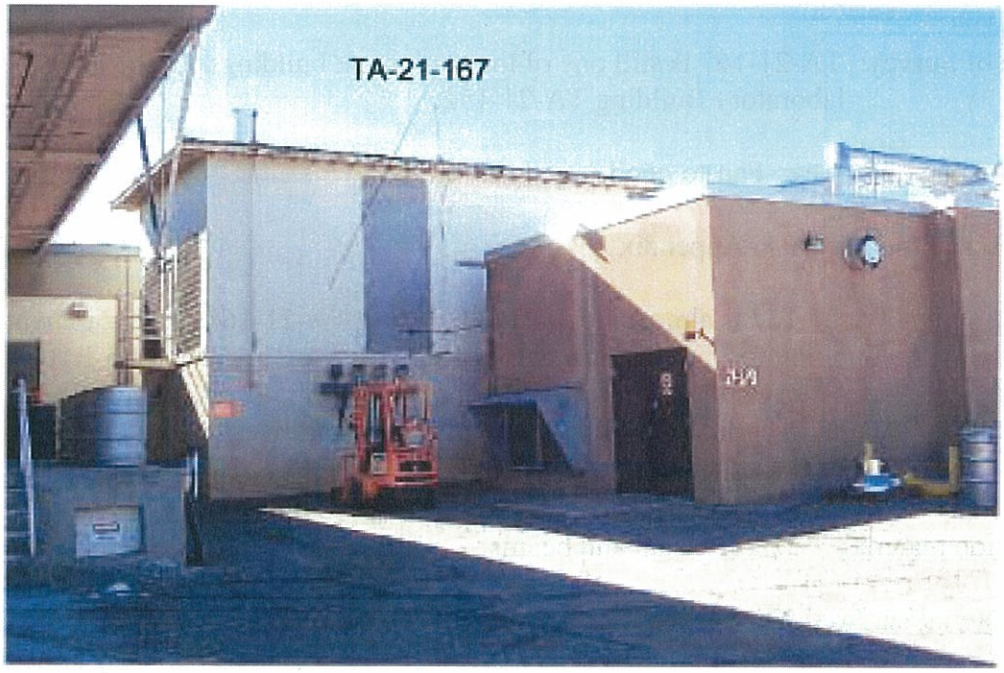
Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A





TA-21-167 East and North Elevations

TA-21-167

Building Name: TA-21-167 Equipment Building
Original Name: DPE-167 (formerly 52-B)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs – Zone 13 Easting 385238 Northing 3970738

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/1/1945 to 9/1/1945

Original Use: TA-21-167 was built as a two-story equipment building (air filters, air supply fan, motor, and heating and cooling systems) for the north wing of Building TA-21-152 (DPE-152).

Use History: Building TA-21-167 has always housed mechanical equipment for the north wing of Building TA-21-152.

Use at Time of Survey: TA-21-167 is still one of the equipment buildings for the large laboratory Building TA-21-152.

Condition at Time of Survey: Fair to good

Building Description: (see also Appendix C)

Building style - TA-21-167 is almost identical to Building TA-21-166, the equipment building for the southern half of Building TA-21-152. It is a 1,102-sq-ft two-story building made of gypsum board siding and concrete masonry units. The first floor contains a pit in the northwest corner and a wooden staircase along the west interior wall.

Foundation material - Concrete slab and beams

Wall material/surface - The second-story exterior walls are made of gypsum board siding. The interior walls are constructed of concrete masonry units covered with two layers of gypsum board.

Architectural features - TA-21-167 is a two-story building with a slanted built-up roof that extends approximately one foot out from the building. The roof has a wood deck and is covered with layers of gravel surfaces. There are exposed wood supports underneath the wood deck. There is a continuous concrete collar that wraps around the exterior surface of the building. TA-21-167 is connected to TA-21-152 by an air supply duct that enters the attic space of TA-21-152.

On the second floor of the east elevation there are two metal weather louvers with screens. In between the louvers is a metal pedestrian door. There is also a metal ladder attached to the building leading to a concrete platform located beneath the door that leads into the second story.

There is one sash-type window and a metal pedestrian door located on the south elevation of the building. Both the window and the door are located on the first floor level.

On the second story of the west elevation of TA-21-167 there is a air vent duct that is connected to the attic of Building TA-21-152. There are no windows or doors located on the north elevation of TA-21-167.

Remodeling History: TA-21-167 was originally constructed in 1945. In 1949 an air conditioning system was installed. In 1966 a compressed air dryer was installed.

Associated Buildings: TA-21-152 and TA-21-166, the equipment building for the south half of Building TA-21-152

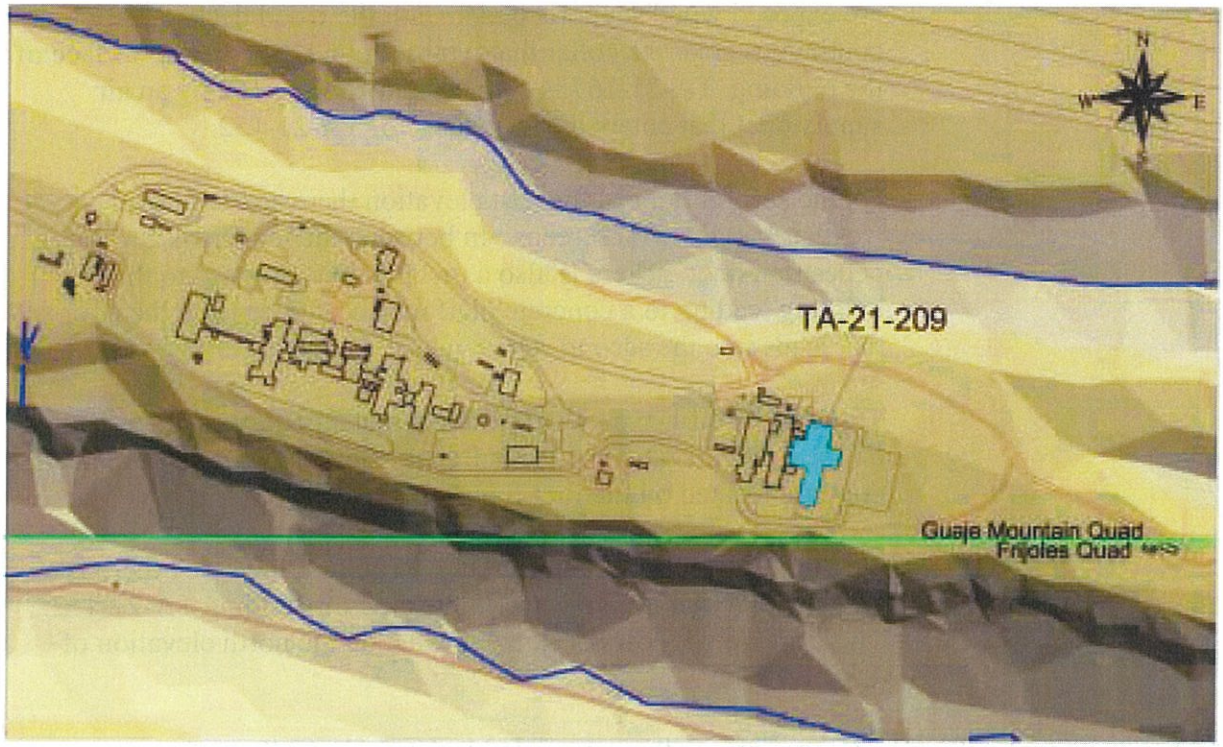
Associated Historic Themes: Initiator Research and Development at DP East (1945–1955) and Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-209 East Elevation

TA-21-209

Building Name: TA-21-209
Original Name: DP-209

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385255 Northing 3970717

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 7/8/1964 to 9/13/1965

Original Use: TA-21-209 was originally designated as the High Temperature Chemistry Facility and was divided into four sections. It contains offices, restrooms, a library, conference room, cryogenics lab, general chemistry lab, high temperature chemistry labs, pyrometry lab, x-ray lab, receiving and storage area, machine shop, dark room, film reading room, vault, lunch room, microscopy lab, metallography lab, induction heating lab, electron microscopy lab, and a furnace room.

Use History: TA-21-209 has always served as a High Temperature Chemistry Facility and administrative office building. When first constructed it was used for support of Project Rover, which was shut down 1972 through 1974. When the Laboratory's TSTA Project was awarded funds in 1977 to conduct tritium research for the fusion program, the building became the administrative office facility and laboratories for TSTA.

Use at Time of Survey: TSTA has remained as a center of tritium research and development for the Laboratory's fusion program. TA-21-209 still houses the administrative offices and some laboratories for TSTA.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - TA-21-209 is a 33,429-sq-ft modern office/laboratory building constructed of concrete columns and beams, concrete masonry units, and brick. The original design plans show the building divided into four sections (A–D,

north, south, east, and west wings) and a partial basement, whereas the as-built drawings divide the building only into three sections (1 = A, 2 = B, and 3 = C & D) not four.

Foundation material - Concrete slab and footings

Wall material/surface - The walls are constructed of concrete columns and beams, concrete masonry units, and brick.

Architectural features - TA-21-209 is a modern office/laboratory building with a V-pitched roof. The roof is constructed of built-up roofing materials over a rigid insulation on a poured gypsum deck. The roof has an approximate four-foot overhang on all sides of the building.

The following building description will discuss the building by the original four sections (wings A–D).

Wing A (southern wing): On the east elevation of the southern wing there are twelve three-paned awning type windows. On the south elevation, which is the south elevation of the main portion of the building, there is a ramp leading down to a set of hollow metal doors. The doors have three-paned wire glass windows and lead into the basement. Above the doors there is a jib crane. At the ground level there is also a concrete staircase leading up to a hollow metal pedestrian door with a single-pane wire glass window that is at floor level. A metal canopy covers the concrete landing and doorway. The west elevation of this wing is void of windows and doors, however along the west wall there is a gas cylinder storage rack enclosure.

Wing B (western wing): On the south elevation of this wing there is a concrete dock with two sets of hollow metal double doors. One set has three-paned wire glass windows and the other set has single-paned wire glass windows. The roof of the building covers the dock that runs along the entire south elevation of wing B. Two sets of concrete steps, one at the western end and the other in the center give access to the dock. The west elevation of wing B is connected to the east elevation of Building TA-21-152. The north elevation is void of doors and windows, however there is a large vent covered with a metal screen.

Wing C (eastern wing): The north elevation of this wing is void of windows and doors. On the east elevation there are five three-paned awning windows. The main entrance to the building is on the south side of this wing. There is a concrete landing and steps leading up to a set of hollow metal double doors with single-paned wire glass windows. A canopy covers the entire entryway. On the south and

east side of the entry landing there are solar screens constructed of decorative brick open-lattice work.

Wing D (northern wing): On the west elevation of this wing there is a concrete dock with steps at either end. There are two sets of hollow metal double doors located on the dock. The roof of the building covers the dock. On the north elevation, which is the north elevation of the main portion of the building, there is a small concrete landing and steps leading to a single metal pedestrian door with a three-paned wire glass window. A metal canopy covers the doorway. There is also a concrete staircase leading down to a single pedestrian door with a three-paned wire glass window, which opens into the basement. On the east elevation there are seven three-paned awning windows.

Remodeling History: In 1969 a dry box facility was added inside along the west side of the northern wing and along the north side of the western wing. The new addition contained a laboratory, office, mechanical room, and a dry box train.

Additional dry boxes, electrical upgrades, and mechanical valve connections were added in 1971. Gas cylinder bottle racks were also added to the west elevation of the new dry box addition.

Several modifications were made between 1982 and 1984. In 1982 ductwork and exhaust air supply conversions were made to lab and office spaces. The sprinkler system was also upgraded. The 1983 modifications included equipment removal, floor penetrations were sealed, and doors and walls were relocated. An isostatic press was installed in 1984. Roof work was also done at this time.

Between 1992 and 1993, PCB transformers were replaced and new gloveboxes were installed.

Associated Buildings: TA-21-152, -155, -166, -167, and the rest of TA-21 DP East

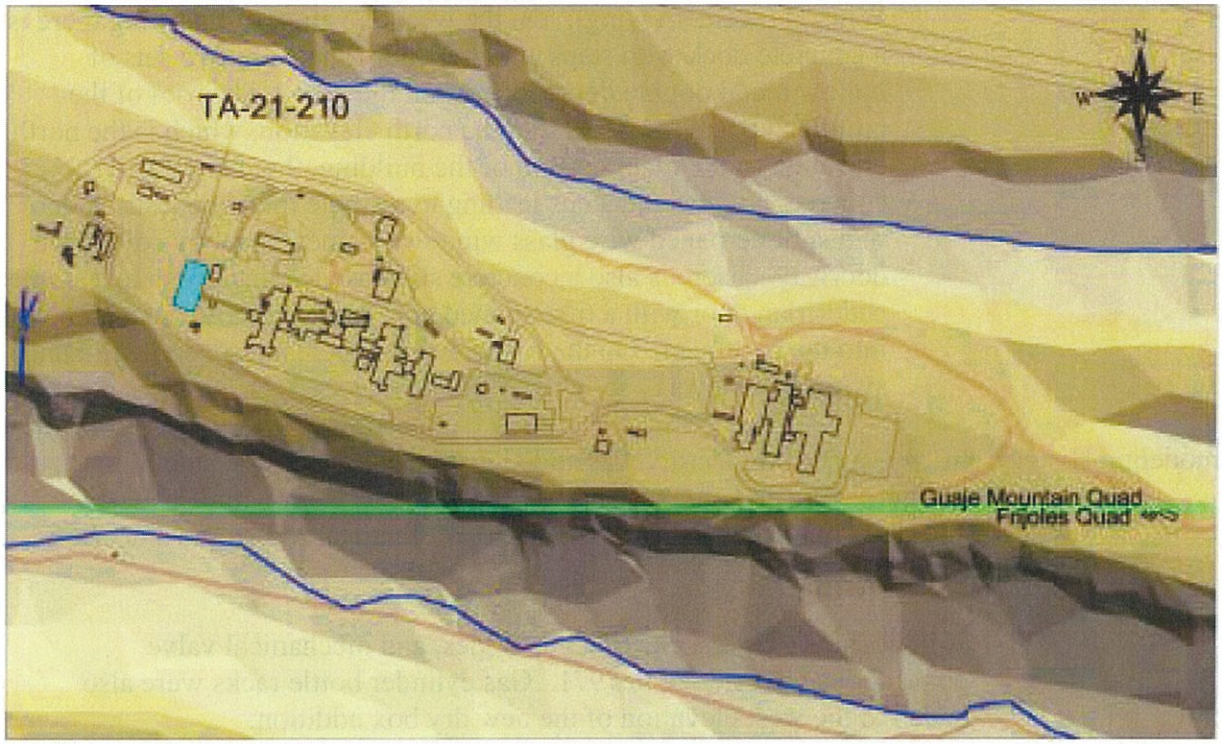
Associated Historic Theme: Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

Property Type: Administration Building and Laboratory/Processing Building

Contamination History: Tritium

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-210 West Elevation

TA-21-210

Building Name: TA-21-210
Original Name: DP-210 (Plutonium Research Support Building)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384616 Northing 3970867

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1964 to 1965

Original Use: Building TA-21-210 was named the "Plutonium Research Support Building" when it was built. "Research into methods of recovering additional plutonium from waste streams was conducted at [former] Building TA-21-33. Additional research on the properties and uses of plutonium was conducted at Building TA-21-210 the plutonium research building" (LANL 1991:3-1). The first floor contained offices, showers, hot and cold change rooms, a hot service area, a hot bagging area, a dispensary, a lunch service area, a kitchen, a machine shop, a nurse's office, and restrooms. Located on the second floor were more offices, a special equipment room, a conference room, a drafting room, a janitor's closet, and restrooms.

Use History: TA-21-210 has served as an office building for several other groups not related to plutonium or tritium research. It has also housed an electrical/electronics laboratory at some time. Currently Building TA-21-210 houses the LANL Ecology Group, ESH-20. It contains offices, light laboratories, restrooms, and conference rooms.

Use at Time of Survey: Office building for the Ecology Group, ESH-20

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Modern office building with a flat gravel roof, and in-filled with curtain wall windows. The building has two stories and a partial basement. The second story covers the southern portion of the building. From the main

entrance to the north end of the building it is only one story. However, within the single-story portion of the building there are varying roof/ceiling heights. Windows are metal framed. The roof is a flat gravel roof.

Foundation material - Concrete footings, pier system, stem walls and slab with a partial basement on the south end of the building.

Wall material/surface - The structural columns are concrete beams and the walls are concrete masonry units with a pre-cast concrete-joist roof structure. The interior walls are gypsum board on frame construction.

Architectural features - The building is separated into three sections, a two-story section on the south end, and single-story sections at the middle and north end. The main entrance to TA-21-210 is on the west elevation of the building. There is a set of metal framed glass double doors underneath an entrance canopy. Inside the building immediately south of the entrance is the open stairs to the second floor. To the north of the entrance are four single-pane glass panel windows, and farther north are a room air conditioner unit and a vent covered with a canopy. There are eight single-pane glass panel windows located to the south of the doorway. Four of the windows are located on the first floor while the other four are on the second floor. Next to these, beyond a concrete beam, is another row of windows, six on the first floor and six on the second. Two windows on each floor are awning-type windows. There are two unit ventilators located in the panels below the first floor row of windows and there are also two more unit ventilators below the second floor windows.

On the west end of the north elevation there is a concrete dock with steps at both west and east ends and a ramp. On the east end of the dock there is a set of metal double doors. Further east along the north elevation there is a group of five windows, then a group of three windows. Both groups are comprised of horizontal slider windows. The windows are positioned slightly higher on the wall than other windows located on the first story. The north side of the two-story section (the southern portion of the building) is located to the south of the main entrance, above the main building stairwell. On the north elevation of the two-story section there is a metal ladder extending from the roof of the first story to the roof of the second story. To the east of the ladder is a metal pedestrian door with a glass window that leads into the second floor. Further along the second story north elevation there are eleven windows. Four of the windows are awning windows.

At the south end of the east elevation, adjacent to the building, there is a concrete slab and staircase with a steel pipe railing leading down to the basement. A low retaining wall constructed of concrete is

located on the east side of the staircase. Access into the basement is provided by a set of metal double doors. The east elevation also contains two rows of six glass panel windows. In the center of the east elevation is the corridor (TA-21-312/18) that connects Building TA-21-210 to Building TA-21-2. Inside, the building is separated from the corridor by a set of metal double doors with glass windows. At the north end of the east elevation, north of the corridor, there are two rows of windows, three windows on each floor. One window on the second floor is an awning window and one window on the first floor holds a room air conditioner unit. There are two louver vents high on the wall over the corridor. To the north of the windows there is a concrete loading dock with steps. Located on the dock are one metal pedestrian door and a window that has been sealed closed with a board. Also on the northern end of the east elevation are conduits that connect to the inside of the building.

On the south elevation of the building there is a concrete dock with steps, at the western end, from the ground surface up to the dock level. On the eastern end of the dock there is a metal fire escape staircase that leads from the second floor to the concrete dock level. Two sets of metal double doors with windows are also located on the dock. Near the west end of the south elevation on the first floor there is a window with three individual panes. The two outside panes are horizontal slider windows. On the second floor there are eighteen glass panel windows, five of which are awning windows. Underneath the row of windows are four unit ventilators.

Remodeling History: Conceptual drawings were made in January 1964, but they were revised prior to the construction of the building. The revised drawings completed in May 1964 were then used in the actual construction of Building TA-21-210.

In February of 1965 modifications were made on both the first and second floors. Modifications consisted of altering room divisions. Also in 1965 a new corridor section (TA-21-312) connecting this new Building, TA-21-210, to a portion of the existing corridor (TA-21-18), that used to connect Building TA-21-2 to TA-21-1, was constructed, so that Building TA-21-210 is now connected to Building TA-21-2.

The ramp on the north dock was constructed in 1967.

Several interior walls were installed dividing some large rooms into multiple rooms between 1977 and 1979. In 1979 a door was installed between two rooms and other minor interior changes were also made.

Between 1979 and 1983 more minor interior modifications were made. In 1983 a window was installed in the southwesternmost room on the first

floor. Interior walls were also added in the southeasternmost room dividing it into several smaller rooms.

Between 1983 and 1996 interior doors between several offices on the first floor were walled up and an interior wall separating two rooms was removed.

From 1997 to 1998 additional interior changes were made which include removal of several wall sections, installation of a wall partition, a new dropped ceiling, removal of a sink, and the modification of a janitors closet into a restroom.

Associated Buildings: TA-21-2, -3, -4, -5, -150, and their connecting corridors (TA-21-312/18, -313, -314, -315, -149) and the rest of DP West. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

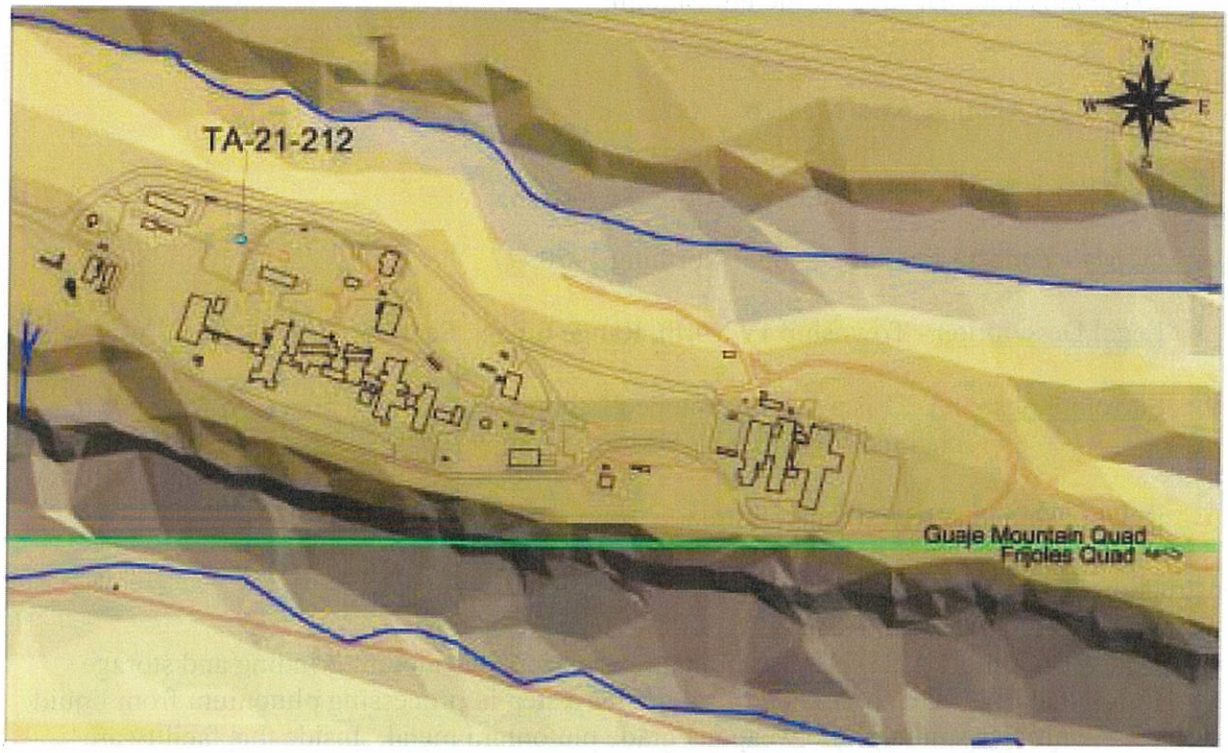
Associated Historic Themes: Plutonium Processing at DP West (1945–1977) and Health and Safety (1945–1977)

Property Type: Administration Building and Laboratory/Processing Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-212 South and East Elevations

TA-21-212

Building Name: TA-21-212
Original Name: DP-212 (Calcium Building)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384665 Northing 3970947

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 9/8/1964 to 12/7/1964

Original Use: Building TA-21-212 was built as a replacement calcium grinding and storage facility. The processing of calcium is a step in processing plutonium from liquid nitrates solution into weapons-grade plutonium metal. Inside this facility are designated areas for a compressor, shaker, grinder, desiccators, and barrels.

Use History: Building TA-21-212 replaced calcium processing facilities in former Buildings TA-21-11 and TA-21-13.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair to Good

Building Description: (See also Appendix C)

Building style - Industrial building, constructed of reinforced concrete and concrete masonry units.

Foundation material - Reinforced concrete slab and footings

Wall material/surface - Concrete masonry units (pumice blocks)

Architectural features - TA-21-212 is a 400-sq-ft concrete masonry unit building with a flat roof that slopes slightly from the south to the north. The roof is constructed of metal roof deck, rigid insulation, and a four-ply built-up roof with metal flashing around the edge.

The east elevation of the building has a set of metal pedestrian double doors. To the south of the doors, along the east wall, there is a metal canopy, attached to the building, over a bottle storage rack area. There is a concrete slab in front of the doors and the bottle rack area.

The south elevation is void of any window or doors, however there are several conduits attached to this side of the building.

In the center of the west elevation there is a single pedestrian metal door with a concrete slab in front.

There are no windows or doors on the north elevation of the building.

Remodeling History: This building does not appear to have had any modifications.

Associated Buildings: TA-21-2, -3, -4, -5, -150 and their connecting corridors (TA-21-312/18, -313, -314, -315, -149) and the rest of DP West. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

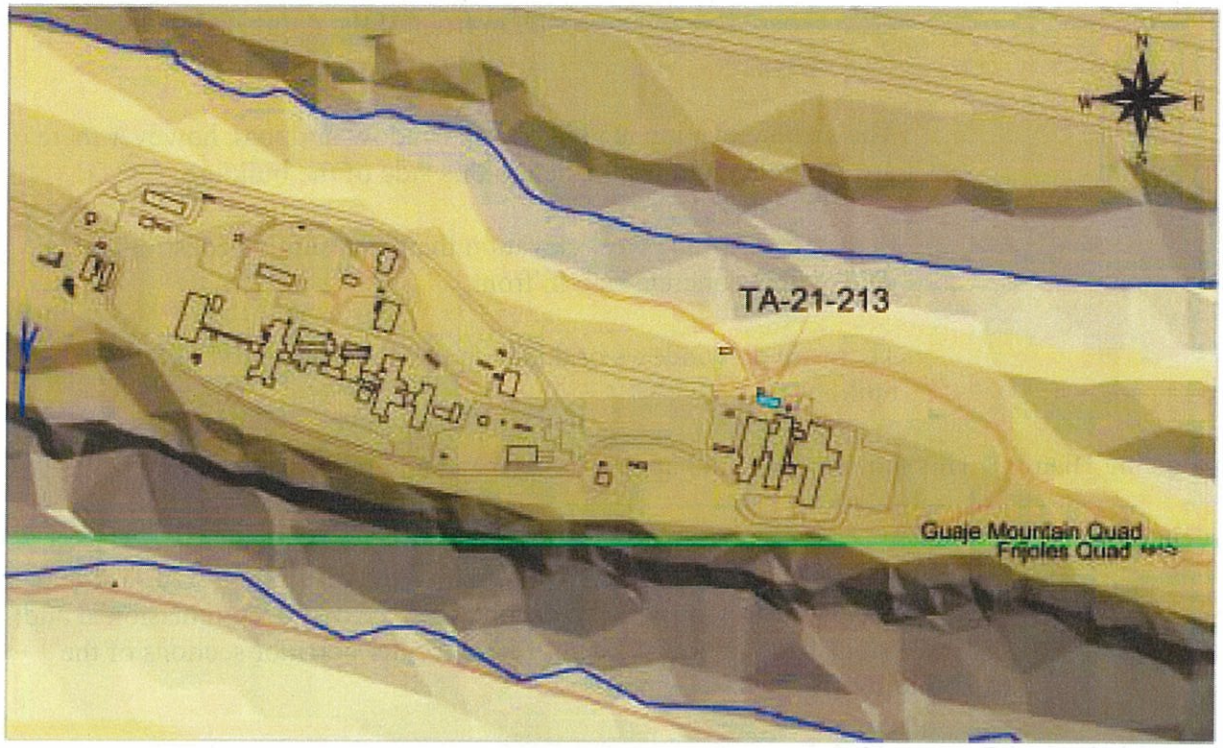
Associated Historic Themes: Plutonium Processing at DP West (1945–1977) and Nuclear Material Stockpile Issues (1945–1977)

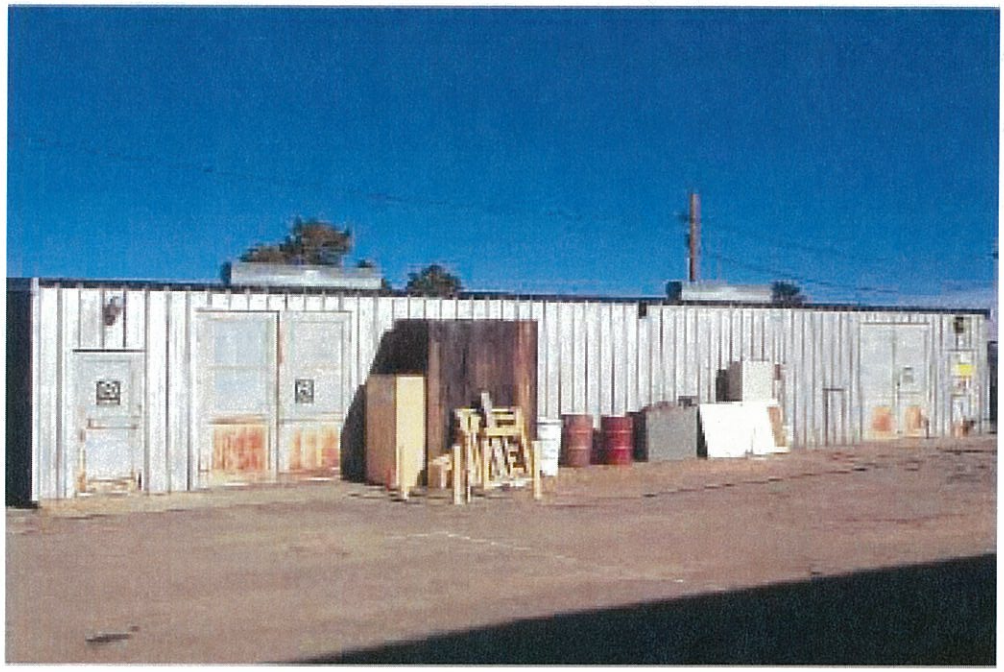
Property Type: Laboratory/Processing Building

Contamination History: No known contamination

Integrity: Good

Eligibility: Eligible under Criterion A





TA-21-213 South Elevation

TA-21-213

Building Name: TA-21-213 Lab Supply Warehouse
Original Name: DP-213 General Warehouse

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385207 Northing 3970774

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/15/1964

Original Use: TA-21-213 was built as a general warehouse.

Use History: TA-21-213 has always been used as a general warehouse.

Use at Time of Survey: TA-21-213 is still being used as a general storage warehouse.

Condition at Time of Survey: Good

Building Description: (see also Appendix C)

Building style - The original building was constructed of a pre-engineered rigid metal frame unit.

Foundation material - Concrete slab with steel footings

Wall material/surface - The walls are pre-engineered ribbed metal panels.

Architectural features - TA-21-213 has a slight pitched metal roof with eight rectangular, translucent roof panels (for light). The roof panels are laid out symmetrically with four panels on each side of the center roof ridge. Two ridge vents are located along the roof ridge.

The only entrances are located on the south elevation of the building. There are two single pedestrian doors located at the east and west ends of the south side of the building. Both of these pedestrian doors are constructed of flush panel steel. Located in-between the two pedestrian doors are two sets of large double doors,

most likely used for the movement of equipment and supplies in and out of TA-21-213. Like the pedestrian doors, the double doors are also made of flush panel steel.

The east, north, and west elevations of the building are void of doors or windows.

Remodeling History: None

Associated Buildings: TA-152, -155, -209, large laboratory buildings in TA-21, DP East

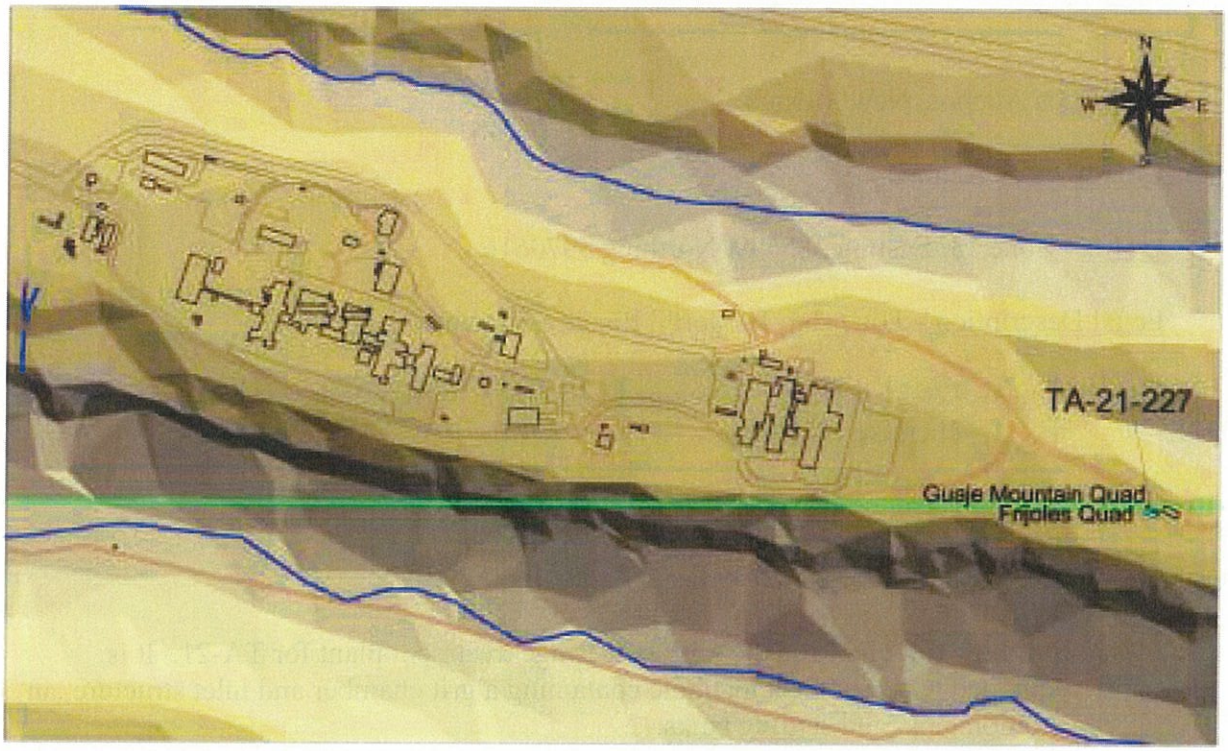
Associated Historic Theme: Non-Weapons Research (1945–1990),
High Temperature Research at DP East (Project Rover)

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Not Eligible



TA-21-227 North and West Elevations

TA-21-227

Building Name: TA-21-227 Sewage Treatment Plant
Original Name: DP-227 Sewage Treatment Plant

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 385599 Northing 3970616

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 7/13/1965 to 2/18/1966

Original Use: Building TA-21-227 is the sanitary sewage treatment plant for TA-21. It is equipped with a control manhole containing a grit chamber and inlet structure, an aeration tank, and settling tanks.

Use History: TA-21-227 has always served as a sewage treatment plant that "treats sanitary wastes and non-contact cooling water from the TA-21 facilities. All of the TA-21 buildings that have sanitary facilities are connected to this sewage treatment plant by sewer lines" (LANL 1990).

Use at Time of Survey: Building TA-21-227 is still used as a sewage/wastewater treatment plant.

Condition at Time of Survey: Fair to good

Building Description: (see also Appendix C)

Building style - TA-21-227 is constructed of corrugated aluminum siding. Concrete masonry units were used to construct the below-ground-level basins.

Foundation material - concrete base and base plate

Wall material/surface - The exterior walls are made of corrugated aluminum siding.

Architectural features - TA-21-227 is an approximate 600-sq-ft metal building with a metal roof, two metal doors, a propeller fan, a gravity closing louver, and a translucent wall.

On the north elevation of TA-21-227 are two metal pedestrian doors.

There is a propeller fan located along the east elevation. Also visible from the east end are the settling tanks, which are concrete structures, covered with aluminum grating that has been painted blue.

The south elevation of TA-21-227 is constructed of lasolite translucent panels.

On the west elevation of the building there is a gravity closing louver.

Remodeling History: In 1977 plans were devised to remove all existing pipe handrail and to relocate an existing 5-in. cast iron pipe from the west end of aeration area to the east end. The remodeling also included plans to construct a 2-ft by 4-ft building with corrugated siding over the existing sewage plant walls. Electrical service was to be provided to the new building from the existing compressor building.

In 1990 several other alterations/upgrades were made to the sewage plant system and various new equipment and materials were also installed. The triangular portion of the grating over the aeration area was removed along with the guardrail in this area as well as the guardrail along the east side of the aeration area. Grating was added along 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.

Associated Buildings: TA-21-229, -230, -387, and the rest of TA-21

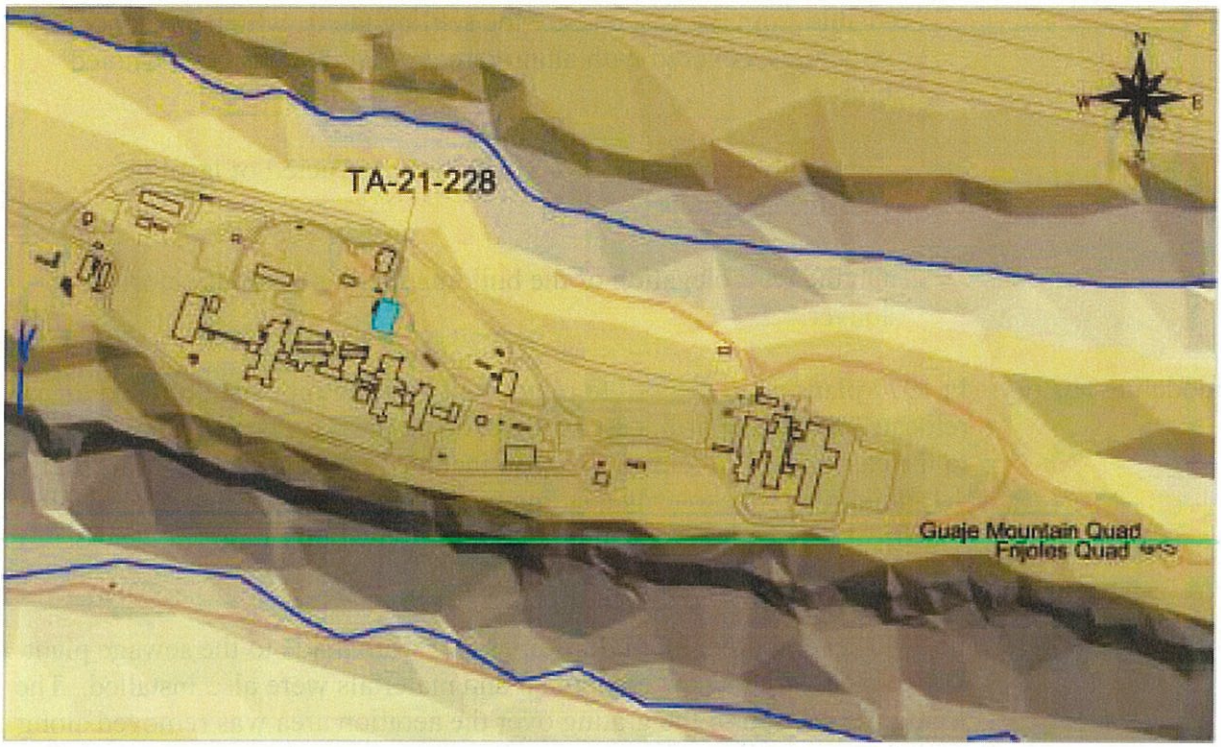
Associated Historic Themes: Plutonium Processing at DP West (1945–1977);
Uranium Processing and Recovery at DP West (1950s–1984);
Initiator Research and Development at DP East (1945–1955);
Nuclear Material Stockpile Issues (1945–1977);
Non-Weapons Research (1945–1990),
Nuclear Chemistry at DP West (Americium-241),
Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels), and
High Temperature Research at DP East (Project Rover);
Health and Safety (1945–1977)

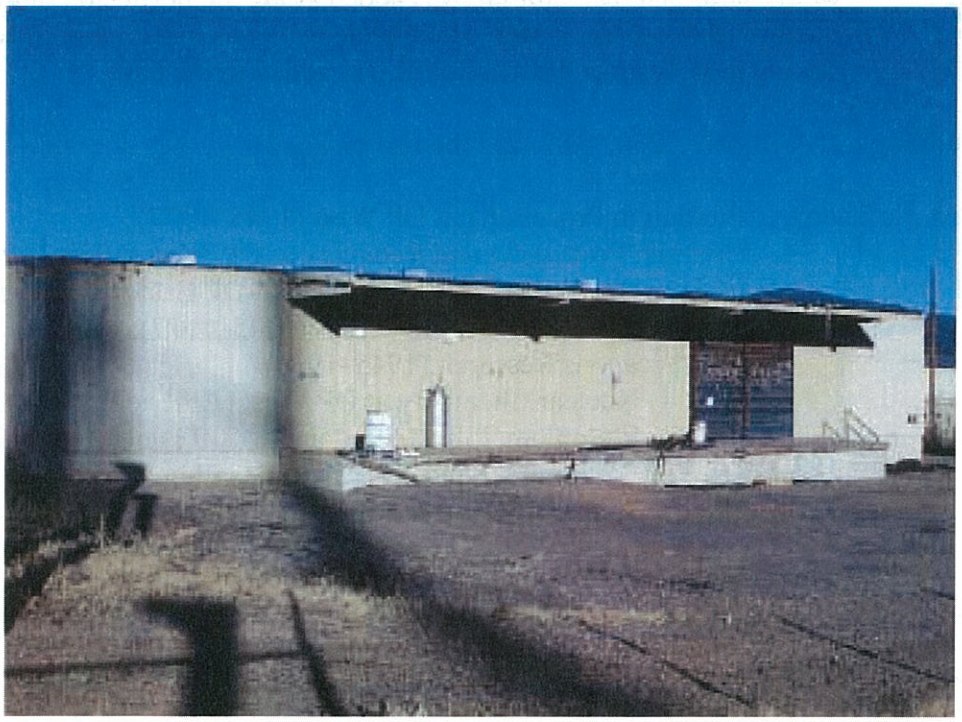
Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Tritium

Integrity: Excellent

Eligibility: Not Eligible





TA-21-228 East Elevation

TA-21-228

Building Name: TA-21-228
Original Name: DP-228 (Replacement Warehouse)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384816 Northing 3970864

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1/4/1966 to 7/10/1966

Original Use: Building TA-21-228 was originally designated as a replacement warehouse.

Use History: Building TA-21-228 has served as a replacement warehouse. It is currently identified as a general storage facility.

Use at Time of Survey: TA-21-228 is abandoned.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - TA-21-228 is a low-profile, pre-engineered rigid frame industrial building. The building has a slightly pitched roof with ten rectangular, translucent roof panels on it. The five pairs of roof panels lie to the east and west sides of the roof ridge. There are also three gravity ventilators located on the ridge of the roof.

Foundation material - Concrete slab, footings, and stem walls

Wall material/surface - The exterior walls are constructed of metal wall panels with purlin wall bracings and grade beams. The interior side of the outer walls is covered with plastic-coated batt insulation. The interior room walls and doors are made of 8-ft woven wire fencing material.

Architectural features - The building measures 5,956 sq ft and is a single-story structure with a height of 14 ft. TA-21-228 has a low-sloping metal pitched roof.

There are also metal pedestrian doors, sliding doors, and a loading dock.

There are no windows, doors, or other defining features on the north elevation of TA-21-228.

The east elevation of the building has a small staircase that leads up to a concrete loading dock and a pair of metal sliding doors. The steps are located near the northeast end of the building, on the north end of the loading dock. The dock extends approximately 60 ft along the east side of the building. A 10-ft overhead metal canopy extends over the length of the loading dock.

In the center of the south elevation of TA-21-228 is a set of metal double doors. Over the doorway there is a 10-ft metal canopy.

At the north end of the west elevation there is a staircase that leads up to a concrete landing and a metal pedestrian door (the entrance into the small equipment room). This room can only be accessed from this door.

Remodeling History: January 1965 engineering drawings of TA-21-228 show the building located to the west of TA-21-12 (which was removed in 1973). It also depicts the sliding door and loading dock on the west side of the building. The original floor plan also designated eleven rooms, including hallways.

In May of 1965, another set of engineering drawings was made in which TA-21-228 was depicted as being located on the east side of TA-21-12. In these drawings the sliding door and loading dock were placed on the east side of the building and on the northwest side is a staircase leading to a pedestrian door, which opened into a small equipment room that was only accessible from the outside. This set of drawings indicated that twelve rooms, including hallways were to be constructed in TA-21-228.

The May 1965 drawings are stamped as-built, dated 4-1-66. A floor plan dated three days after construction of the building was completed (July 13, 1966) shows several of the doors opening in the opposite direction as shown on earlier plans. By 1984 all interior, woven wire-fencing partitions were removed creating a single large storage room.

Associated Buildings: TA-21-286, another similar type warehouse building built two years later, and the actual plutonium processing buildings, TA-21-2, -3, -4, -5, and -150.

Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

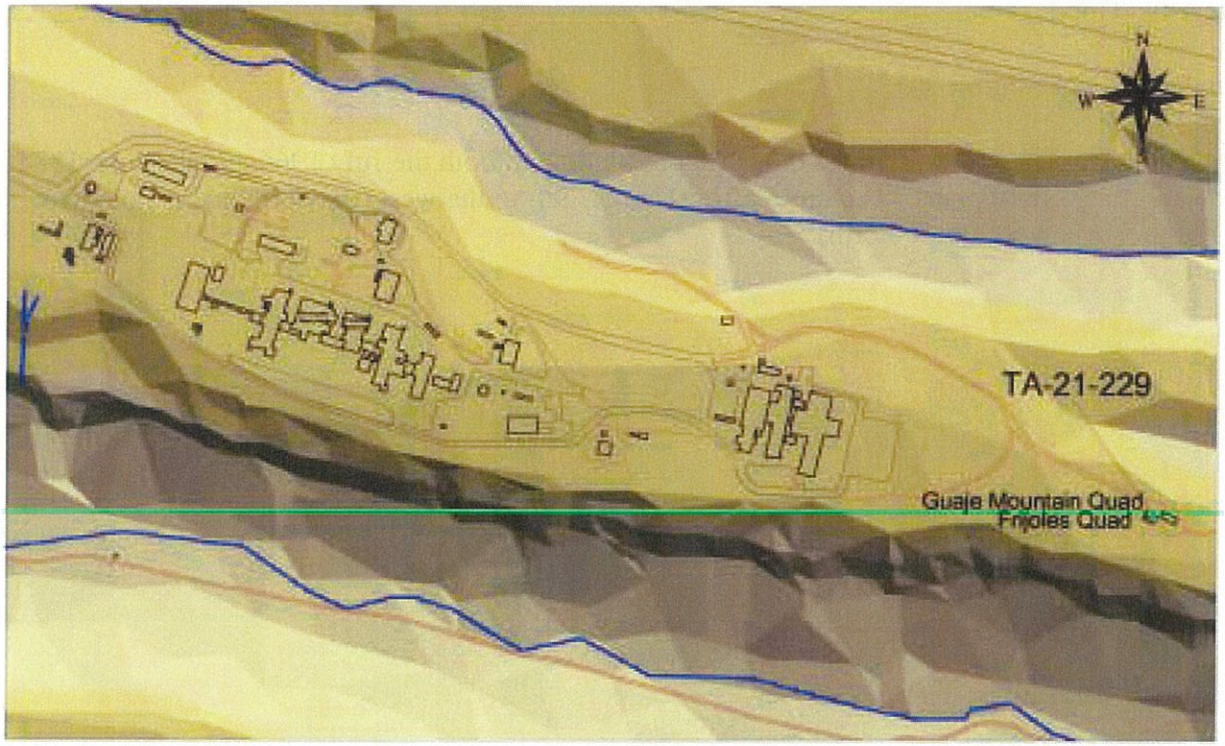
Property Type: Support Building

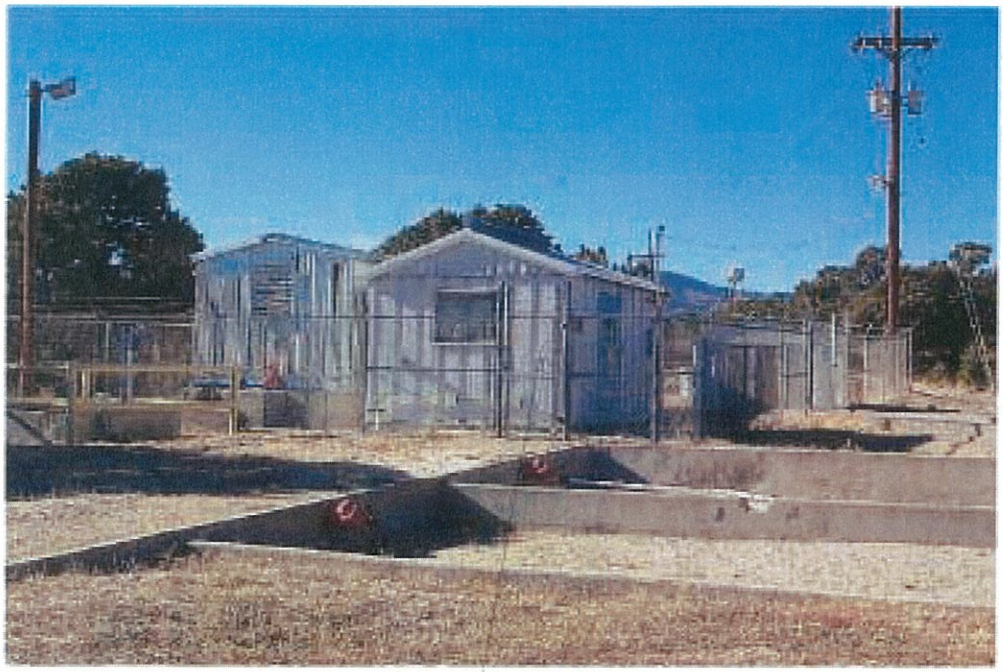
Contamination History: None

Integrity: Good

Eligibility: Not Eligible

Special Note: There is an error in the north orientation on both the July 1966 and the June 1984 floor plans. The north arrows are off 90° to the west (the north arrow points to west, not to north).





TA-21-229 East and North Elevations

TA-21-229

Building Name: TA-21-229 Control Building
Original Name: DP-229 (Control Building)

Location:

City - Los Alamos, New Mexico

County - Los Alamos 13 Easting 385605 Northing 3970617

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 7/13/1965 to 2/18/1966

Original Use: The original Building TA-21-229 is the control or mechanical building for the sewage treatment plant. The building contains two blowers, a spray pump, a low-pressure backflow preventer crane, a froth spray pump, and other equipment.

Use History: TA-21-229 always has served as the control building to the sewage treatment plant.

Use at Time of Survey: Building TA-21-229 is still used as the control building for the TA-21 sewage treatment plant.

Condition at Time of Survey: Fair to good condition

Building Description: (see also Appendix C)

Building style - The building is constructed of ribbed metal siding.

Foundation material - Concrete slab and footings

Wall material/surface - The exterior walls are ribbed metal siding.

Architectural features - TA-21-229 is a 192-sq-ft metal building with a concrete sidewalk surrounding the entire building. On the metal pitched roof there is a 4-in. ridge ventilator. The building also has two horizontal slider windows and one metal door.

The only entrance into the building is on the north elevation. It is a hollow metal pedestrian door with a glass window covered with a metal screen.

The east elevation of the building has an aluminum frame, horizontal slider window. Also visible from the east elevation is the ridge ventilator. The ventilator extends along the roof ridge from the east to west end of the building.

There are no windows or doorways located on the south elevation of TA-21-229.

On the west elevation there is an aluminum frame, horizontal slider window similar to the one on the east side of the building.

Remodeling History: The windows located on the east and west elevations were possibly replaced sometime between the time the building was constructed in 1966 and the present. The original drawings of TA-21-229 indicate the two windows were designed as each being fixed windows with six individual glass panes and exterior screens. Photographs of TA-21-229, taken in 1998 during the site survey visit, however, show both windows as two individual glass paned horizontal slider windows with aluminum frames.

Associated Buildings: TA-21-227, -230, -387 and the rest of TA-21

Associated Historic Themes: Plutonium Processing at DP West (1945–1977);
Uranium Processing and Recovery at DP West (1950s–1984);
Initiator Research and Development at DP East (1945–1955);
Nuclear Material Stockpile Issues (1945–1977);
Non-Weapons Research (1945–1990),
- Nuclear Chemistry at DP West (Americium-241 Research),
- Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels),
- High Temperature Research at DP East (Project Rover); and

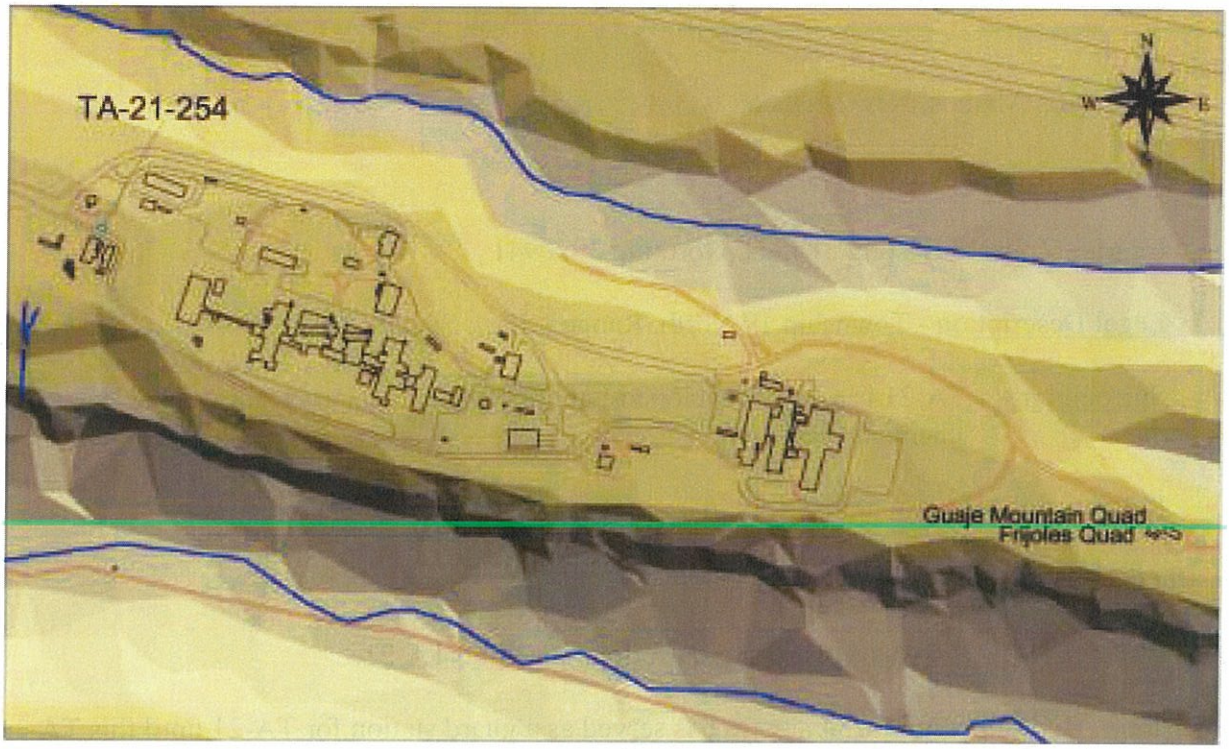
Health and Safety (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Tritium

Integrity: Excellent

Eligibility: Not Eligible



TA-21-254 West and South Elevations

TA-21-254

Building Name: TA-21-254
Original Name: DP-254

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384524 Northing 3970941

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility.)

Relationship to surroundings - Similar

Construction Date: 3/21/1966 to 6/29/1966

Original Use: TA-21-254 was a guard station for entrance into TA-21.

Use History: Building TA-21-254 always has served as a guard station for TA-21 until this TA became an open TA in the mid-1990s.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair

Building Description: (See also Appendix C)

Building style - TA-21-254 is a 113-sq-ft pre-engineered, industrial style, steel tube frame structure with glass and cemesto panels.

Foundation material - Reinforced concrete pad and footings

Wall material/surface - Steel tube frame column and beam frame with cemesto in-fill panels and solar gray tint glass window panels

Architectural features - TA-21-254 is situated on an "island" pad between the two traffic lanes for entering and exiting the TA-21 facility.

The building has a sloped roof made of metal decking and built-up roofing material. The roof overhangs the building on all sides. There are four floodlights mounted at each corner on the roof. Towards the front, or west end of the building, there is an antenna

on the roof. Inside the building there is the main station area and in the southeast corner a restroom.

On the west elevation there are two side by side windows and four cemesto panels, one above and below each window panel.

There is a hollow metal pedestrian door with a wire glass window located on the north elevation. There are also three glass window panels and seven cemesto panels on this elevation.

The east elevation is comprised of three cemesto panels. Above the panels are three glass window panels.

On the south elevation there is a hollow metal pedestrian door with a wire glass window, three glass window panels, and seven cemesto panels.

Remodeling History: TA-21-254 does not appear to have been remodeled.

Associated Buildings: TA-21-210 and the rest of TA-21 that lies behind the security fences.

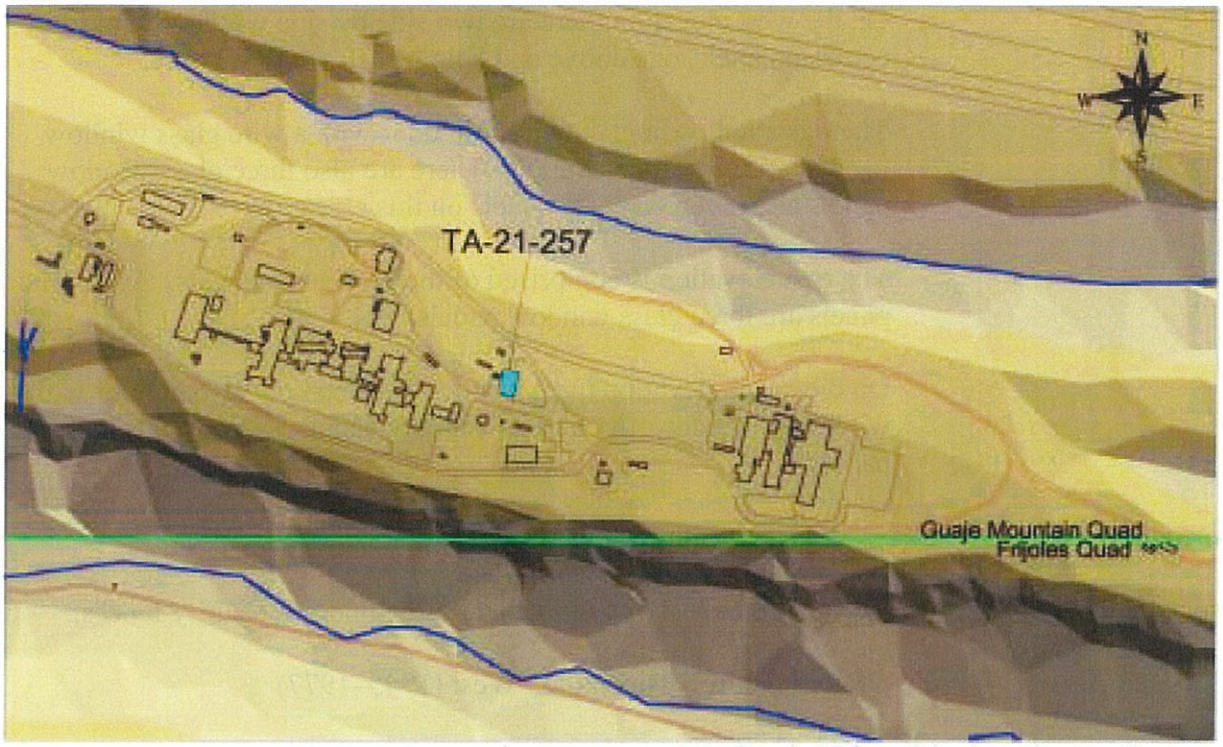
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Security/Guard Station Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-257 West and South Elevations

TA-21-257

Building Name: TA-21-257 Radioactive Liquid Waste Disposal Facility
Original Name: DP-257 (Contaminated Waste Disposal Facility)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384942 Northing 3970795

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar to other support buildings for the TA-21 plutonium facility.

Construction Date: 7/15/1966 to 8/22/1967

Original Use: TA-21-257 is a contaminated waste disposal facility. It contains raw waste storage areas, sludge storage, settling tanks, batch waste storage, pumping stations, a flocculator, and a filter sump.

Use History: TA-21-257 has always served as a contaminated (radioactive) liquid waste disposal facility. It also contains a stock room, pug mill, maintenance area, laboratory, change room, process area, pits, lockers, and a janitor's closet. Related, but not contained within the actual building, are four acid storage tanks (TA-21-110, -111, -112, and -113).

Use at Time of Survey: Currently, TA-21-257 is still used as a radioactive waste disposal facility.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Industrial, single-story concrete masonry unit building. It contains treatment and holding tanks and pumping stations. Many components of TA-21-257 are located exterior of the building. Such components include storage tanks, fans, stacks, and pumps.

Foundation material - Reinforced concrete slab, stem walls, and footings

Wall material/surface - Concrete masonry units

Architectural features - TA-21-257 is a 3,940-sq-ft single-story building with a flat roof constructed of built-up roofing material.

On the north elevation of TA-21-257 there is a horizontal slider window. There are also concrete steps that go down to a concrete pad, at ground level, that has exposed piping and equipment.

There are two horizontal slider windows along the east elevation. In between the two windows there are gas cylinders located under a metal awning. Further southward along the east elevation there is a metal ladder leading to the roof. There is a louver at the south end of the east wall.

Along the south elevation there is a set of hollow metal pedestrian double doors. One of the doors is equipped with a vent on the lower portion of the door. Also located on the south elevation there are several conduits and pipes. West of the conduits there is a set of large hollow metal double doors. Each door has a wire glass window. At the west end of the south elevation there is an awning-type window.

On the west elevation of the building there are two hollow metal pedestrian doors with wire glass windows. Attached to the west wall is a ribbed metal lean-to. The lean-to is set on four metal columns, which are connected to a concrete pad. Within the lean-to there are several tanks. There are four acid storage tanks, TA-21-110, -111, -112, and -113 that are outside TA-21-257, but are related to the building. These tanks are located to the west of TA-21-257.

Remodeling History: In 1969, the jib crane located south of TA-21-257 was removed so that the west and south walls of the south elevation could be extended outward. This made the west end of the south elevation flush with the east end.

Minor window and door modifications were made in 1977.

Containment reservoirs and tanks were replaced in 1978.

Plans for a vacuum filter were compiled in 1979, but installation did not occur until 1981.

Associated Buildings: TA-21-110, -111, -112, -113 (acid tanks) and the rest of TA-21

Associated Historic Theme: Plutonium Processing at DP West (1945–1977);
Uranium Processing and Recovery at DP West (1950s–1984);
Initiator Research and Development at DP East (1945–1955);
Nuclear Material Stockpile Issues (1945–1977);

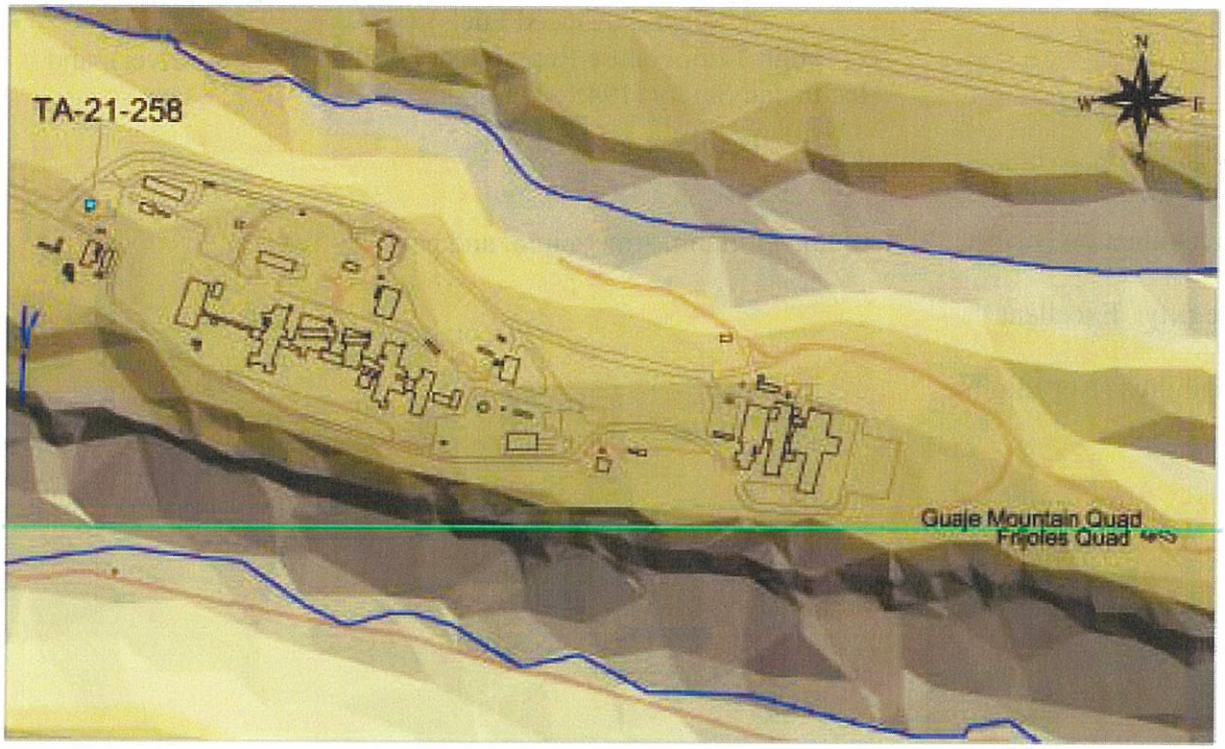
Non-Weapons Research (1945–1990),
Nuclear Chemistry at DP West (Americium-241 Research),
Plutonium-238 and Plutonium-239 Fuels (Space Heat Sources and other Advanced Fuels),
High Temperature Research at DP East (Project Rover); and
Health and Safety (1945–1977)

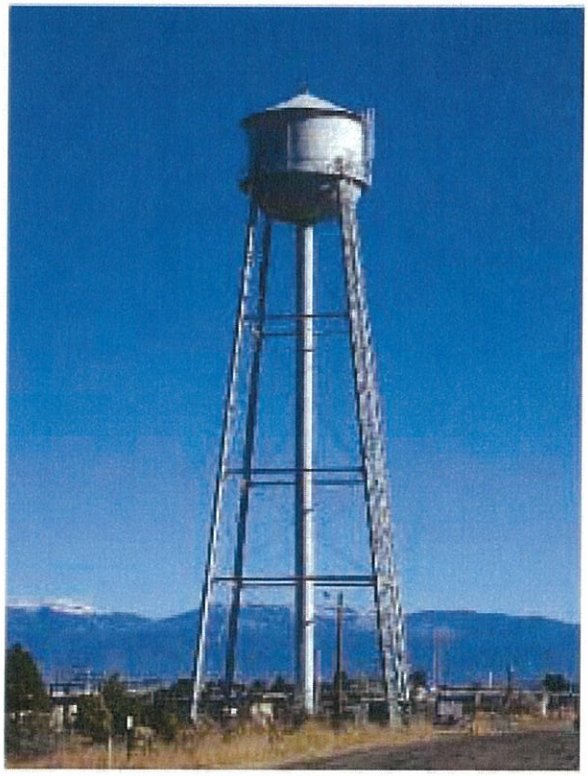
Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and possibly Tritium

Integrity: Excellent

Eligibility: Not Eligible





TA-21-258 West Elevation

TA-21-258

Building Name: TA-21-258 Elevated Water Reservoir
Original Name: TA-1-132

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384515 Northing 3970970

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 10/1/1948 to 12/3/1948. This elevated water reservoir (TA-21-258) was originally constructed at TA-1, the original site of the Laboratory during World War II. According to the engineering drawing (C-45876), the Pittsburg – Des Moines Steel Company manufactured TA-21-258 in 1941, however, it was not constructed at Los Alamos until the end of 1948.

Original Use: This elevated water reservoir (TA-21-258) was originally constructed at TA-1, the original site of the Laboratory during World War II. In TA-1 the water reservoir was designated as TA-1-132. The main Laboratory buildings during the war were around Ashley Pond in what is now the Los Alamos townsite.

Use History: TA-21-258 (formerly TA-1-132) has always served as an elevated water reservoir. In 1966 the reservoir was dismantled and moved to its current location at TA-21 on DP Mesa.

Use at Time of Survey: Structure TA-21-258 is still functioning as a water reservoir for TA-21.

Condition at Time of Survey: Fair to good condition

Building Description: (see also Appendix C)

Building style - The elevated water reservoir is a 100,000-gallon steel tank with a spherical bottom and conical removable cover that is mounted 150 ft above ground level on one center column leg (stand pipe) and four support legs. TA-21-258 contains an altitude valve and floor drain. All motor breakers, switches, and other electrical equipment are bonded to the building grounding system. The reservoir's legs and center column are mounted on individual concrete slabs.

Foundation material - Concrete slab and footings

Wall material/surface - The reservoir walls are made of steel riveted steel plates.

Architectural features - TA-21-258 is a cylindrical elevated water reservoir with a conical top and spherical bottom. The conical top is equipped with a lifting bar. There is a flashing beacon located at 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 lanyard type, which can be lowered to the ground for maintenance and bulb changes.

There is a safety ladder located on the southwest support leg.

The tower and reservoir are currently painted a light gray/blue color.

Remodeling History: Prior to 1966, the water tank had been located in TA-1 near Ashley Pond in what is now the Los Alamos townsite. From September 25, 1966, to November 3, 1966, it was relocated to TA-21 and redesignated structure TA-21-258.

Requirements of the relocation process included that all new underground piping was to be class ISO mechanical joint cast-iron. It was to be located in the concrete valve house (TA-21-259) adjacent and connected to the concrete base for the standpipe. Also, there had to be electrical service to operate the condensate pump, aircraft warning lights, and cathoding protection. Additionally, the top of the reservoir was fitted with three ¾-in. rods for bracing, and two 100-watt marker lights were located on each support leg. Lastly, a tank disinfection procedure was performed before the structure could be used at its new location.

The tank, standpipe, and support legs were painted in a checkerboard pattern to conform to Federal Aviation Administration requirements using aviation "orange" (red) and white colors.

In 1990, all existing obstruction lights were removed from the support legs and compression struts and lanyard type aeronautical obstruction lights were added. Guide wire was used to mount the water tower to the concrete base. Rain-tight covers and flex conduits were built into new light fixtures. Before 1990, TA-21-258 had been painted red and white. In 1990 the structure was repainted solid in a gray-blue color.

Associated Buildings: TA-21-259 the concrete valve house associated with the water reservoir and the rest of the buildings at TA-21, which this water reservoir serves.

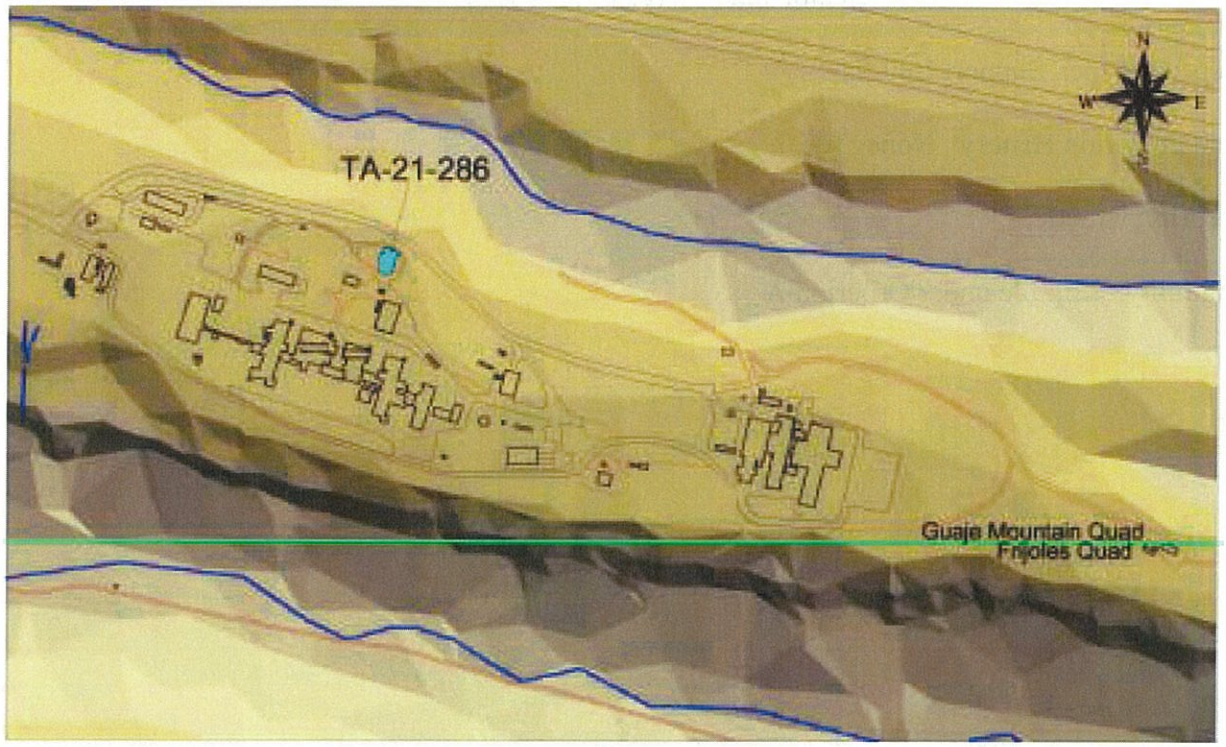
Associated Historic Themes: Plutonium Processing at DP West (1945–1977) and Health and Safety (1945–1977)

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Eligible under Criterion A



TA-21-286 East Elevation

TA-21-286

Building Name: TA-21-286 Hot Storage Replacement Warehouse
Original Name: DP-286 (Hot Storage Replacement Warehouse)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384817 Northing 3970921

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 5/7/1968 to 12/3/1968

Original Use: TA-21-286 was constructed as a hot storage replacement warehouse.

Use History: TA-21-286 has always served as a "hot" storage replacement warehouse (plutonium storage vault) at the TA-21 plutonium facility.

Use at Time of Survey: Abandoned, but some original shelving and vault doors still exist.

Condition at Time of Survey: Fair to good condition

Building Description: (see also Appendix C)

Building style - TA-21-286 is a pre-engineered, rigid steel frame building with a pitched roof and concrete masonry unit addition on the west elevation. The building is approximately 3,338 sq ft.

Foundation material - Concrete slab, piers, and footings

Wall material/surface - The exterior walls are made of steel siding and galvanized wainscot. The interior surface of the building walls consists of blanket insulation, covered by gypsum board. Six of the seven interior rooms are designated by 8-ft chainlink fencing material. The seventh room is delineated by metal studs with gypsum board on both sides of the metal wall studs.

Architectural features - TA-21-286 has a pitched galvanized steel roof with galvanized flashing. There are roof canopies on the center portion of the building, covering the docks on both the east and west elevations of

the building. Steps leading up to the docks, which are 2 ft 6 in. above the ground surface, are at the south end of the docks.

The building is composed of seven rooms, six storage rooms and one small room, at the southeast corner of the building, designated as a mechanical room. The rooms can only be accessed from exterior entrances, there are no interconnecting doorways between rooms.

The north elevation is devoid of doors and windows.

The east elevation has a concrete dock area along the center portion of this side and three sets of hollow metal double pedestrian doors.

The south elevation is also devoid of windows and has only a single pedestrian door that leads to the small mechanical pit room.

On the west elevation there is an approximate 300-sq-ft concrete masonry unit addition. This room is an air lock for two of the six internal storage rooms. This room encloses two of the three double door entrances on this side of the building. Entrance into the air lock is by double doors on the south side of the addition.

Remodeling History: In 1973 a concrete masonry unit and rebar addition was added to the west elevation of the building on the concrete dock, under the roof canopy. This room became an air lock for two of the rooms (Room 1 and Room 5). The entrance into the air lock is a set of hollow metal double pedestrian doors on the south elevation of the addition. Also at this time the chainlink fence walls of one of the rooms, accessed through the air lock, were made into permanent solid walls constructed of metal wainscot, with blanket insulation, and gypsum board over the metal lath frame. Additionally, various other mechanical and fire protection systems were also upgraded at this time.

Associated Buildings: TA-21-228, another similar type warehouse building built two years earlier and the plutonium processing buildings, TA-21-2, -3, -4, -5, and -150 and corridors TA-21-312/18, -313, -314, -315, and -149. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

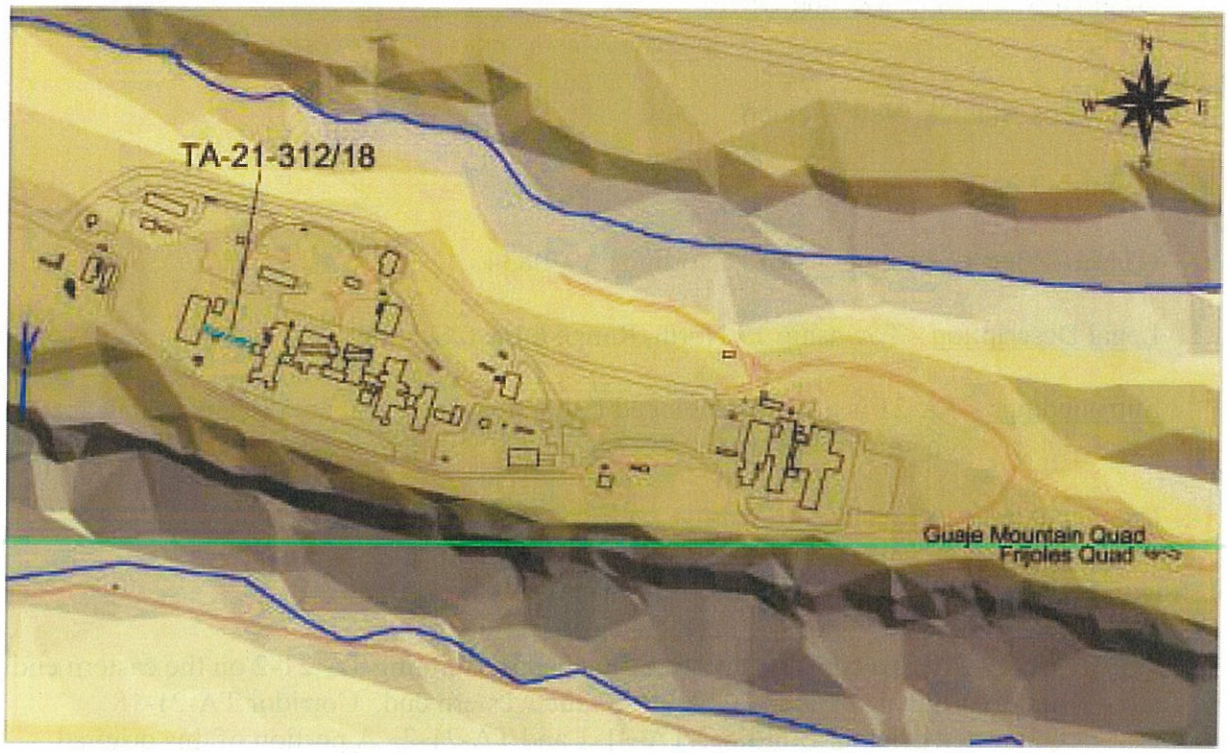
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

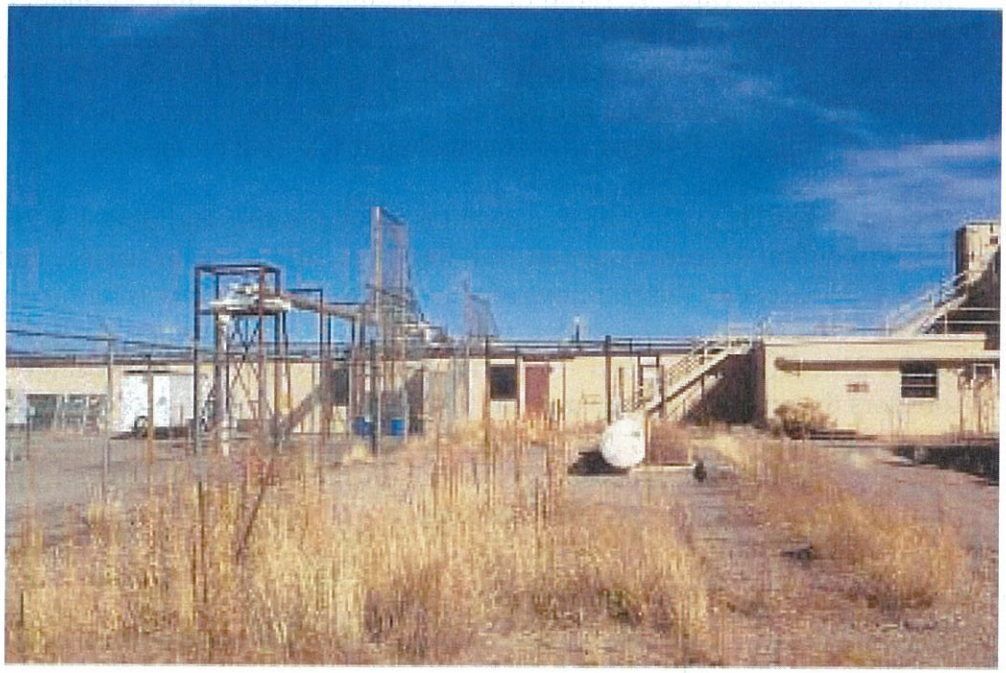
Property Type: Security Building

Contamination History: Plutonium, Uranium, and Americium

Integrity: Excellent

Eligibility: Eligible under Criterion A





TA-21-312/18 South Elevation

TA-21-312 and TA-21-18

Building Name: TA-21-312 and TA-21-18
Original Name: DP-312 and DP-18

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384681 Northing 3970834

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1971 TA-21-312 portion, 1945 TA-21-18 portion

Original Use: TA-21-312 is a corridor structure attached to Building TA-21-2 on the eastern end and to original corridor TA-21-18 on the western end. Corridor TA-21-18 connected original Buildings TA-21-1 and TA-21-2. A portion of this original corridor (TA-21-18), which was constructed in 1945, was demolished and removed. Approximately 180 ft of new concrete masonry unit corridor (TA-21-312) was built in 1971, after the construction of Building TA-21-210 in 1965. It was attached on the west end to 60 ft of original corridor (TA-21-18). Together, the two portions of corridor provide access between Buildings TA-21-210 and TA-21-2, Building TA-21-210 on the west and TA-21-2 on the east.

Use History: TA-21-312 has always served as a corridor for connecting Building TA-21-210 (the "Plutonium Research Support Building" – an office administrative building) and TA-21-2 (one of the buildings of the main plutonium processing facility). As well as being a personnel corridor, piping for utility lines that service Buildings TA-21-210, -2, -3, -4, -5, and -150 run through this corridor like all of the corridors that connect the separate buildings in the plutonium processing facility.

Use at Time of Survey: Abandoned. This corridor is still operable but is not utilized since Building TA-21-2 is abandoned.

Condition at Time of Survey: Fair to good

Building Description: (See also Appendix C)

Building style - Industrial style structure that was originally constructed of concrete masonry units and a wood roof (TA-21-18). The 1971 replacement (TA-21-312) was

constructed to match the remaining portion of the original corridor, except that the roof was constructed of structural steel and built-up roofing material and gravel. At this time the original wood roof on the TA-21-18 section remaining was replaced with a metal roof deck.

Foundation material - Concrete slab and footings

Wall material/surface - Concrete masonry units

Architectural features - There are several rooms constructed off the south elevation of the corridor. One of these has been given a separate building number designation (TA-21-328) and several have been designated as part of the corridor itself and have been given room numbers associated with the corridor. These rooms are designated as an electrical equipment room and a monitoring room.

A portion of this corridor has a second story. Exhaust fans and filter houses are located on the roof of the north end. These are constructed of metal panels secured to a steel frame with hidden fasteners. Two steel stairways provide access to the roof, and pipe guardrails surround the roof.

The original portion of the corridor, TA-21-18, is constructed of a steel frame with concrete masonry units between the structural steel frame. There are many utility lines located along the roof of the structure, and utility piping and conduits run in the ceiling space.

On the south elevation of the corridor there are four single-paned windows with in-fill panels above and below the window glass, and two louvers. West, towards Building TA-21-210, there is a single metal pedestrian door and two single-paned windows, the height of the door, immediately west of the door. Inside the internal security fence around Buildings TA-21-2, -3, -4, and -5, continuing along the south elevation of the corridor there is a louver and a small, concrete landing with two steps and a metal pedestrian door that leads into the corridor. The equipment room addition is located adjacent to Building TA-21-2 on the east side. On the south elevation of this addition there is a set of metal double doors with small wire glass windows and a three-paned sash-type window. On the west side of the addition there is a single metal pedestrian door and a set of metal double doors with small wire glass windows.

On the north elevation of the corridor there are a total of seven single-paned windows with in-fill panels above and below the window glass, and three louvers. One of the windows has been covered with a board. West, towards Building TA-21-210, there is a single metal pedestrian door and two single-paned windows, the

height of the door, immediately west of the door. This door and windows are directly across from the door and windows on the south elevation of the corridor. Also on this elevation, like on the south side of the corridor, inside the internal security fence, there is a small, concrete landing with two steps and a metal pedestrian door that leads into the corridor.

At the east and west ends of the corridor there are metal double doors where the corridor connects to the buildings.

Remodeling History: The eastern end of the original corridor between Buildings TA-21-2 and the original TA-21-1 was replaced with a new corridor section numbered TA-21-312. The replacement corridor section was constructed to match the existing portion of the corridor. The wooden roof on the original TA-21-18 portion of the corridor was replaced with built-up roofing material and gravel. The HEPA filter plenums and exhaust system was upgraded in 1972.

Associated Buildings: TA-21-2, -3, -4, -5, -150, -210 and connecting corridors -313, -314, -315, and -149. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

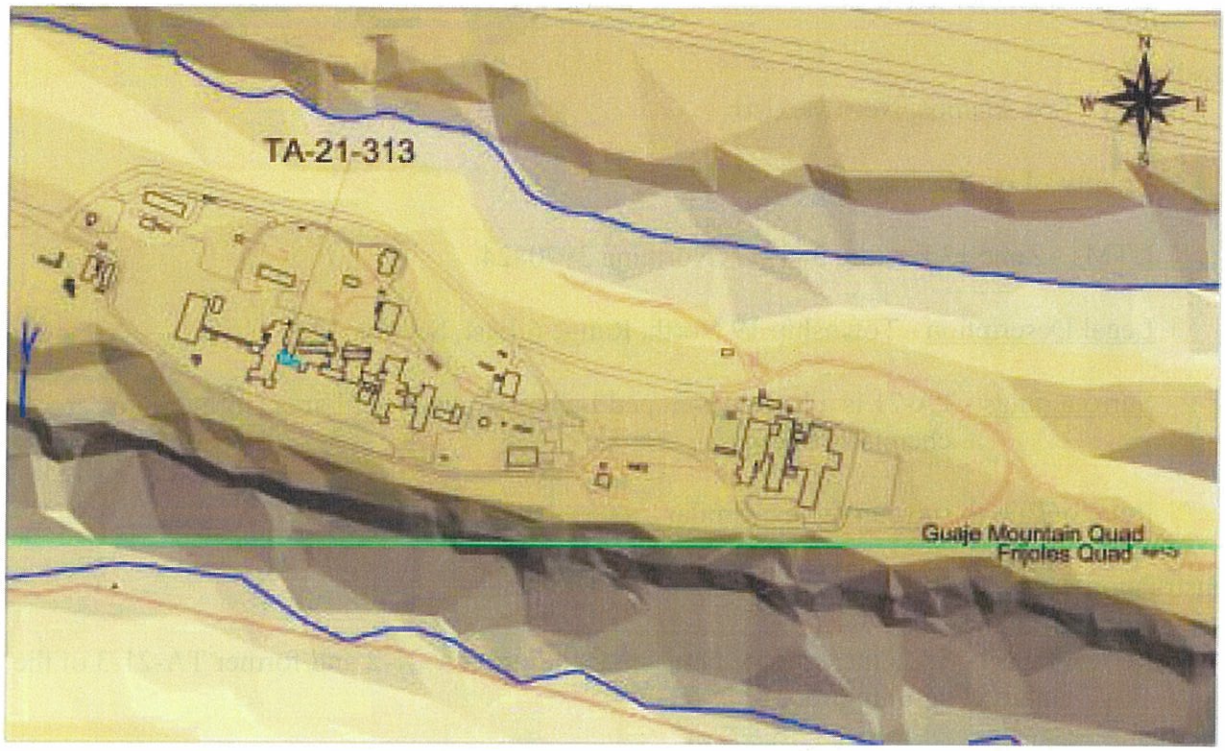
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

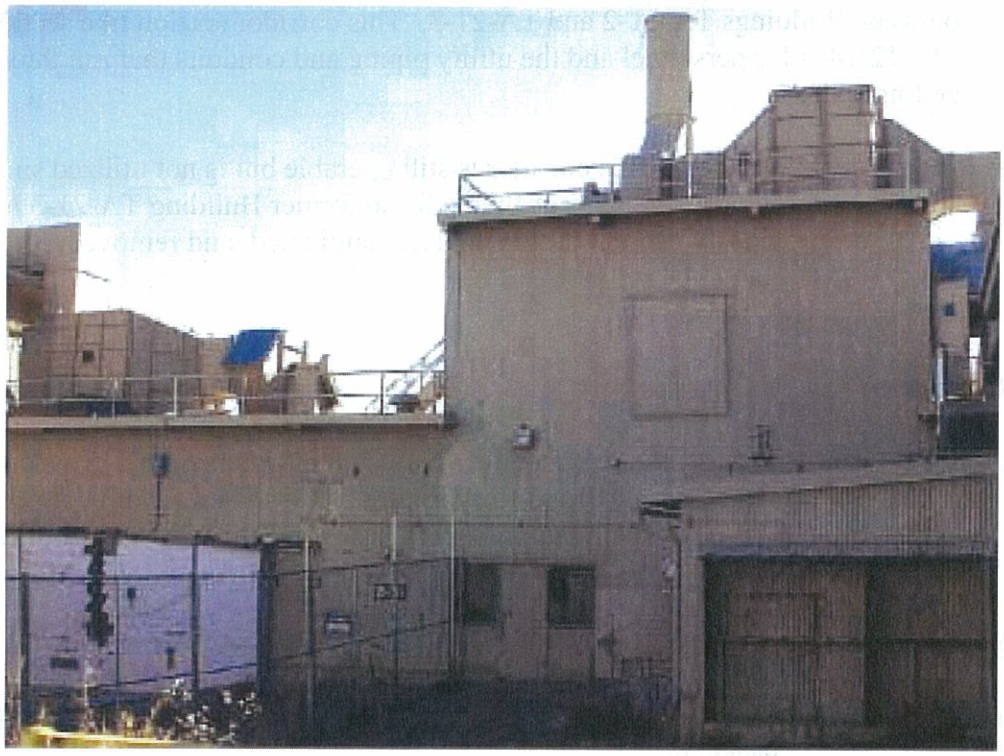
Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Not Eligible





TA-21-313 North Elevation

TA-21-313

Building Name: TA-21-313
Original Name: DP-313

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384711 Northing 3970824

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility.)

Relationship to surroundings - Similar

Construction Date: 1971

Original Use: TA-21-313 is the corridor between Buildings TA-21-2 and former TA-21-3 of the main plutonium processing facility.

Use History: TA-21-313 is the replacement corridor for corridor TA-21-15, the original corridor between Buildings TA-21-2 and TA-21-3. This corridor section like section TA-21-312/18 is for personnel and the utility piping and conduits that run through the ceiling space.

Use at Time of Survey: Abandoned. This corridor is still operable but is not utilized since Building TA-21-2 is abandoned and former Building TA-21-3 has been previously decommissioned, decontaminated, and removed.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Industrial, steel frame structure with insulated metal siding. This corridor section has a partial second story referred to as the mezzanine or penthouse (high bay area). The metal roof deck is covered with built-up roofing material and gravel.

Foundation material - Concrete slab and footings

Wall material/surface - Steel frame with insulated metal siding panels attached with hidden fasteners

Architectural features - Corridor TA-21-313 connects to Building TA-21-2 on the west end and former TA-21-3 on the east end. There are metal double doors where the corridor connects to the buildings.

There are several rooms constructed off of the south elevation of the corridor that have been designated as part of the corridor and have been given room numbers associated with the corridor. These rooms include a mechanical equipment room, an electrical equipment room, telephone cabinet, janitor's closet, and a restroom.

On the south elevation there are two sets of double doors, a single pedestrian door, and a steel stairway leading up to the two levels of the roof. There is a pipe railing along the stairway that surrounds the roof edge. Fan equipment, ductwork, filter houses, and an exhaust stack are located on the roof. Access into the high bay area is gained from the lower roof level. On the south elevation of the high bay area there is a set of metal double doors.

On the north elevation there is a metal pedestrian door between two single-pane windows on the ground level, and on the high bay area there is a set of metal double doors.

Remodeling History: The HEPA filter plenums and exhaust system were upgraded in 1972.

Associated Buildings: TA-21-2, -3, -4, -5, -150, -210, and corridors -312/18, -314, -315, and -149. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

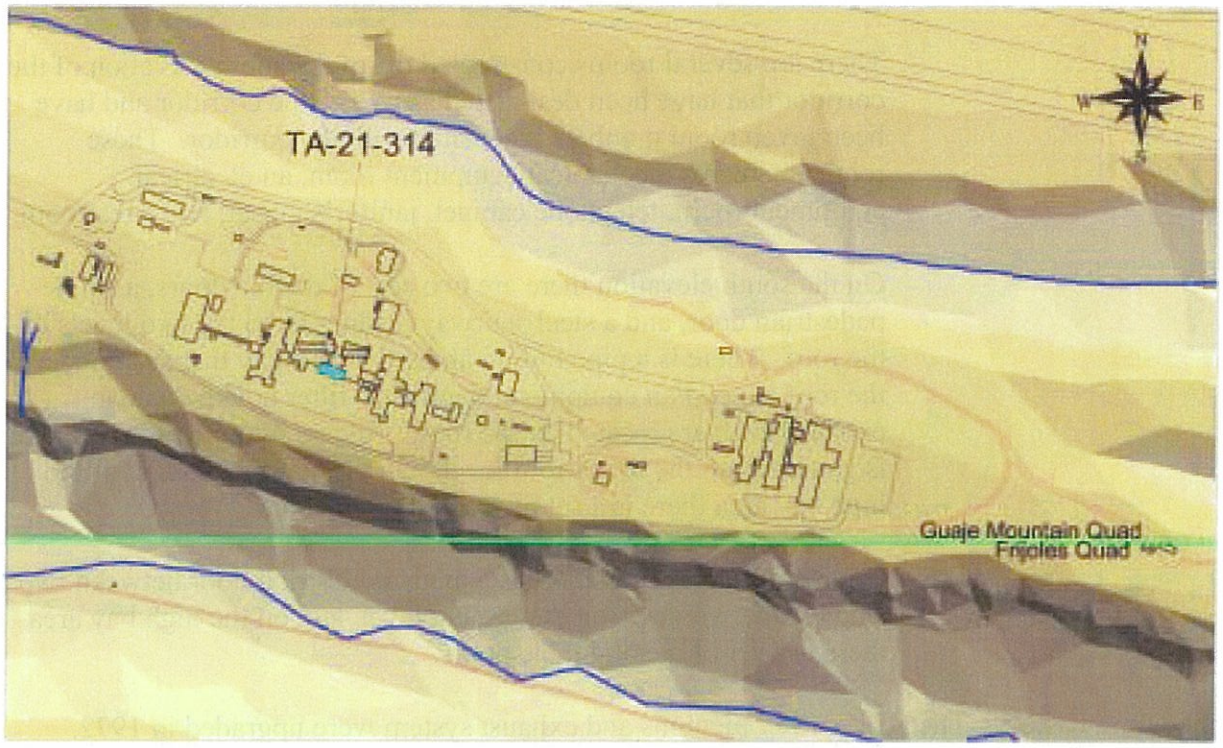
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Not Eligible



TA-21-314 North Elevation

TA-21-314

Building Name: TA-21-314
Original Name: DP-314

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384756 Northing 3970808

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1971

Original Use: TA-21-314 is the corridor between Buildings TA-21-3 and TA-21-4 of the main plutonium processing facility.

Use History: TA-21-314 is the replacement corridor for corridor TA-21-16, the original corridor between Buildings TA-21-3 and TA-21-4. This corridor section like the other corridor sections is for personnel and the utility piping and conduits that run through the ceiling space.

Use at Time of Survey: Abandoned. This corridor is still operable but is not utilized since Buildings TA-21-3 and TA-21-4 have been previously decommissioned, decontaminated, and removed.

Condition at Time of Survey: Fair to Good

Building Description: (See also Appendix C)

Building style - Industrial, steel frame with insulated metal siding. This corridor section has a partial second story designated as the mezzanine or penthouse (high bay area). The metal roof deck is covered with built-up roofing material and gravel.

Foundation material - Concrete slab and footings

Wall material/surface - Steel frame with insulated metal siding panels attached with hidden fasteners.

Architectural features - Corridor TA-21-314 connected to former Buildings TA-21-3 on the west end and TA-21-4 on the east end. There are metal double doors where the corridor connects to the buildings. There are several rooms constructed off the south elevation of the corridor that have been designated as part of the corridor and have been given room numbers associated with the corridor. These rooms include two mechanical equipment rooms, an electrical equipment room, air lock area, sample room, and a battery room.

On the south elevation there are two sets of double doors with wire glass windows and a metal stairway leading up to the two levels of the roof. The stairway has a pipe railing and there is pipe railing surrounding the roof edges. Two fan rooms, an equipment room, and air washer rooms are located on the roof. Access to the high bay area is gained from the lower roof level. On the south elevation of the high bay area there is a set of metal double doors.

On the north elevation there is a metal pedestrian door located in between two single-pane windows and a set of metal double doors, and on the high bay area there is a set of metal double doors.

Remodeling History: The HEPA filter plenums and exhaust system were upgraded in 1972.

Associated Buildings: TA-21-2, -3, -4, -5, -150, -210 and corridors -312/18, -313, -315, and -149. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

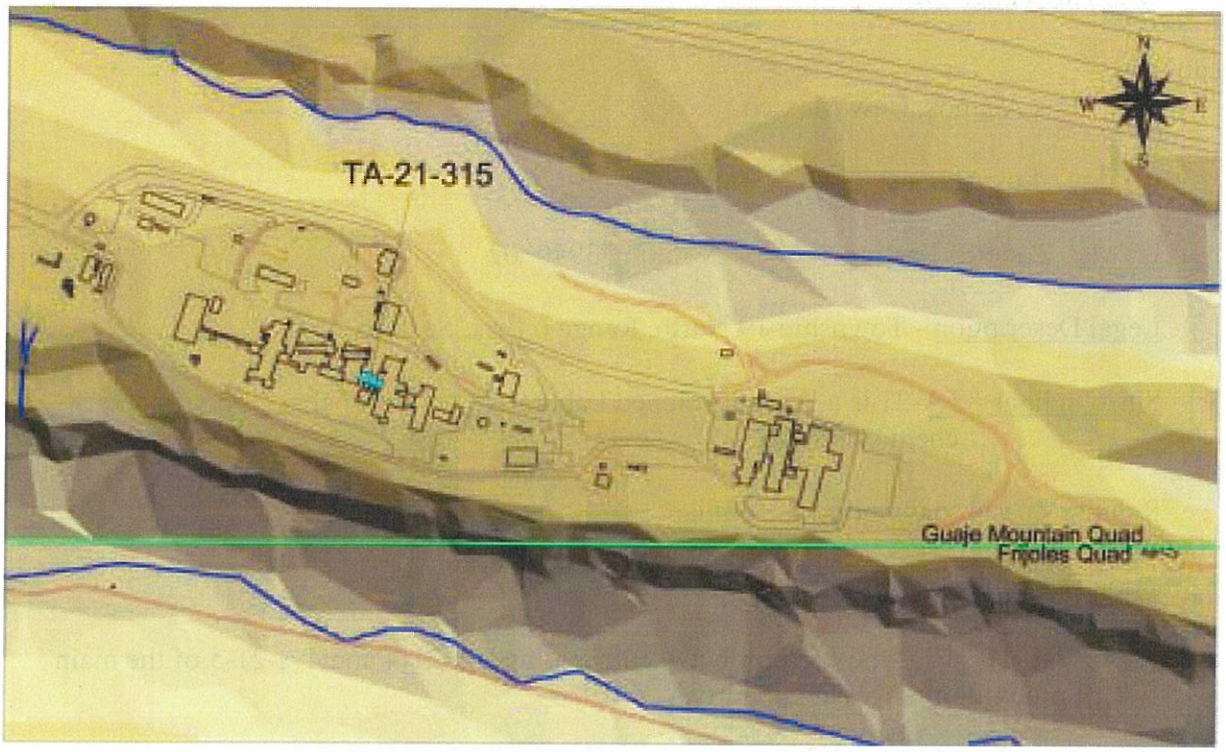
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Not Eligible



TA-21-315 North Elevation

TA-21-315

Building Name: TA-21-315
Original Name: DP-315

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384799 Northing 3970802

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1971

Original Use: TA-21-315 is the corridor between Building TA-21-4 and TA-21-5 of the main plutonium processing facility.

Use History: TA-21-315 is the replacement corridor for corridor TA-21-17, the original corridor between Buildings TA-21-4 and TA-21-5. This corridor section like the other corridor sections is for personnel and the utility piping and conduits that run through the ceiling.

Use at Time of Survey: Abandoned. This corridor is still operable but is not utilized since Building TA-21- 4 has been previously decommissioned, decontaminated, and removed and Building TA-21-5 is abandoned.

Condition at Time of Survey: Fair to Good

Building Description: (See also Appendix C)

Building style - Industrial, steel frame with insulated metal siding. This corridor section has a partial second story designated as the mezzanine or penthouse (high bay area). The metal roof deck is covered with built-up roofing material and gravel.

Foundation material - Concrete slab and footings

Wall material/surface - Steel frame with insulated metal siding panels attached with hidden fasteners

Architectural features - Corridor TA-21-315 connected to former Building TA-21-4 on the west end and TA-21-5 on the east end. There are metal double doors where the corridor connects to the buildings. There are several rooms constructed off the north elevation of the corridor that have been designated as part of the corridor and have been given room numbers associated with the corridor. These rooms include mechanical equipment rooms and electrical equipment rooms. On the south elevation of the corridor there are several rooms that have been given a separate building number designation (TA-21-116).

On the south elevation of TA-21-315 there is a pedestrian door situated between two single-paned windows on the west side of corridor TA-21-144 (discussed earlier), which leads to TA-21-116. On the east side of the corridor there is a single-pane window and a metal pedestrian door with a glass window. Also there is a louver on this elevation.

On the north elevation there is a metal stairway with a pipe railing leading to the roof of the first floor and to the high bay area. On the north elevation of the high bay area there is a set of double doors and another stairway leading to the roof of the high bay area. There is pipe railing surrounding the roof areas. On the ground level there are three sets of double doors with glass windows. There is a metal awning extending north off the north elevation.

Remodeling History: The HEPA filter plenums and exhaust system were upgraded in 1972.

Associated Buildings: TA-21-2, -3, -4, -5, -150, -210 and corridors -312/18, -313, -314, and -149. (Buildings TA-21-3 and TA-21-4 have previously been decontaminated and decommissioned and have since been removed except for the center corridor sections of the buildings.)

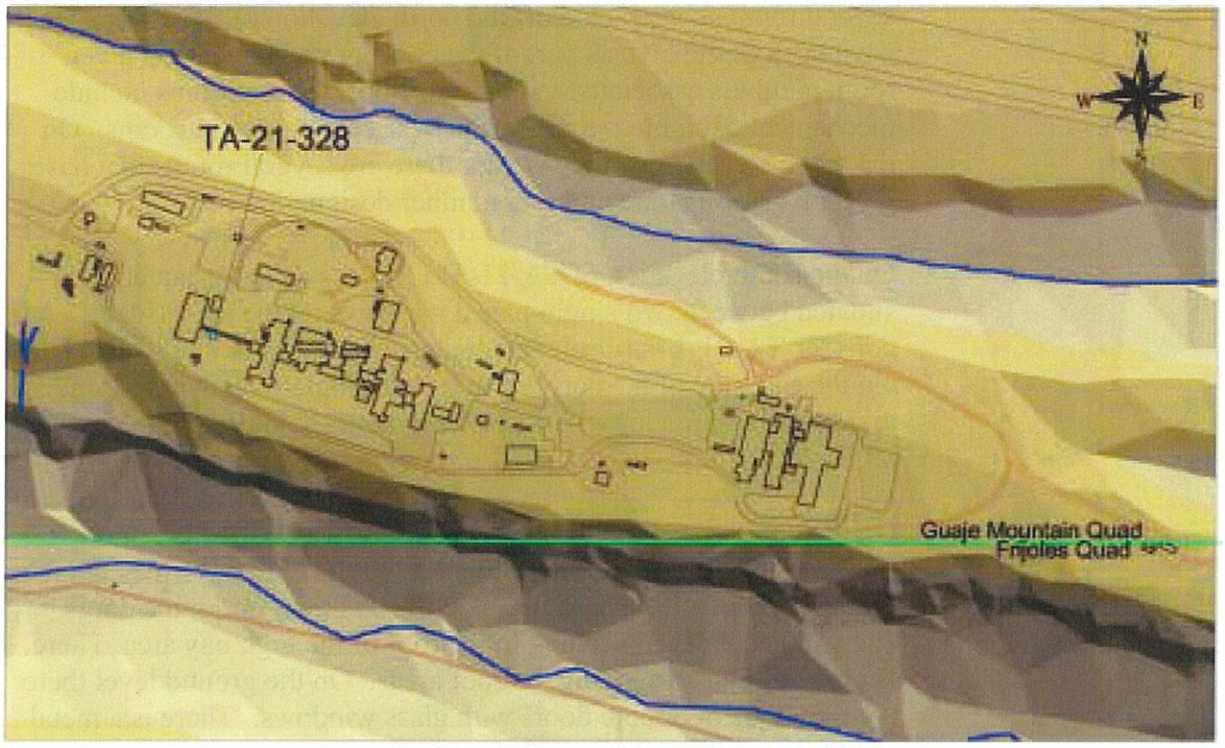
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

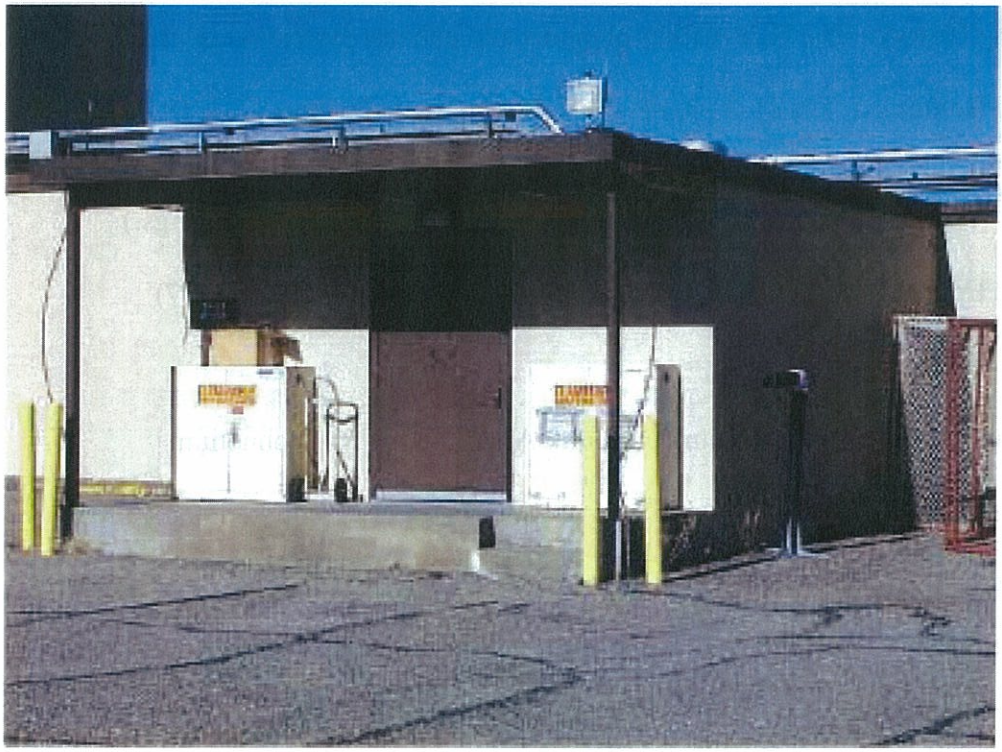
Property Type: Support Building

Contamination History: Plutonium, Uranium, Americium, and Technetium

Integrity: Good

Eligibility: Not Eligible





TA-21-328 South and East Elevations

TA-21-328

Building Name: TA-21-328 Material Receiving Building
Original Name: DP-328

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384640 Northing 3970847

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1973

Original Use: TA-21-328 was constructed as a material receiving building connected to corridor TA-21-312/18.

Use History: TA-21-328 was originally used as a material receiving building for the plutonium facility. Later it has been used for general storage.

Use at Time of Survey: TA-21-328 is currently used as a general storage area for the Biology Team of the Ecology Group (ESH-20).

Condition at Time of Survey: Good condition.

Building Description: (see also Appendix C)

Building style - TA-21-328 is constructed of concrete pumice masonry units.

Foundation material - Gravel fill covered with a 6-in.-thick concrete slab, concrete piers are located under the dock, which is located at the south side of the building.

Wall material/surface - The walls are made of concrete pumice masonry units.

Architectural features - TA-21-328 is a pumice block structure whose north wall is a portion of the south wall of the corridor section (TA-21-312/18) that connects Buildings TA-21-210 and TA-21-2. It has a flat roof that extends over a dock area located across the length of the south side of the structure. The edge of the roof is covered with a galvanized

flashing. The floor of the building was built at an even level with that of the corridor it is connected to.

There are no windows or doors located on the east side of TA-21-328.

The north side is connected by a hollow metal pedestrian door to corridor TA-21-312/18. The corridor leads to Building TA-21-210 on the west and Building TA-21-2 on the east.

There are no doors or windows located on the west side.
On the south side there is a roofed dock that extends 6 ft out from the building. A set of stairs is located near the east end of the dock leading from ground level to the level of the dock. There is a hollow metal pedestrian door with a hollow metal frame leading into the storage room.

Remodeling History: TA-21-328 originally contained adjustable metal shelves along the east and west interior walls. By 1983 these shelving units had been removed.

Associated Buildings: TA-21-312/18, -210, and -2

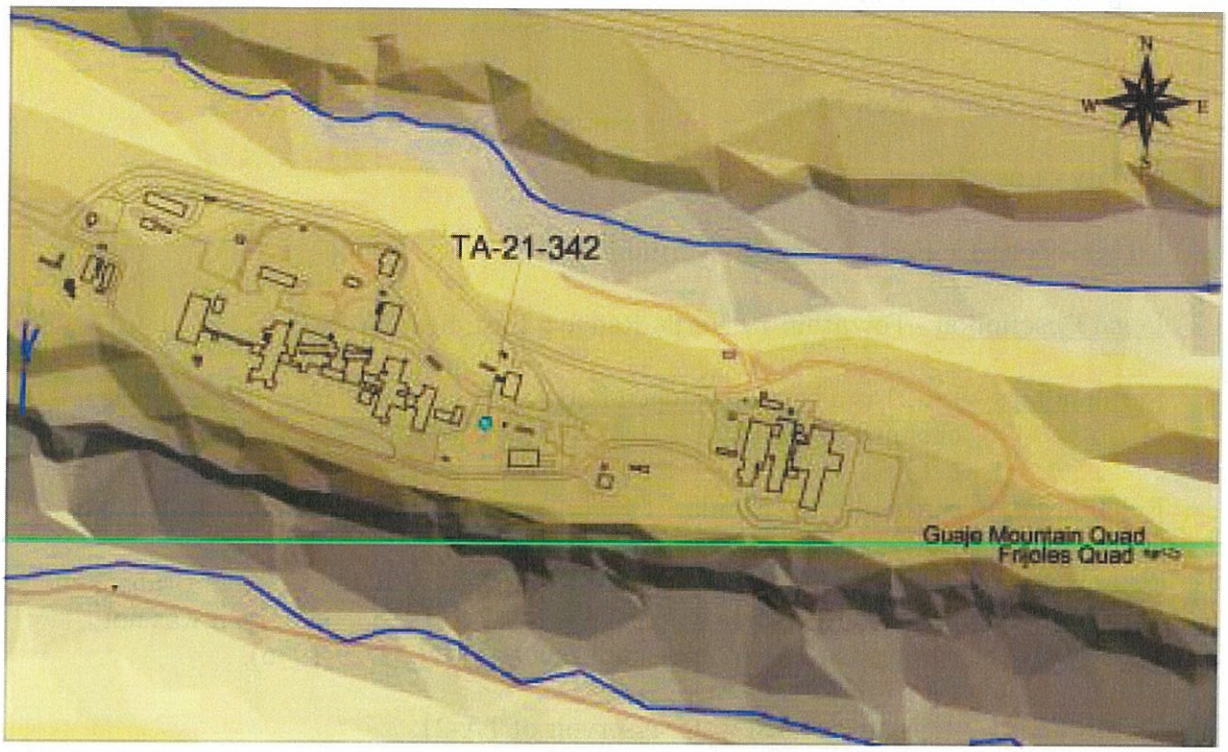
Associated Historic Theme: Plutonium Processing at DP West (1945–1977)

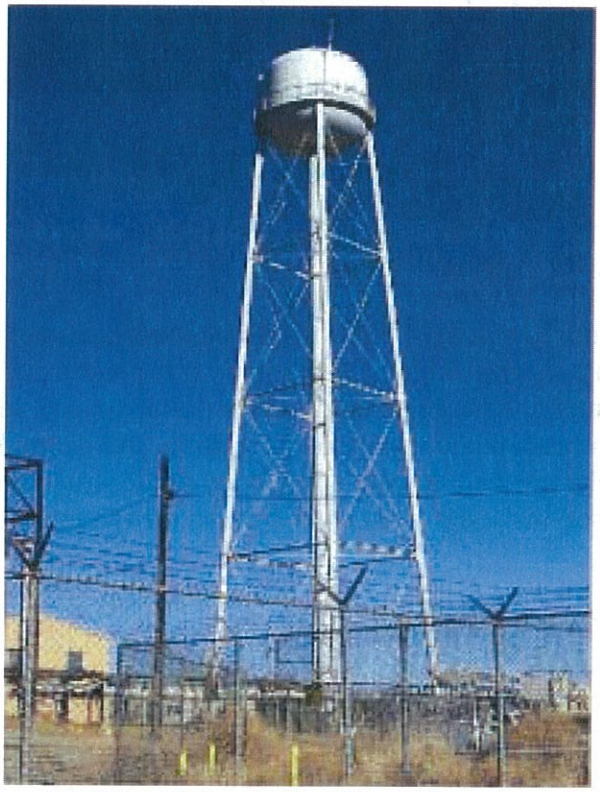
Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Not Eligible





TA-21-342 South and West Elevations

TA-21-342

Building Name: TA-21-342 Elevated Water Reservoir
Original Name: DP-342

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384916 Northing 3970757

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: According to the engineering drawing (C-45876), the Chicago Bridge and Iron Company manufactured TA-21-342 in 1975, however, it was not constructed at Los Alamos until January 1976 (1/29/1976).

Original Use: TA-21-342 is an elevated water reservoir of TA-21.

Use History: TA-21-342 has always been an elevated water reservoir for TA-21.

Use at Time of Survey: Structure 342 is still functioning as a water tower for TA-21.

Condition at Time of Survey: Fair to good condition.

Building Description: (see also Appendix C)

Building style - The water tower is a 100,000-gallon cylindrical steel tank with a spherical bottom and removable spherical top. It is mounted 170 ft above ground on one center column leg (standpipe) and four support legs. TA-21-342 contains an altitude valve and floor drain. All motor breakers, switches, and other electrical equipment are bonded to the structures grounding system. The reservoir's legs and center column are mounted on individual concrete slabs.

Foundation material - Concrete slab and footings

Wall material/surface - The reservoir's walls are made of riveted steel plates.

Architectural features - TA-21-342 is a cylindrical elevated water reservoir with a spherical cover that is equipped with a flashing beacon. Aeronautical

obstruction lights are located halfway up to the top of the tank on three of the support legs. The lights are lanyard type, which can be lowered to the ground for maintenance and bulb changes.

There is a safety ladder located on the northeast support leg. The tower and reservoir are currently painted a light gray/blue color.

Remodeling History: In 1990, all existing obstruction lights were removed from the support legs and compression struts and lanyard type aeronautical obstruction lights were added. New fixtures were furnished with rain-tight covers and flex conduits. Also, guide wires were used to mount the water tower to its concrete base. Before 1990, TA-21-342 had been painted red and white, in 1990 the structure was repainted solid in a gray-blue color.

Associated Buildings: TA-21 buildings

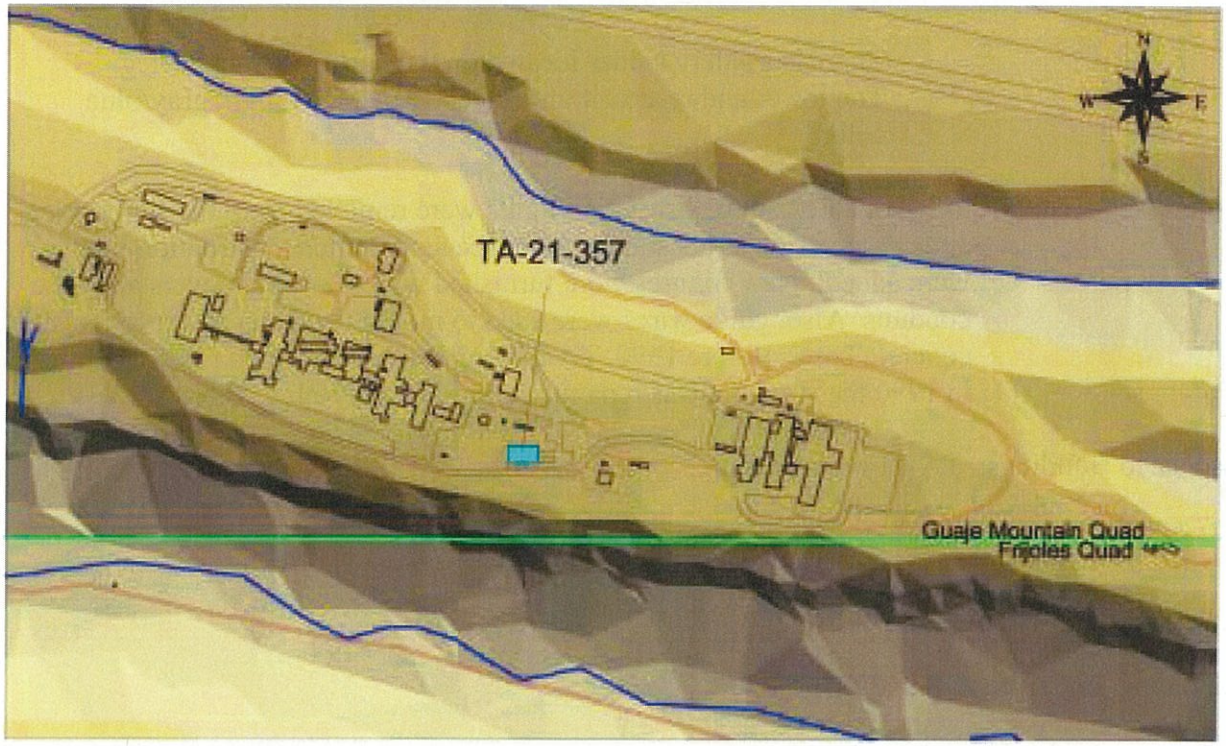
Associated Historic Theme: None, too recent

Property Type: Support Building

Contamination History: None

Integrity: Good

Eligibility: Not Eligible



TA-21-357 East and North Elevations

TA-21-357

Building Name: TA-21-357
Original Name: DP-357 (DP Steam Plant)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384955 Northing 3970721

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-21 is a large developed Laboratory technical area (former nuclear chemistry facility).

Relationship to surroundings - Similar

Construction Date: 1984

Original Use: TA-21-357 is the new steam plant for TA-21 that replaced steam plant TA-21-9.

Use History: Building TA-21-357 has always served as a steam plant for TA-21 since its construction when it replaced TA-21-9, the original TA-21 steam plant.

Use at Time of Survey: Steam Plant for TA-21

Condition at Time of Survey: Excellent

Building Description: (See also Appendix C)

Building style - Industrial, pre-engineered metal building with numerous pipes, ventilation equipment, and exhaust stacks.

Foundation material - Concrete slab, footings, and stem walls

Wall material/surface - Factory manufactured rolled steel panels. These panels overlap and are attached with exposed metal fasteners.

Architectural features - TA-21-357 is an approximate 5,647-sq-ft rectangular metal building with a slightly pitched metal roof. The building contains three gas-fired boilers, and outside at the west end of the building is a semi-recessed chemical treatment pit.

On the east end of the north elevation there are two horizontal slider windows. There is also a hollow metal pedestrian door with a wire

glass window. West of the door there is another horizontal slider window with a small louver below it. Further west, along the north elevation there are two smaller horizontal slider windows. Beyond the windows, there are two louvers positioned one above the other. At the west end of the north elevation there is another horizontal slider window.

There are two louvers located just below the roof on the east elevation. Below the more northern louver, there is a hollow metal pedestrian door with a wire glass window. Next to or north of the pedestrian door there is a vehicle size roll-up door. On the north end of the east elevation there are two more louvers located above a horizontal slider window.

On the east end of the south elevation there are two insulated light panels (skylights). Farther west along this elevation there is a louver and two more light panels. There are also concrete steps with a pipe railing leading up from the ground surface to a hollow pedestrian door with a wire glass window. West of the door there is a louver, and at the far west end of the south elevation there is another light panel.

The west elevation has two louvers and concrete steps with pipe railing that leads up to a hollow metal pedestrian door with a wire glass window.

Remodeling History: During 1996 the supply and return piping from the fuel oil tank were disconnected and capped in place. The above ground piping was removed whereas the underground was left in place.

The air compressors and air dryer were replaced and a filter bank and associated valves were installed in 1998.

Associated Buildings: All of TA-21

Associated Historic Theme: None, too recent

Property Type: Support Building

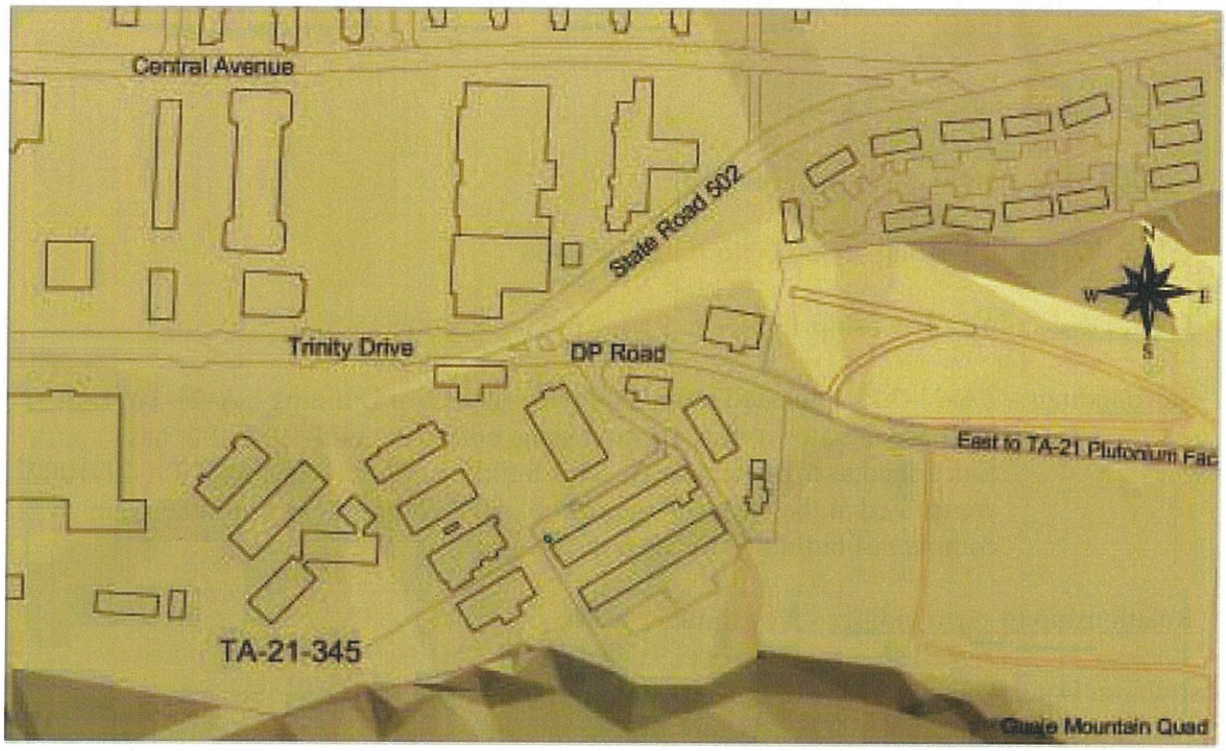
Contamination History: None

Integrity: Good to Fair

Eligibility: Not Eligible

APPENDIX A

Property Descriptions for Part 2



TA-21-345 North and West Elevations

TA-21-345

Building Name: TA-21-345 Portable Guard Station
Original Name: TA-18-1185 and TA-54-27

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 383363 Northing 3971066

Legal Description - Township 19 North, Range 6 East, Section 15

Surroundings - TA-21-345 is located immediately northwest of Building TA-21-1001. It has been situated at this location since before the mid-1980s but has functioned as a guard station. This building, TA-21-1001, and TA-21-1002 are located at the far western portion of TA-21, separate from the main complex of buildings in DP Site, TA-21.

Relationship to surroundings - Not similar

Construction Date: Unknown date of construction for portable building

Original Use: TA-21-345 was originally used as a guard station for TA-18, in possibly several different locations, and has been assigned several different building numbers over time.

Use History: When designated TA-18-185 this building was used as a guard station for TA-18 and located across Pajarito Road from the TA-18 facility on the side of the hill. It has also had the building number designation TA-54-27 and was referenced as being located on the north side of Pajarito Road across from TA-18. The building designation change from TA-18 to TA-54 was probably because of a shift in the technical area boundaries. At some time, approximately during the mid-1980s, it was moved to its current location at TA-21. Based on information received from personal communications with Laboratory personnel, this building has never been used as a guard station at this location. It has been used for storage space in the past. The building still has the TA-54-27 building number placard on the east side and the TA-21-345 placard on the west side.

Use at Time of Survey: Abandoned

Condition at Time of Survey: Fair to Good

Building Description: (See also Appendix C)

Building style - Portable, pre-engineered small metal building

Foundation material - No permanent foundation, building is a portable building

Wall material/surface - Metal siding

Architectural features - TA-21-345 is a small rectangular pre-engineered metal building with a flat roof. The roof overhangs the building approximately two feet on the north side and one foot on the other three sides. There are two external lights on the building, one on the roof and another under the overhang on the west elevation.

Entrance into the building is on the north elevation through a metal pedestrian door with a window at the top. There is also a single-paned window on the north elevation.

The east and west elevations are virtually identical. They both have three fixed, single-paned windows. The east elevation has a small air conditioner unit or compressor attached to the building along the northern portion of the wall.

The west elevation has a metal louver on the northern portion of the wall, across from the air conditioner/compressor. Under the center window on the west elevation there is a small ledge the width of the window. Probably at one time this window was operable and was used as a pass window.

The south elevation of the building has two fixed, single-paned windows.

Remodeling History: There is no information available on this building. It does not appear that there have been any changes to this building.

Associated Buildings: TA-21-1001 and TA-21-1002, LANL archives and a permanent concrete warehouse building

Associated Historic Theme: Laboratory Security

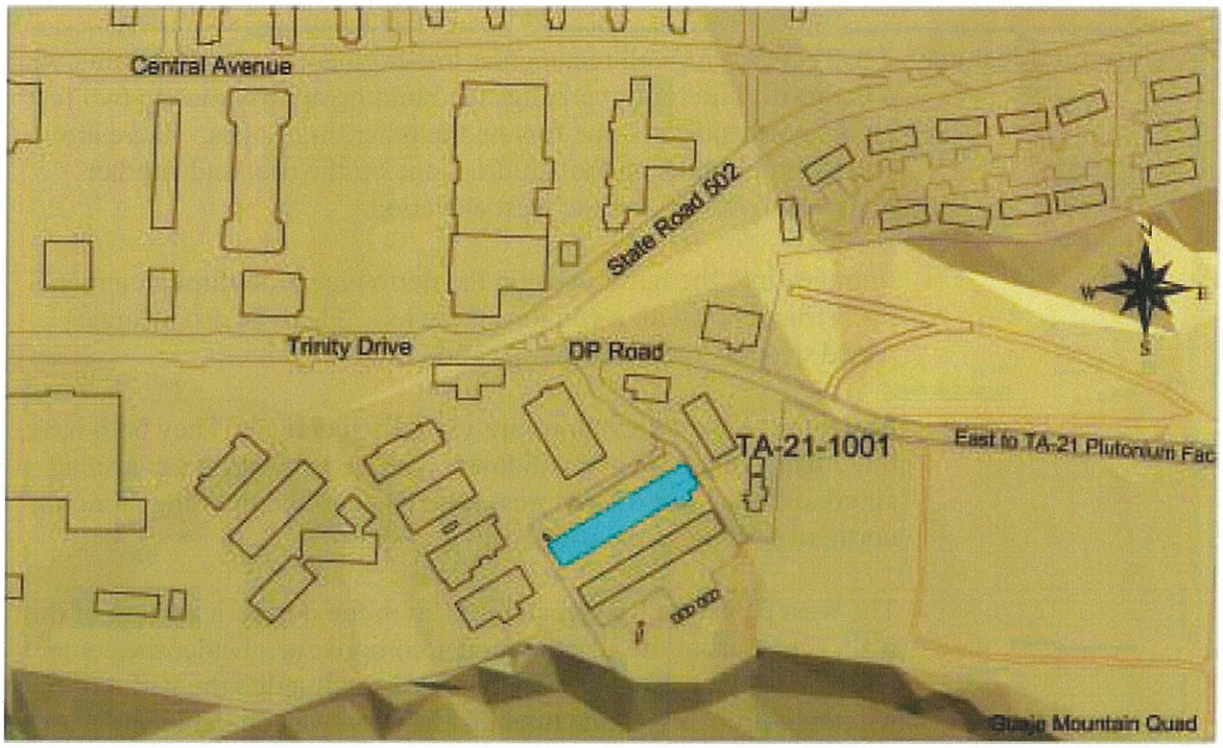
Property Type: Portable Security Building/Guard Station

District Potential: No

Contamination History: No known contamination

Integrity: Poor. Building is a portable building and had been situated at TA-18 before it was placed at its current location.

Eligibility: Not Eligible



TA-21-1001 North Elevation

TA-21-1001

Building Name: TA-21-1001 Records Vault
Original Name: ULR-130 Permanent Warehouse (TA-0-130)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 383404 Northing 3971079

Legal Description - Township 19 North, Range 6 East, Section 15

Surroundings - TA-21-1001 and TA-21-1002 are located at the far western portion of TA-21, separate from the main complex of buildings in DP Site, TA-21.

Relationship to surroundings - Similar to TA-21-1002, another warehouse building built from the same plans.

Construction Date: 1947

Original Use: TA-21-1001 was built as a permanent concrete warehouse.

Use History: TA-21-1001, originally used as a warehouse, was named the Atomic Energy Commission (AEC) Depository in 1949, and by 1950 it was identified as the Records Service Center at which time a vault room was added. Since that time (1949/1950) it has been used solely as the LANL Records Center – Archives and Vault.

Use at Time of Survey: TA-21-1001 is currently LANL's Records Center – Archives and Vault

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Utilitarian, concrete masonry unit building with horizontal slider windows, and metal pedestrian double doors and metal roll-up doors

Foundation material - Concrete slab and footings

Wall material/surface - Concrete masonry unit building covered with stucco

Architectural features - TA-21-1001 is the combination of two identical warehouse buildings (warehouse 1 and 2) abutting each other on the west end of warehouse 1 and the east end of warehouse 2 (see site form drawing ENG-C 24132).

The roof has a slight slope for drainage purposes and is constructed of several layers of built-up roofing material and gravel with metal flashing around the edge. There are masonry firewalls between sections of the building that extend beyond the roofline. A dock extends along most of the north side of the building. All of the windows have metal framing and are covered with wire security mesh. There are eleven windows on the north elevation of the building and eighteen on the south elevation.

At the east end of the north elevation there are concrete steps with steel pipe railing leading up to the dock. To each side of the steps there is one 36-paned window. Next to the windows on the west there is a masonry sealed door opening. To the west of this there is one metal pedestrian door with a small window and a 24-paned horizontal slider window with each half consisting of twelve individual panes of glass. To the west of this window is another window that has eighteen individual panes of glass. Continuing west of these windows the north wall juts back to the south for approximately twelve feet, making a small covered recessed portion of the dock that runs along the north side of the building. The roof over this recessed area has a lower level. There are ten windows above the recessed area to let light enter into the building. On the north wall of this recessed area there is a set of double metal doors. Along the east wall there is a single pedestrian door and a six-paned window, and on the west side there is only a six-paned window. The outer edge of this recessed opening is lined with wood trim.

Continuing west along the north elevation of the building there is another eighteen-paned window then a three-panel roll-up door. To the west of this door there are two more 36-paned windows followed by two six-paned windows with vents and another 36-paned window. A ramp with a steel pipe railing leads up to the dock at this location. There is a single metal pedestrian door directly across from the head of the ramp, and to the west of the ramp there is a set of metal pedestrian doors and a eighteen-paned window, then another recessed portion of the north wall (see above description). Beyond this recessed area there is another eighteen-paned window, a three panel roll-up door, a single metal pedestrian door, and two window openings that have been filled in.

There are no windows or doors located on the west elevation of the building.

At the east end of the south elevation there is a vault room addition, which encompassed portions of two of the building windows. The window to the east of the new addition and the top portions of the two windows that remained above the roofline of the addition were covered. Six windows at the west end of the south elevation have been filled in with masonry, and the nine windows in the center portion of the south elevation are horizontal slider windows like those on the north elevation of the building.

There are no windows or doors located on the east elevation of the building.

Remodeling History: Electrical and lighting upgrades were conducted, and new interior partitions were constructed and portions of existing partitions were removed in 1949.

In 1950 the vault room addition was added to the east end of the south elevation of the building. The top portions of the windows encompassed by the vault room addition were replaced and security sashes were installed. One of the openings became the doorway into the vault room from the main building, and the lower portion of the other was filled with masonry to match the existing wall.

Interior modifications were made in 1951. These include relocating shelving, moving a counter and remodeling it to fit a new location, and removing a wall partition.

In 1968 several doors were welded shut, a new pedestrian door was installed, which is sealed today, the wooden bumper along the edge of the dock was removed, and the sprinkler system to the entire building was modified.

The original center roll-up door opening was sealed, and new metal double pedestrian doors were installed in 1973. At the same time the single pedestrian door to the east of the new doors was welded shut, and the eastern roll-up door was anchored to the floor with a concrete anchor.

In 1982 a single pedestrian door was removed, and the opening sealed with concrete masonry units, a fire door was relocated and the original opening also filled with concrete masonry units.

Additional electrical power was installed in 1987.

Associated Buildings: TA-21-1002, another permanent concrete warehouse building built at the same time from the same plans

Associated Historic Theme: Laboratory Administration

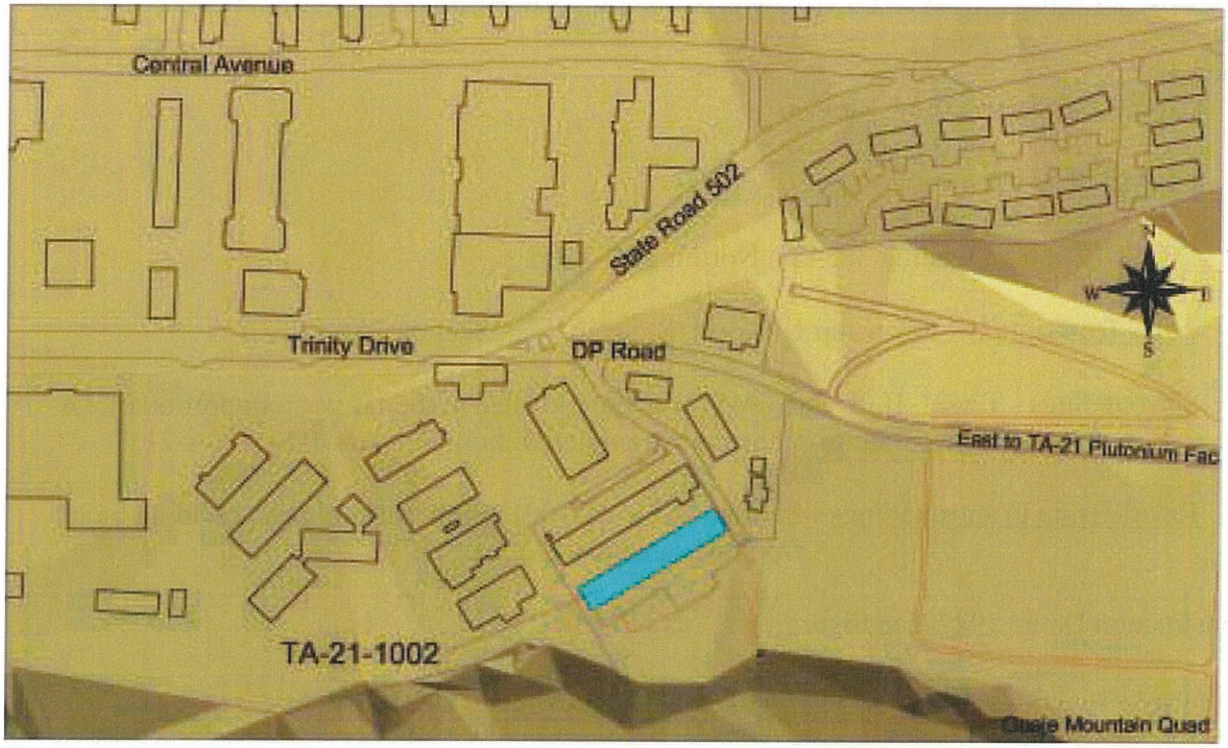
Property Type: Administration/Office Building

District Potential: No

Contamination History: No known radiological contamination.

Integrity: Excellent. The majority of the modifications that have occurred to the building have been to strengthen the physical security of the building. The majority of the original shelving and file cabinets still remain as well as most of the main configuration of the interior as it was in the 1950s.

Eligibility: Eligible under Criteria A and Criteria C based on the good integrity of the building.



TA-21-1002 South Elevation

TA-21-1002

Building Name: TA-21-1002
Original Name: ULR-470 Permanent Warehouse (TA-0-470)

Location:
City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 383421 Northing 3971052

Legal Description - Township 19 North, Range 6 East, Section 15

Surroundings - TA-21-1002 and TA-21-1001 are located at the far western portion of TA-21, separate from the main complex of buildings in DP Site, TA-21.

Relationship to surroundings - Similar to TA-21-1001, another warehouse building built from the same plans.

Construction Date: 1947 (see Figure 1)

Original Use: TA-21-1002 was built as a concrete warehouse

Use History: TA-21-1002 served as a warehouse for the Zia Company, a former Laboratory contractor. In 1961 Zia records indicate that the building was leased for commercial use by Sears, Metzgers, Los Alamos Transfer, Creamland Dairies, and other private business (LANL 1992). Johnson Controls Northern New Mexico, the current Laboratory maintenance contractor, is currently using the warehouse as a maintenance shop/warehouse.

Use at Time of Survey: In use as a general warehouse and maintenance shop

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Utilitarian, concrete masonry unit building with horizontal slider windows and metal pedestrian double doors and metal roll-up doors

Foundation material - Concrete slab and footings

Wall material/surface - Concrete masonry unit building covered with stucco

Architectural features - TA-21-1002 is the combination of two identical warehouse buildings (warehouses 3 and 4) abutting each other on the west end of warehouse 3 and the east end of warehouse 4 (see site form drawing ENG-C 24132).

The roof has a slight slope for drainage purposes and is constructed of several layers of built-up roofing material and gravel with metal flashing around the edge. There are masonry firewalls between sections of the building that extend beyond the roofline. A dock extends along most of the south elevation of the building. All of the building windows but four have 36 individual panes of glass. There are twelve windows on the south elevation and eighteen on the north elevation. Three of the eleven windows on the south elevation have eighteen individual panes of glass and a fourth window is one pane of glass. One additional window opening has been sealed with concrete masonry units.

There are four metal roll-up doors, three single metal pedestrian doors, and three sets of metal pedestrian double doors on the south elevation. Only one of the original two recessed areas remains. The easternmost area has been walled in so that the south wall in this area is flush with the rest of the south wall of the building. One set of double doors and the single-pane window are located in this area.

Inside the western existing recessed area a small wooden shed type structure has been added. The shed with a ceiling height less than the open height of the recessed area has two windows and a pedestrian door. Like Building TA-21-1002 the outer edge of this recessed opening is lined with wood trim. This recessed area has a lower roof level and there is a set of ten windows above it to let light enter into the building. To the east of the easternmost roll-up door there is a metal ladder and cage that is attached to the building that leads to the roof.

At the west end of the south elevation there are concrete steps with steel pipe railing leading up to the dock. The dock runs along most of the south elevation of the building.

There are no windows or doors on the west elevation of the building.

There are eighteen window openings on the north elevation of the building. Seventeen of the windows have 36 individual panes of glass, and the eighteenth has currently been boarded over.

There are no windows or doors on the east elevation of the building. However, a small lean-to was added to this end of the building apparently to house gas cylinders.

Remodeling History: Based on available engineering drawings it doesn't appear that many modifications were made to this building.

A section of wooden mezzanine was replaced with a prefabricated metal mezzanine in 1990.

In 1992 a small lean-to type structure was added adjacent to the east wall of the building. It was to be along approximately ¾ of the length of the east wall. It is constructed out of ribbed metal siding and has a sloping metal roof. This area also had a chainlink fence around it at one time. Only a small portion of this lean-to structure still exists.

At some point in time one of the windows on the south elevation was walled up with concrete masonry units, and the eastern recessed area was walled up to make the south building wall in this area flush with the rest of the building. A single-paned window and a set of metal pedestrian double doors were installed in this new section of wall.

Also at some unknown time a small wooden shed type structure was added inside the western recessed area on the south elevation of the building.

Associated Buildings: TA-21-1001, another permanent concrete warehouse building built at the same time from the same plans.

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. However, we have not looked at a site-wide material procurement, warehousing, and distribution of supplies, or general maintenance shops and operations theme for the Laboratory.

This building was originally a general warehouse/maintenance/utility shop. In the early 1960s the building was leased to private businesses as a warehouse. The Laboratory's maintenance contractor, Johnson Controls Northern New Mexico, is using the building as a maintenance warehouse/shop.

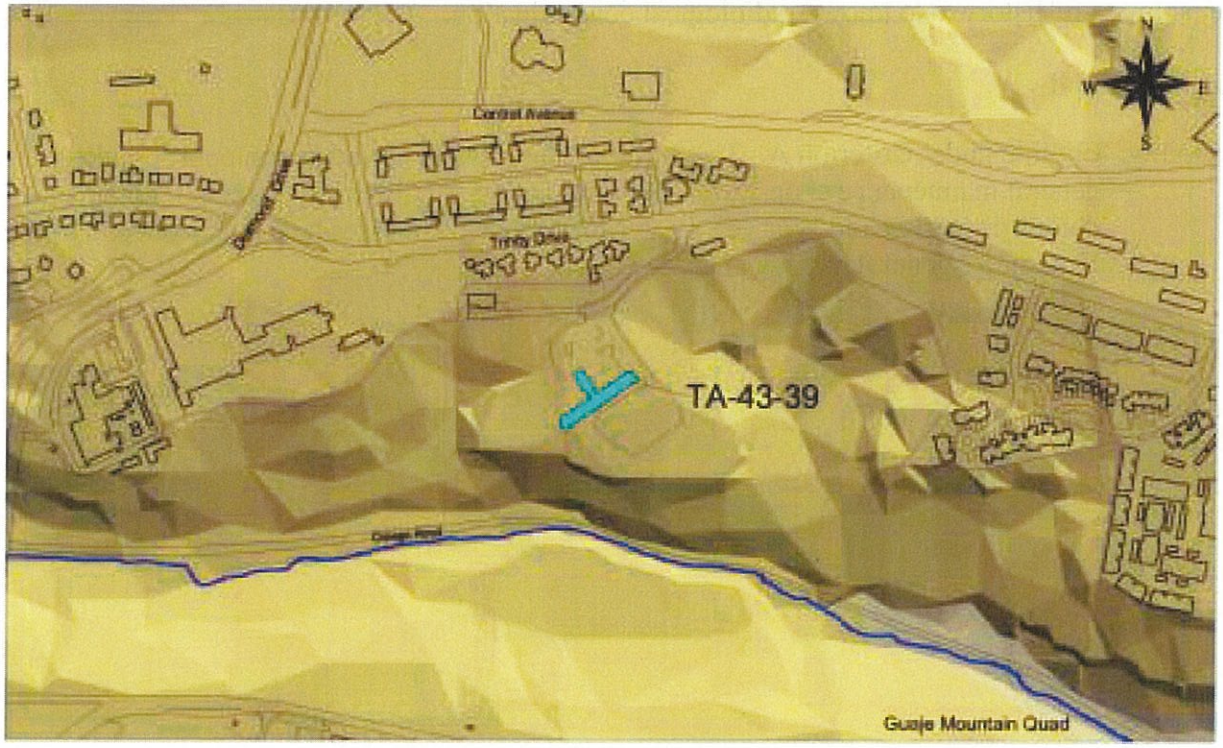
Property Type: Support Building, general operational/maintenance support for the Laboratory

District Potential: No

Contamination History: No known radiological contamination.

Integrity: Good

Eligibility: Eligible under Criterion A. This building has always served as a support building, a general maintenance shop/warehouse originally for Laboratory general maintenance during the early Cold War years, later for private businesses, and again currently for Laboratory general maintenance.



TA-43-39 South and East Elevations

TA-43-39

Building Name: TA-43-39 DOE LAAO Building
Original Name: ULR-469 Police Barracks (TA-0-469)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 381361 Northing 3971373

Legal Description - Township 19 North, Range 6 East, Section 16

Surroundings - TA-43 is a small developed technical area. In the immediate surroundings to Building TA-43-39, the current DOE LAAO, is TA-43-41, the original steam plant that serviced Building TA-43-39. There used to be a pump house (TA-43-40) until a few years ago when the building was removed, however, the valves and pipes still exist on a concrete pad.

Relationship to surroundings - Similar to TA-43-41, the old steam plant that serviced Building TA-43-39.

Construction Date: 1948 to 1949

Original Use: Building TA-43-39 was originally the "Police Barracks" for the Laboratory's military support security force.

Use History: Between 1949 and 1961 Building TA-43-39 was converted into the LAAO administrative building for the AEC, followed by ERDA, and then the DOE, the federal agencies that have had responsibility for overseeing the operations of the Laboratory.

Use at Time of Survey: The administrative office building for DOE LAAO

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - International style, reinforced concrete building covered with stucco

Foundation material - Reinforced concrete slab

Wall material/surface - Reinforced concrete and concrete masonry unit, plaster, and stucco

Architectural features - TA-43-39 is a roughly rectangular three-story building with a room extension to the north from the center of the north elevation. The building has a partial basement and a penthouse room on the roof of the third floor.

The main entrance is on the south elevation of the building. It consists of three glass pedestrian doors with one two-paned vertical awning-type window on either side of the entrance doors. Above the entrance doors, on the second and third floors, there are eleven windows the entire height of each floor. These windows have a large pane of glass with a smaller pane on top, seven out of the eleven windows are awning windows that open. On the south elevation of the penthouse level there is a single pedestrian door that leads out onto the roof. There are three two-paned vertical awning windows, one to the east of the door and two to the west.

On each floor there were originally 27 two-man rooms each with individual lavatory sinks; 14 rooms on the west wing and 13 rooms on the east wing. Also on the north side of each wing, on each floor, there is a common bathroom. Each of these rooms on each floor has a six-pane multiple awning window, the side panels open vertically and the center bottom panel opens horizontally. There are 39 room windows on the south elevation and 39 room windows, 12 bathroom windows, and three stairwell windows on the north elevation.

In the center of the north elevation of the building, on the first floor, there is a room that extends to the north. There is a short hallway that leads from the main portion of the building into the northern extension.

To the west of the entrance on the first floor was a room designated as the resident matrons quarters. It had an individual bathroom and kitchen. Also on the first floor to the east of the entrance was an office room.

On the second floor, the space above the building's main entrance, the resident matron's room, and the office room, was originally designated as a private lounge. There is no second floor on the northern building extension. The roof over the northern extension was used as a sun deck and there are doors leading out to the roof area from the center building hallway area.

On the third floor the space above the entrance lobby was utilized as a private lounge. On the northeast side of the entrance hall there is an interior center staircase that leads to all floors and the penthouse.

At both the east and west ends of the south elevation there are stairwells with large continuous windows on all three floors. These fixed windows are comprised of 36 individual panes of glass.

On the east and west elevations of the building there are also large continuous windows in the stairwells on all three floors. These windows are comprised of 33 individual panes of glass. Nine of these individual panes are awning-type and open.

There is a basement level below the northern room extension area only. The ground surface level at the north elevation of the northern extension is lower than at the rest of the building, and, therefore, the basement and first floor are visible on the north side.

The basement rooms were originally designated as a linen supply room, stairwell, housekeeper's office, and a telephone cable room. These were later remodeled into a photo lab for the security force. The rooms on the first floor, in the northern building extension were originally designated as a lounge, two coat closets, a men's restroom, a women's restroom, kitchen, and dining alcove. In the northwestern corner is the stairwell that led into the basement from the first floor.

On the basement level of the north elevation of this northern extension there is a single pedestrian door and two awning windows. On the first floor level there are four awning windows. Towards the top of the north wall there is a louver vent. On the east and west sides of the northern extension at ground floor level there are four single pedestrian doors, one at each corner. The majority of the remaining wall space is on the east and west sides and comprised of large panel windows.

On the north elevation of the main part of the building there are 39 awning-type room windows, the same as on the south elevation, one per each room. In the bathrooms, which are on the north side of each wing, there are two vertical awning windows per each wing on each floor (four bathroom windows per floor). There are also vertical awning windows in the central interior staircase, one on each floor. At the northeast and northwest corners of the building there are single pedestrian doors that lead into the stairwells at either end of the building.

The east and west sides of the short hallway that leads from the main portion of the building into the northern extension have glass double pedestrian doors with fixed glass panels on either side of the doors. To the south of the doors there are three large glass panels.

Remodeling History: As early as 1949 minor building alterations were made. Steel security grills were installed over several of the windows, a single-pane window and an electric buzzer were installed to an interior room door, and several walls were removed.

Sometime before 1961 the building became the LAAO headquarters building of the AEC, followed by the ERDA, and currently the DOE.

The basement was remodeled into a photo lab for the security office in 1961. This space now included a waiting and fingerprint room, file room, office, finishing room, and dark room. Also, some minor modifications were made in some of the first floor rooms.

Individual room faucets and plumbing were removed, counters were placed over the sinks, and door openings were made between some of the rooms in 1964.

In 1976 the penthouse was modified into a conference room, and modifications were made to the legal library—walls were removed and portions of the floor raised.

In 1977 modifications were made to the sprinkler system, and in 1978 modifications were made to the conference room in the northern extension of the building.

An evaporative cooler was installed in the conference rooms in 1980. Alterations were made to office spaces—walls and partitions and doors between rooms were removed in 1982. In 1983 the electrical distribution system was upgraded. Also, the windows on the second and third floors in the entrance area on the south elevation were replaced.

New thermostats were installed in 1986 for more energy efficiency of the building's heating and cooling system during hours when the building is unoccupied.

More modifications were made to the conference room in 1993—the ceiling was lowered, and new lighting and a folding partition that divided the room in half were installed.

The last major change took place in 1995 when an elevator was installed next to the center interior stairwell.

Associated Buildings: TA-43-41, the steam plant that serviced Building TA-43-39. It was built during the same time period, 1949.

Associated Historic Themes: Laboratory Security and Laboratory Administration

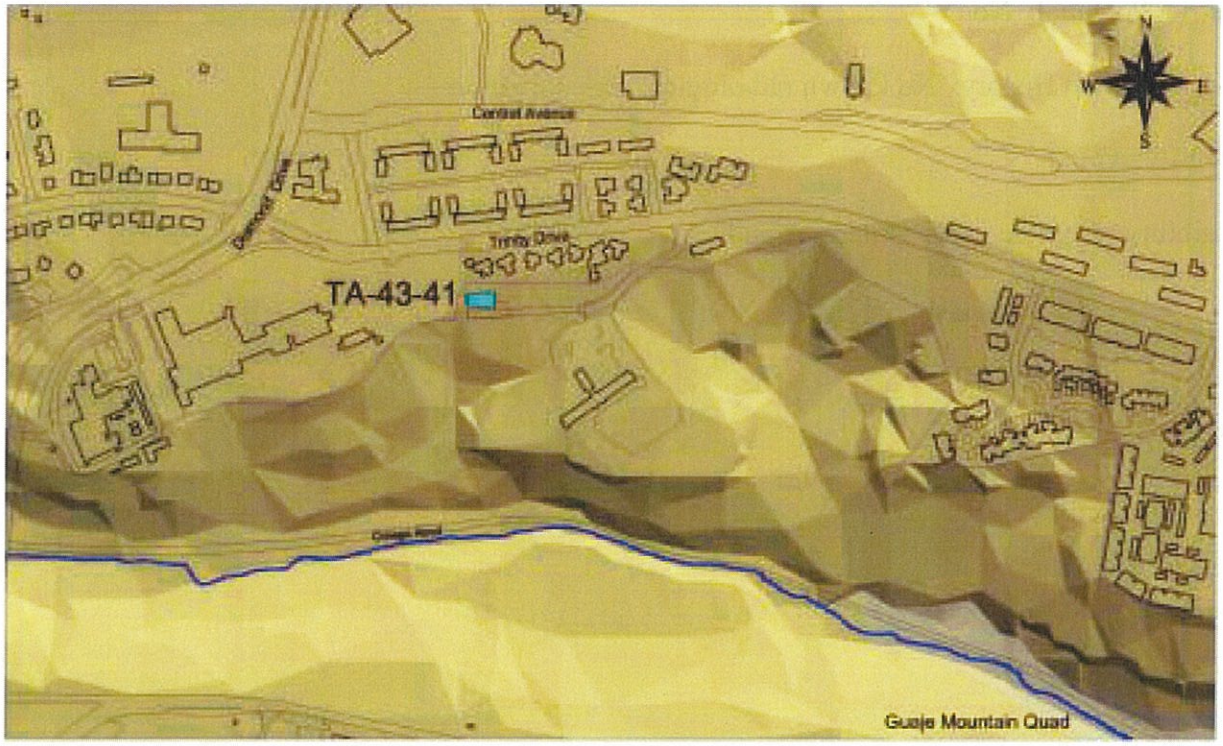
Property Type: Security Building and Administration/Office Building

District Potential: No

Contamination History: No known radiological contamination

Integrity: Good

Eligibility: Eligible under Criteria A and C



TA-43-41 South and East Elevations

TA-43-41

Building Name: TA-43-41
Original Name: Steam Generating Plant

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 381246 Northing 3971476

Legal Description - Township 19 North, Range 6 East, Section 16

Surroundings - TA-43 is a small developed technical area. The immediate surroundings to Building TA-43-41, an abandoned steam plant, is the "Police Barracks," the current DOE LAAO Building, TA-43-39. There used to be a pump house (TA-43-40) until a few years ago when the building was removed, however, the valves and pipes still exist on a concrete pad.

Relationship to surroundings - Similar to TA-43-39, the old "Police Barracks," currently the DOE LAAO Building that the steam plant serviced. The steam plant and the Police Barracks were built at the same time, 1949.

Construction Date: 1949

Original Use: Building TA-43-41 was a steam plant that served the DOE LAAO Building.

Use History: Building TA-43-41 has always served as a steam plant.

Use at Time of Survey: Abandoned, general storage

Condition at Time of Survey: Fair to good

Building Description: (See also Appendix C)

Building style - Reinforced concrete industrial building

Foundation material - Concrete slab

Wall material/surface - Painted reinforced concrete

Architectural features - TA-43-41 is an industrial type building of reinforced concrete with painted exterior walls and a flat, concrete slab roof. The roof is constructed of a 3½-in. lightweight, concrete slab, with a ½ in. of insulation and topped by a built-up roof of several plies of tarpaper and gravel.

The north elevation of the building has nine windows, seven of which are manually operated, awning type with two individual panes of glass on top and two on the bottom. The remaining two windows are fixed windows with two panes of glass beside each other. All glass throughout the building, in windows and doors, is double-strength glass.

The east elevation of the building has large double metal doors situated 3 ft above the ground surface. From the location of the doors they appear to be loading doors, with the exception that there is no dock. Vehicles would have been able to back directly up to the building. Each door has four windows. Above the doors there is one large, fixed window with 14 individual panes of glass in two columns.

The south elevation has four, awning-type windows, designed in two columns per window with 22 individual panes of glass. Four panes of glass at the top of each window are fixed leaving 18 that are connected and open together mechanically. These windows are in front (south) of the boilers. There is a single metal pedestrian door with four windowpanes and a set of double pedestrian doors with two windows. Both of these doors are 3 ft above the ground with steps leading up to them. Also, there are three additional awning type windows, one of which has obscured glass, presumably for the restroom. All three have two panes of glass.

Starting on the south elevation of the building and running up the west elevation of the building is an exterior flight of stairs that leads to the landing/deck entrance for the upper floor.

On the landing/deck at the top of the stairs there is a single metal pedestrian door with a window. Additionally, there are two fixed windows with two individual panes of glass. On the northern portion of the west side there are two fixed windows situated side by side.

The first floor consists of two boilers, a pump room, a shop, and a restroom.

The upper floor consists of an office, catwalks, and platforms in the boiler room and a deaerator platform above the pump room.

Remodeling History: Building TA-43-41 does not appear to have had any remodeling. However, the 1948 plans show notes that a new extension on the east side of the building was planned. From comparing the existing 1985 floor plan and the building itself, the planned extension was never constructed.

Associated Buildings: TA-43-39 DOE LAAO Building – built at the same time, 1949.

Associated Historic Themes: Laboratory Security and Laboratory Administration. This building also served as a steam supply plant for the Gold Street Apartments, Los Alamos High School, all the County buildings, Fuller Lodge, and the Community Center (what is now the Central Park Square business area). It also was connected to the Los Alamos Medical Center and the Laboratory's HRL building as a backup. Building TA-43-39 was taken out of service in the early 1980s.

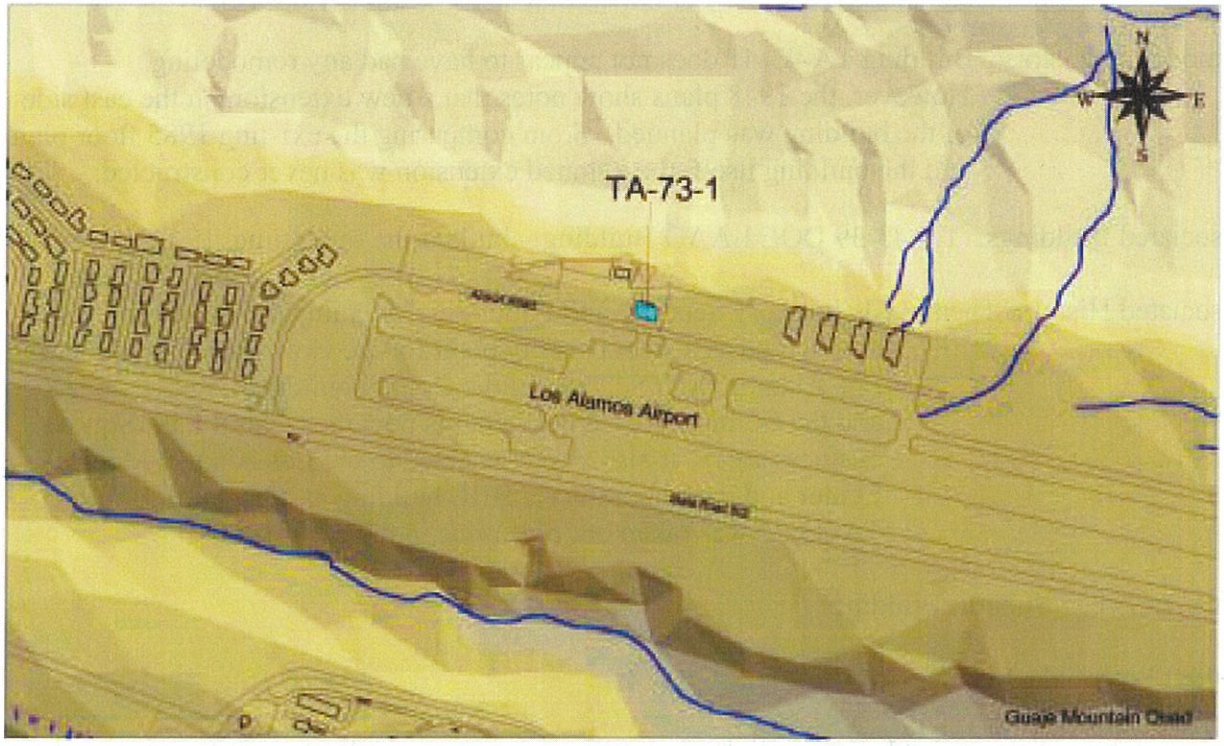
Property Type: Support Building

District Potential: No

Contamination History: No known radiological contamination, possible chemical contamination from treatment of sanitary wastewater.

Integrity: Good

Eligibility: Eligible under Criteria A and C



TA-73-1 West Elevation

TA-73-1

Building Name: TA-73-1
Original Name: ULR-195 (TA-0-195)

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384930 Northing 3971385

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-73 includes former TA-26, the Los Alamos Airport, parking, runway, and hangars. The airport was built on a landfill that was used by DOE, its predecessors, the AEC and the ERDA, and by Los Alamos County.

Relationship to surroundings - Not similar

Construction Date: 1970-1971

Original Use: Building TA-73-1 was built as the Los Alamos County Airport Terminal Building. It replaced an earlier structure that was located to the east of the current building.

Use History: Building TA-73-1 has always served as the Los Alamos County Airport Terminal.

Use at Time of Survey: Los Alamos Airport Terminal

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Functional, concrete masonry unit building with glass windows on the east elevation and a sloping roof

Foundation material - Concrete slab

Wall material/surface - Concrete masonry units and steel frame and glass

Architectural features - Building TA-73-1 is roughly a rectangular building. It is constructed of metal framing and concrete masonry units with glass windows. The flat roof slopes slightly from the east to the west. It is a built-up roof with layers of tar and gravel over rigid insulation on top of a wood deck.

The entrance is on the west elevation of the building. It was remodeled sometime before 1989. Short wing walls and a small vestibule area with sliding glass doors were added. This concrete masonry unit addition has a flat roof that is lower than the roof elevation of the main portion of the building.

The western two-thirds of the south elevation of the building has four windows that run the entire height of the building and two metal pedestrian doors with windows above them. The eastern third of the south elevation wall is glass.

The entire eastern elevation of the building, which houses the flight office, lobby, and waiting room, is metal frame and glass. There is a set of pedestrian glass double doors and one single pedestrian glass door on the east elevation.

The north side of the building is like the south in that the eastern third is glass (the glass-walled flight office, lobby, and waiting room). There are two metal pedestrian doors on this side. A small, concrete masonry unit addition was constructed sometime before 1989. The addition has a metal set of double pedestrian doors. On the east elevation of this addition there is also a single metal pedestrian door. The roof elevation of this addition also is lower than the roof of the main portion of the building.

Remodeling History: Before 1989 a new sliding glass entrance door was added to the west elevation of the building. Additionally, a small room was added on the north side at the northwest corner. Between 1989 and 1994 a low interior wall partition was installed.

Associated Buildings: This is the second terminal building at the Los Alamos Airport, it was built much later than the other building evaluated at the airport, TA-73-2, an old Laboratory incinerator built in 1947.

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. This building is only the Los Alamos County Airport Terminal.

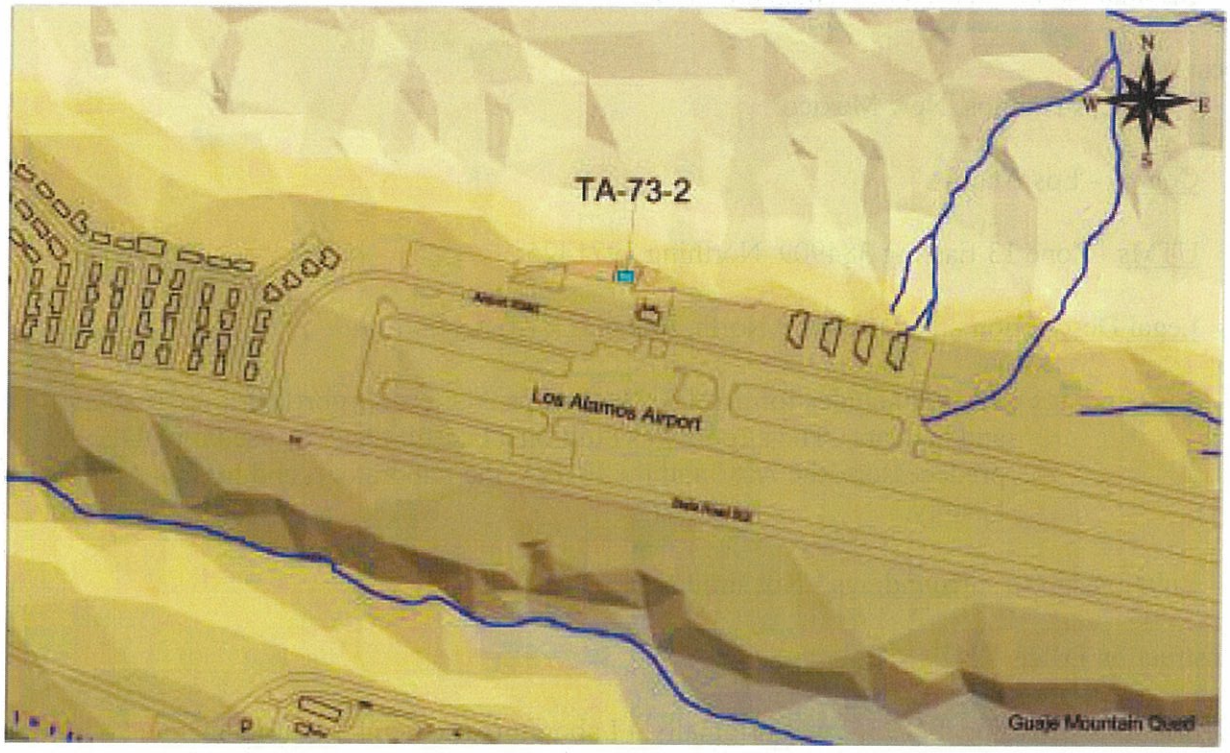
Property Type: Airport Terminal – Support Building

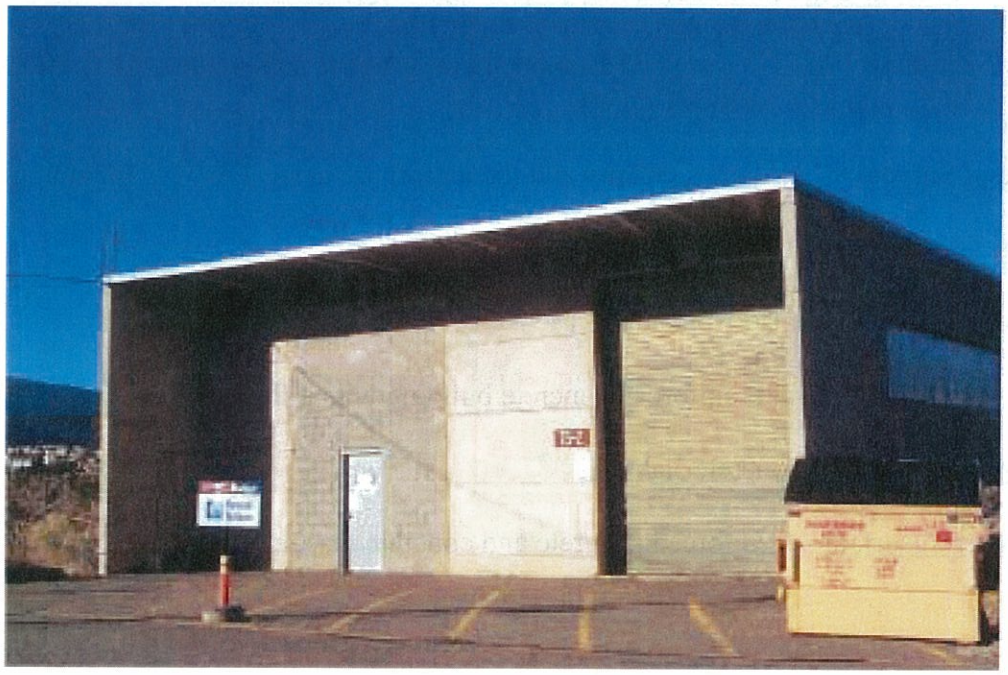
District Potential: No

Contamination History: No known contamination

Integrity: Good

Eligibility: Not Eligible





TA-73-2 South and East Elevations

TA-73-2

Building Name: TA-73-2
Original Name: TA-0-1123 (Incinerator Building)

Location:
City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384909 Northing 3971425

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-73 includes former TA-26, the Los Alamos Airport, parking, runway, and hangars. The airport was built on a landfill that was used by DOE, its predecessors, the AEC and the ERDA, the Laboratory, and by Los Alamos County.

Relationship to surroundings - Not similar

Construction Date: 1947

Original Use: Building TA-73-2 was originally a Laboratory incinerator that incinerated classified documents (LANL 1992). Later it was used to burn all types of Laboratory trash and County trash. Non-combustible materials were dumped over the edge of the mesa into Pueblo Canyon to the north.

Use History: Building TA-73-2 was used as an incinerator by the Laboratory, AEC, ERDA, DOE, and Los Alamos County.

Use at Time of Survey: Los Alamos County and the airport are using TA-73-2 for storage.

Condition at Time of Survey: Fair to good

Building Description: (See also Appendix C)

Building style - Industrial, reinforced concrete building with a flat roof

Foundation material - Concrete slab

Wall material/surface - Reinforced concrete and concrete masonry units

Architectural features - TA-73-2 is a one-story rectangular building with a basement that is below grade on the south elevation but at ground level on the north elevation. It is constructed of reinforced concrete.

The south elevation is the front of the building, only the ground floor is visible from this side. Originally there were two large roll-up garage doors on the south elevation. The western door has been removed and the opening walled up with concrete masonry units and a metal pedestrian door.

On the east elevation the ground level and a portion of the basement are visible. There is a series of six three-pane awning windows that have been covered with metal plates. On the basement level there is another window, a double awning window, one window on top of the other with three panes of glass in each, covered with a metal plate.

On the north elevation of the building both the ground floor and the basement level are visible. There are two large window openings that have also been covered with metal plates. Each window is composed of two side-by-side, double awning three-pane windows, one on top of the other with one fixed pane of glass between the two awning windows. On the basement level there are two sets of metal double pedestrian doors. Between the two doors there are two openings that also have been covered with metal plates.
These two openings may have been from where the exhaust stack was connected to the building. The foundation to the exhaust stack for the incinerator is located to the north of the building. The stack was removed sometime after 1965.

On the west elevation, like the east elevation on the ground level, there is a series of six awning windows that have been covered with metal plates. Below these windows there is a small awning window that has also been covered by a metal plate. On the basement level there is a double awning window that has been covered by a metal plate. Towards the southern side of the west elevation at the basement level there is a covered vent that connects to the fan room.

Inside the building along the west wall there is a stairway leading up to a landing and restroom.

Remodeling History: At some time the western roll-up garage door was removed and the opening walled up with concrete masonry units and a metal pedestrian

door. Additionally, the incinerator and stack have been removed and the building windows covered with metal plates. Per comments from a Los Alamos resident, by 1965 the incinerator had been removed but the exhaust stack was still there. It was removed some time later.

Associated Buildings: None

Associated Historic Theme: Laboratory Administration and a possible Waste Management Theme

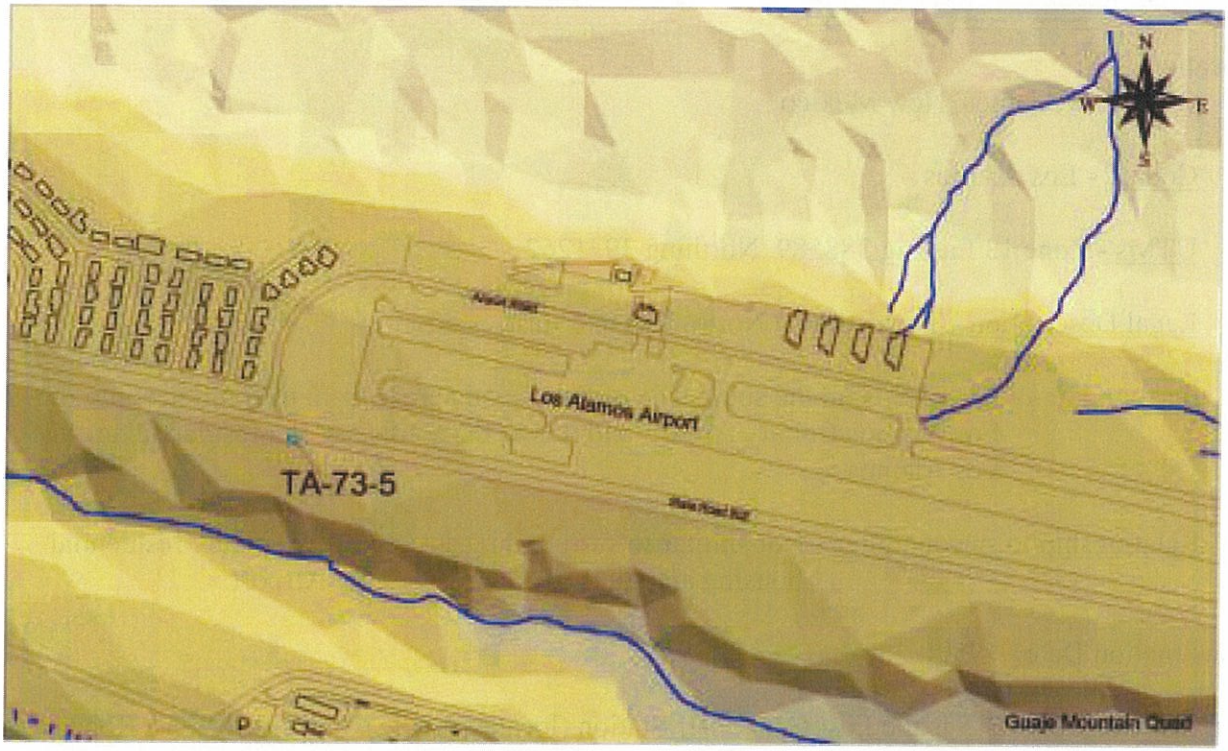
Property Type: Support Building

District Potential: No

Contamination History: No known contamination

Integrity: Fair

Eligibility: Eligible under Criteria A



TA-73-5 East and North Elevations

TA-73-5

Building Name: TA-73-5
Original Name: TA-0-1089, TA-0-1115, and TA-0-1351

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 388589 Northing 3971262

Legal Description - Township 19 North, Range 6 East, Section 14

Surroundings - TA-73-5 is on the south side of East Road across from the entrance into the Los Alamos County Airport and it is to the southeast of a residential area of Los Alamos.

Relationship to surroundings - Not similar to surrounding structures, which are residential housing and the Los Alamos County Airport.

Construction Date: 1950

Original Use: TA-73-5 is the East Gas Meter Station (located on the south side of East Road across from the airport entrance).

Use History: TA-73-5 has always served as a gas meter station.

Use at Time of Survey: TA-73-5 is still functioning as a gas metering station. As of August 1, 1999, it has been transferred to the Public Service Company of New Mexico (PNM). PNM has an easement to do repairs and work on the line.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Reinforced concrete and concrete masonry unit building

Foundation material - Reinforced concrete slab

Wall material/surface - Stuccoed concrete masonry unit walls

Architectural features - Situated outside on all sides of the building is exterior equipment (tanks and/or pipes) that connects to the building.

On the north elevation of TA-73-5 there are three screened windows and a metal awning covering a control box.

Both the east and west elevations have metal pedestrian doors with wire glass windows.

On the south elevation there are three screen windows, like on the north elevation of the building. External conduits are located on the west end of the south elevation.

Remodeling History: There are no engineering drawings or plans for this building, however, it does not appear that any remodeling has occurred.

Associated Buildings: Other gas metering stations

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. This building is only a utility support building.

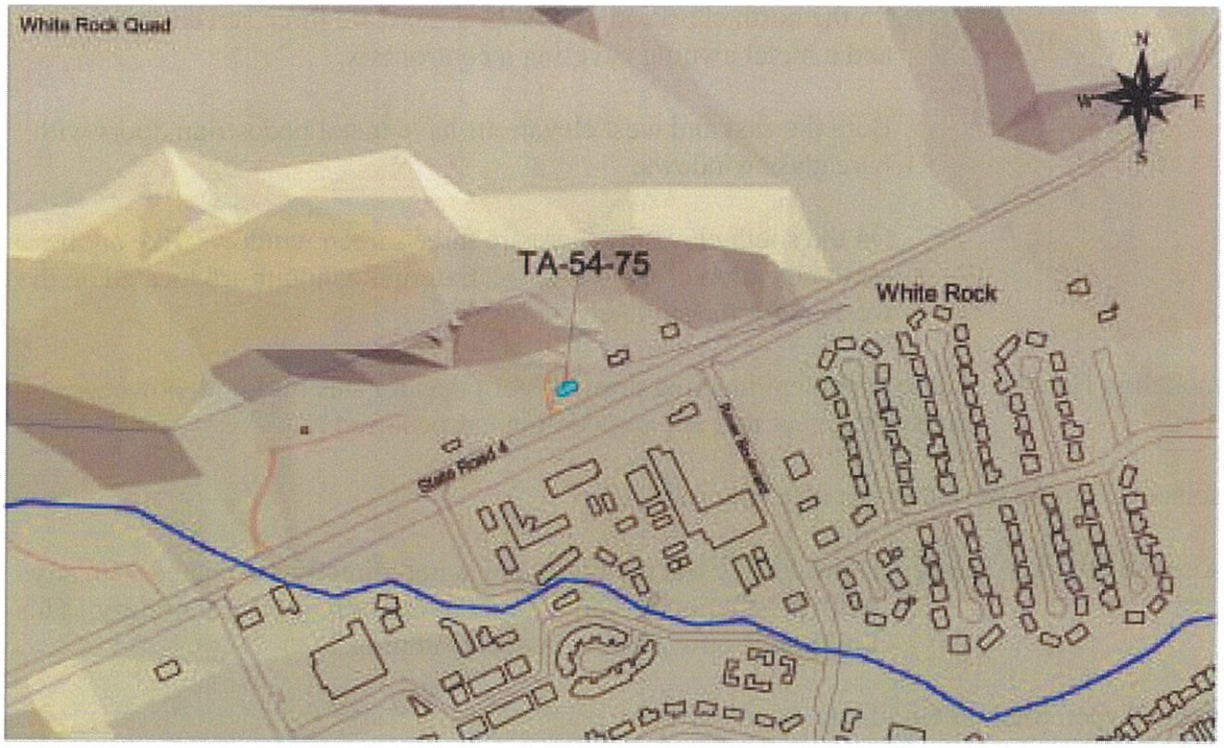
Property Type: Support Building

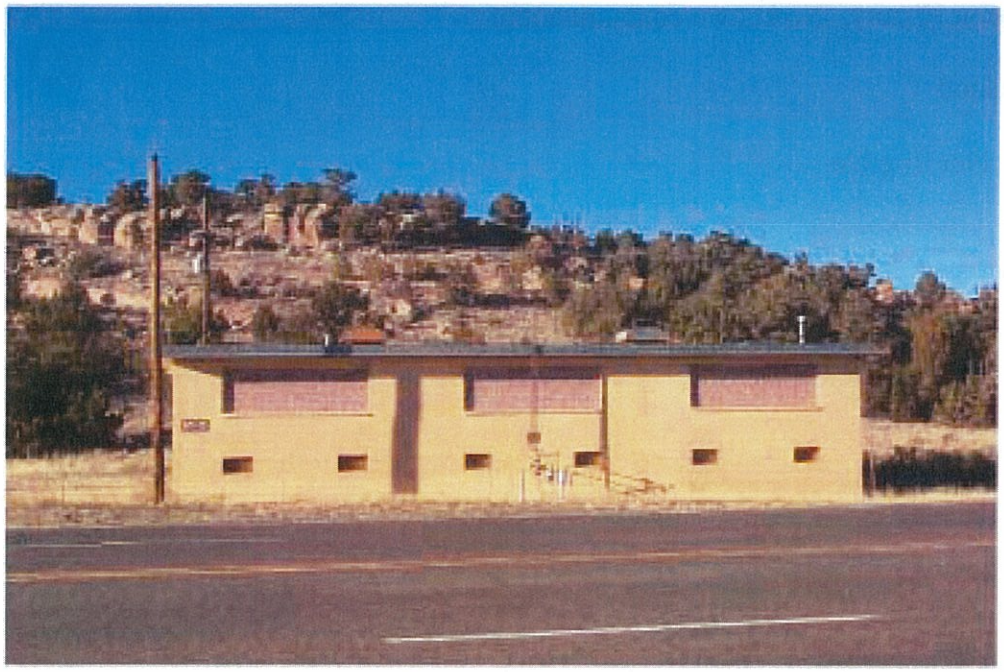
District Potential: No

Contamination History: No known contamination

Integrity: Good

Eligibility: Not Eligible





TA-54-75 South Elevation

TA-54-75

Building Name: TA-54-75 White Rock Pump Station
Original Name: TA-0-1057

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 390917 Northing 3965412

Legal Description - Township 19 North, Range 6 East, unplatted land

Surroundings - The pump house is located in an undeveloped portion of TA-54 and is situated to the north of the business district of the community of White Rock.

Relationship to surroundings - Similar to other well houses

Construction Date: 1962

Original Use: Building TA-54-75 is the White Rock water pump station.

Use History: Building TA-54-75 has always served as the White Rock water pump station.

Use at Time of Survey: White Rock water pump station. Part of the building is also a fluoride analyzer station.

Condition at Time of Survey: Good

Building Description: (See also Appendix C)

Building style - Concrete masonry unit structure

Foundation material - Concrete slab and stem walls

Wall material/surface - Concrete masonry units and red brick

Architectural features - TA-54-75 is a rectangular building with a flat roof. Two large convex-shaped vents are located on the roof.

Along the south elevation there are six inset louvers, evenly spaced below three red-brick-filled openings (probably original window openings).

On the west elevation there is a set of metal double doors and an inset louver.

There is a set of metal double doors at the west end of the north elevation. At the east end of the elevation there are two single metal pedestrian doors.

On the east elevation there is a red-brick-filled opening (probably an original window opening) located above an inset louver.

Remodeling History: What appears to be original window openings have been filled in with red brick. There are no engineering drawings or plans for this building, however, it does not appear that any remodeling has occurred.

Associated Buildings: Other water well pump stations

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. This building is only a utility support building.

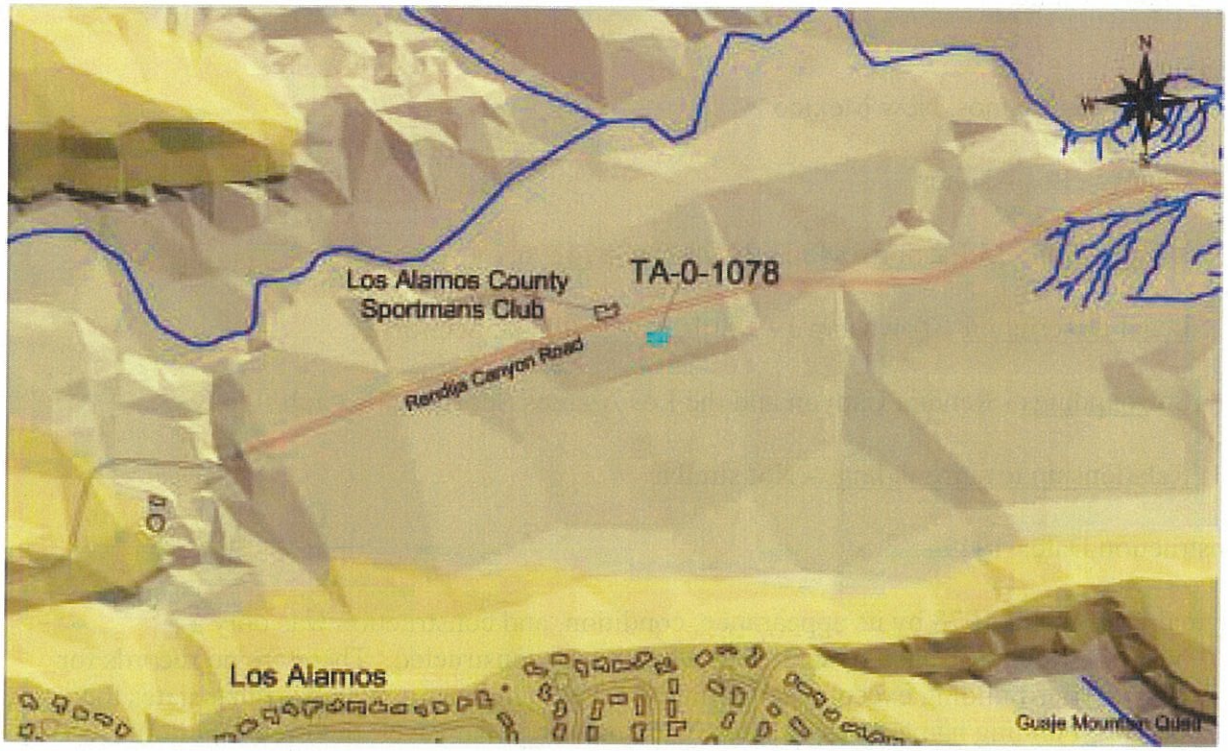
Property Type: Support Building

District Potential: No

Contamination History: No known contamination

Integrity: Good

Eligibility: Not Eligible



TA-0-1078 North Elevation

TA-0-1078

Building Name: TA-0-1078 Sportsmen's Club Storage Shed
Original Name:

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 384803 Northing 3974396

Legal Description - Township 19 North, Range 6 East, Section 2

Surroundings - Rendija Canyon and the Los Alamos Sportsmen's Club

Relationship to surroundings - Not similar

Construction Date: 1949

Original Use: TA-0-1078 by its appearance, condition, and construction was only a warehouse/shed of some sort when it was constructed. There are no records for this building except an entry in the LANL engineering database that states the building name as "Sportsman Club building," however, the LANL building number sign and designation is still attached to the building. At some point in time it was moved to its current location at the Los Alamos County Sportsmen's Club in Rendija Canyon.

Use History: By the buildings' appearance and construction it appears that the building was originally some type of Laboratory warehouse/shed. There is no information regarding this building as to when it was moved to its present location at the Los Alamos County Sportsmen's Club in Rendija Canyon.

Use at Time of Survey: TA-0-1078 is being used as an equipment shed for the Los Alamos County Sportsmen's Club.

Condition at Time of Survey: Poor

Building Description: (See also Appendix B)

Building style - Wood frame and siding building

Foundation material - Wood footings sitting directly on the ground surface

Wall material/surface - Wood frame and siding, planks laid crosswise over frame

Architectural features - Building TA-0-1078 has an elevated wood floor with a wood skirt enclosing the space between the wood footings and the wood floor. This building is approximately 800 sq ft. The roof is pitched and has several layers of asphalt shingles.

On the north elevation of the building there is a set of wooden stairs and a wooden door. There are four areas, which appear to have been windows that have been closed with smaller wood planks than that of the building's siding. Two of these areas are at the east end and two are at the west end of this elevation.

There were possibly two louvers in the pediment of the east elevation. Both areas have been covered with boards. A light fixture is attached to the building between the two boards. Also, on this elevation there are two areas with small planks that appear to have been windows, and there is one area, that extends from the floor level the height of the building, which has also has been filled with small planks. This area may have been a doorway at one time.

On the west end of the south elevation there are two areas filled with small planks. These areas may have been a door and window.

In the pediment of the west elevation there is a louver. There are also four areas that appear to have been window openings that have been covered with small wood planks.

Remodeling History: What appears to have been window and door openings on all elevations have been closed with small wooden planks.

Associated Buildings: The Los Alamos County Sportsmen's Club clubhouse building

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. By the appearance of this building it was built as a warehouse/storage building for the Laboratory and was later moved to its present location in Rendija Canyon. It is being used as a storage building by the Los Alamos County Sportsmen's Club.

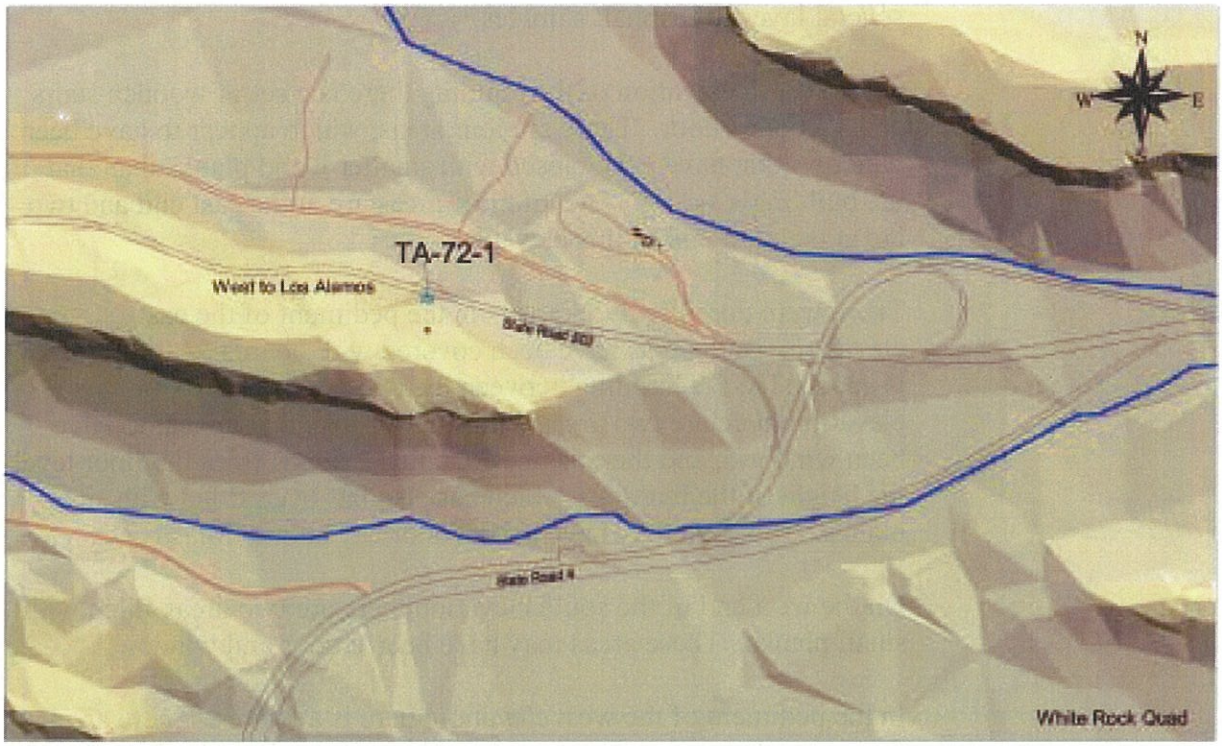
Property Type: Support Building

District Potential: No

Contamination History: None

Integrity: Poor

Eligibility: Not Eligible



TA-72-1 North Elevation

TA-72-1

Building Name: TA-72-1 Los Alamos Booster #3
Original Name: TA-72-1

Location:

City - Los Alamos, New Mexico

County - Los Alamos

UTMs - Zone 13 Easting 389741 Northing 3970040

Legal Description - Township 19 North, Range 7 East, Section 20

Surroundings - Open, undeveloped buffer areas of the Laboratory. This water well booster station and a ground-mounted water reservoir are located directly south of East Road. There is another ground-mounted water reservoir located to the northeast of this building.

Relationship to surroundings - Not similar

Construction Date: 1948

Original Use: TA-72-1 is a water well booster station.

Use History: TA-72-1 has always been a water well booster station for Los Alamos.

Use at Time of Survey: It is still used as a water well booster station. It is currently designated as Los Alamos Booster Station #3.

Condition at Time of Survey: Good

Building Description: (See also Appendix B)

Building style - Concrete masonry unit building covered with stucco

Foundation material - Concrete slab

Wall material/surface - The walls are constructed of concrete masonry units that have been covered with stucco.

Architectural features - On the north elevation of TA-72-1 there are two large sash windows. In between the two windows there is a set of metal double doors with glass windows. A transom window is located above the doors.

Remodeling History: There are no engineering drawings or plans for this building, however, it does not appear that any remodeling has occurred.

Associated Buildings: Other water well booster stations and well houses

Associated Historic Theme: This building has not been, and is not, directly associated with any main production/research thrust or mission at the Laboratory. This building is only a utility support building.

Property Type: Support Building

District Potential: No

Contamination History: No known contamination

Integrity: Good

Eligibility: Not Eligible

Los Alamos
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