

Title:

NEPA AND NHPA- SUCCESSFUL DECOMMISSIONING OF
HISTORIC MANHATTAN PROJECT PROPERTIES AT
LOS ALAMOS NATIONAL LABORATORY, LOS ALAMOS, NEW MEXICO

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**NEPA and NHPA- Successful Decommissioning of Historic Manhattan Project Properties
at
Los Alamos National Laboratory, Los Alamos, New Mexico**

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1. Introduction to Los Alamos

In 1942, shortly after the United States became involved in World War II, Albert Einstein wrote a letter to president Franklin D. Roosevelt warning him that Germany could be developing an atomic bomb. In the same year, a conference organized by University of California physicist Dr. J. Robert Oppenheimer concluded that a bomb based on nuclear fission was feasible. Acting on Einstein's concerns, President Roosevelt gave approval for the Manhattan Project, a coordinated effort by universities and industry to develop an atomic bomb. A secret laboratory was to be established with the sole purpose of producing a weapon based on nuclear fission. The site for this project had to be isolated and capable of being maintained in the utmost security. Adequate water, a local labor force, and transportation had to be available. Robert Oppenheimer, who had visited northern New Mexico and the Pajarito Plateau, suggested Los Alamos, which was then a ranch school for boys. What is now Los Alamos National Laboratory (LANL) was established by Presidential Order in 1943 as "Project Y". It was operated by the University of California under control of the War Department. U.S. Army Brigadier General Leslie Groves managed security, construction, and overall operations. Robert Oppenheimer coordinated the scientific work of designing and constructing the bomb.

The original operations area was located around a pond in the center of what is now the town of Los Alamos (Figure 1). Laboratory buildings were hurriedly constructed and the assembled scientists began a series of chemistry and physics experiments to understand the nature of the uranium and plutonium isotopes capable of fission.

Based on this early work, two bomb designs appeared to be the most promising: a uranium "gun" type and a plutonium "implosion" type. The "gun-type" bomb involved firing a mass of fissionable material at another mass of the same material, in this case uranium-235, to form a critical mass. Scientists were less confident about the second "implosion-type" method, a design that required the compression of fissionable material using high explosives (HE). The compression action would increase the density of a slightly subcritical mass of plutonium-239 and would cause a critical reaction (LANL 1995). Because of the hazards associated with working with these materials, all explosives were fabricated and assembled in remote locations called "V-Site" and "S-Site", several miles southwest of the main operations area (Figure 2). HE components of the "Trinity" device, the first implosion bomb, were test assembled in building TA-16-516 at "V-Site". Other buildings at "V-Site" were used to prepare and finish the HE components and to run preliminary tests on the "Trinity" bomb (Wilder 1991). Buildings at "S-Site" were also used in conjunction with the development of early atomic bombs, including pioneering explosive and casting research.

The outcome of the Manhattan Project and the work at the scientific laboratory was demonstrated by the detonation of the "Trinity" device at White Sands, New Mexico on the morning of July 16, 1945. This was followed by explosions of the two remaining bombs, "Little Boy", a uranium "gun" type, at Hiroshima, Japan on August 6, and "Fat Man", another plutonium-implosion device, at Nagasaki on August 9. The end of World War II followed immediately.

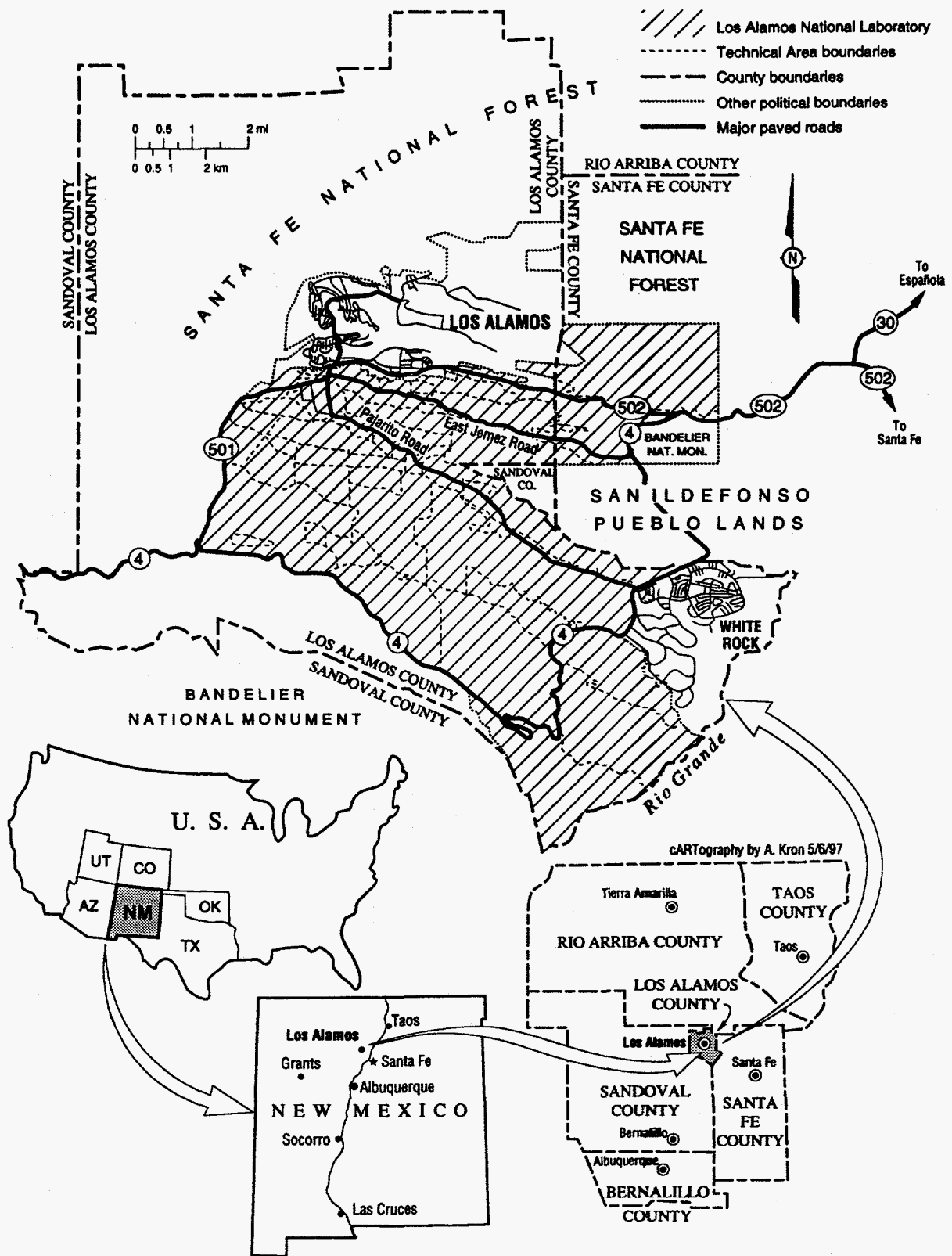


Figure 1. Location of Los Alamos, New Mexico and Los Alamos National Laboratory.

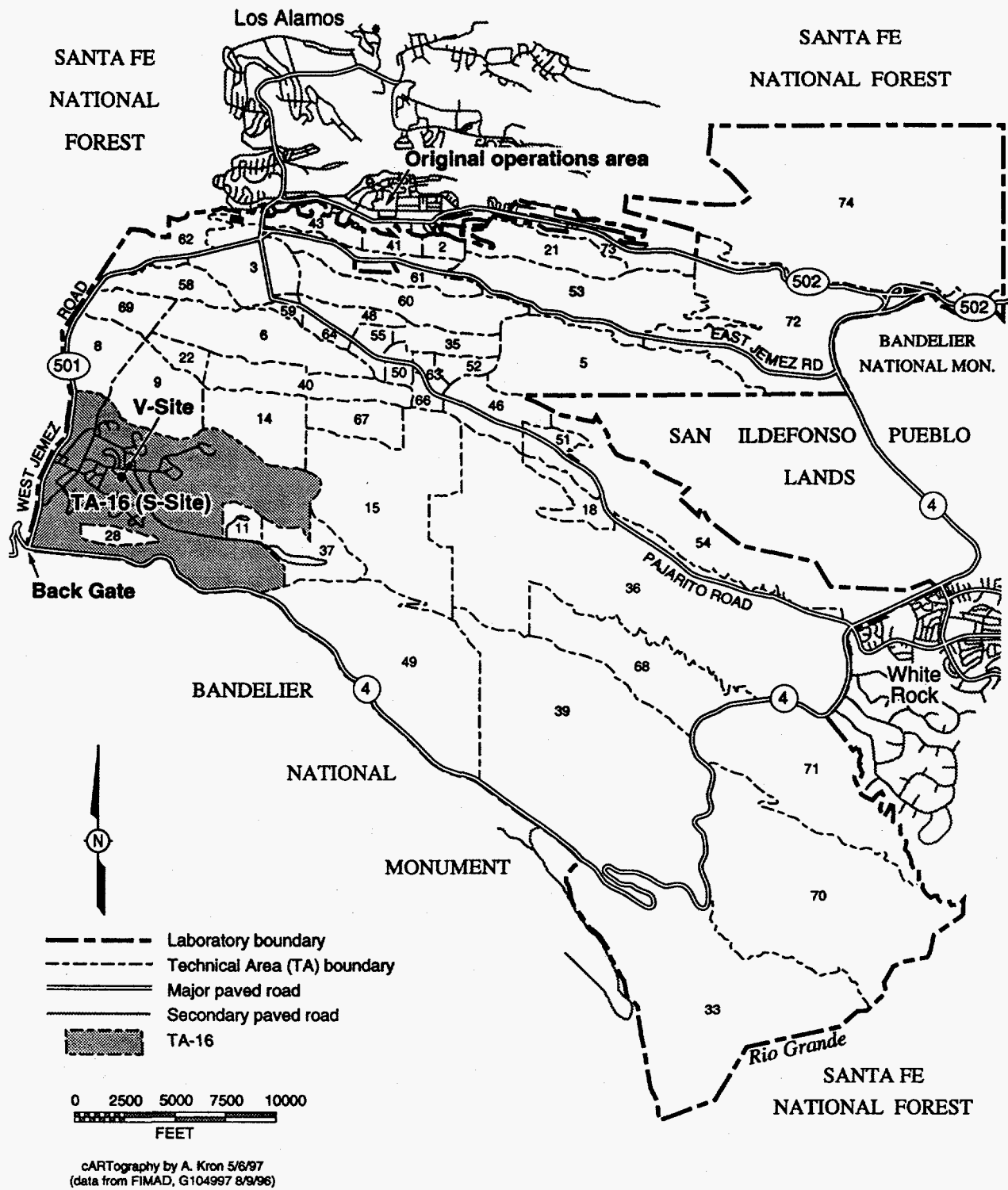


Figure 2. Location of original operations area, Technical Area 16 (S-Site and V-Site) and the Back Gate.

2. Statement of Problem— Old, Contaminated, Historic Buildings

Rather than closing and abandoning the laboratory at Los Alamos after the conclusion of the war, the decision was made to use the facilities and scientific talent assembled there to continue research on the military applications of nuclear energy. The Soviet Union began developing nuclear weapons and the political realignment of the Cold War era came into being. In 1946, the Atomic Energy Commission (AEC) was established as the civilian steward of atomic technology. The AEC took over the scientific laboratory in 1947 and made the commitment to retain it as a permanent weapons laboratory. Subsequently, scientists at Los Alamos participated in developing the hydrogen bomb, many specific weapons designs, and plastic-bonded explosives, all of which have been significant in Cold War and subsequent arms limitation treaties.

With the transition to a permanent installation, the old laboratory buildings in the original operations area were demolished and new scientific facilities were constructed across Los Alamos Canyon, away from the old laboratory and housing area. Research laboratories were built on South Mesa, now called Technical Area (TA) 3. Plutonium operations were moved to TA-21, east of what was becoming a town. Other TAs were developed for special scientific purposes including fundamental biomedical research, health physics, supercomputing, reactor technology, and physics of subatomic particles. However, HE operations continued at S-Site, which was renamed TA-16. The old wooden buildings were abandoned because they were impractical for long-term HE work and new concrete buildings were constructed.

This group of abandoned buildings, associated with events of historical significance, posed an interesting problem when they became candidates for decontamination and decommissioning (D&D) as a part of the U.S. Department of Energy (DOE) Environmental Restoration Program at LANL. They are representative of many buildings built during the Manhattan Project and early Cold War period in that they were built rapidly and for short-term use out of whatever materials were available. Work with the explosives materials was done under extreme pressures of time and not to current standards.

By 1994, 28 properties in this group were scheduled for D&D. These properties, constructed between 1944 and 1951, consisted of 27 buildings and 1 platform structure. The 28 S-Site properties can be grouped into functional categories related to the overall HE-manufacturing process: storage magazines, bunkers/personnel shelters (Figure 3), casting (Figure 4 a & b), processing, inspecting, cleaning (Figure 5), assembly (Figure 6), and security (Figure 7). Several steps were necessary in order to process the HE into a finished casting. First, molten HE was poured into a mold (various techniques were developed in order to control the cooling of the HE as it solidified; including the use of steam heat and controlled temperatures of water). The castings were then machined under water at the different process buildings. Physical inspection of the castings utilized X-rays, and darkrooms were used to develop the resulting films. HE castings were stored in "rest houses" or bunkers during the different stages of processing. Finally, finished castings were coated with a protective layer of varnish, felt, and paper (Wilder 1991).

The properties were constructed out of wood or concrete. By 1994, the wooden buildings were badly deteriorated, particularly those bermed with earth. In addition, they were contaminated with hazardous materials. Walls, floors, and waste piping under the floors contained HE residues. Roofing and wall materials contained asbestos. Lead-based paints had also been used. In many cases, buildings had been abandoned for forty or more years. Most buildings had active rodent nests with associated droppings, of particular concern because of the possibility of hanta virus contamination. Proposed D&D activities included the removal of all contaminated equipment and material from the interior and exterior of structures and buildings. Associated drain lines and utilities, if contaminated, would also be removed. As a result of the decontamination phase, most of the 28 properties would be completely demolished.



Figure 3. Building TA-16-77, concrete bunker with earthen barricade



Figure 4a. Building TA-16-27, east side of casting facility



Figure 4b. Building TA-16-27, interior view of main casting room

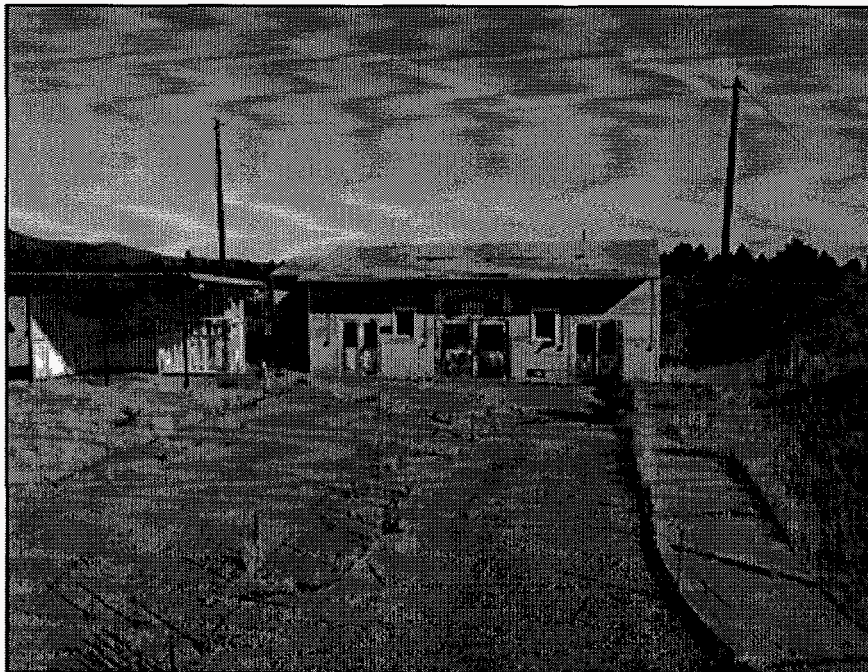


Figure 5. Buildings TA-16-99 (processing facility) and TA-16-164 (shed)

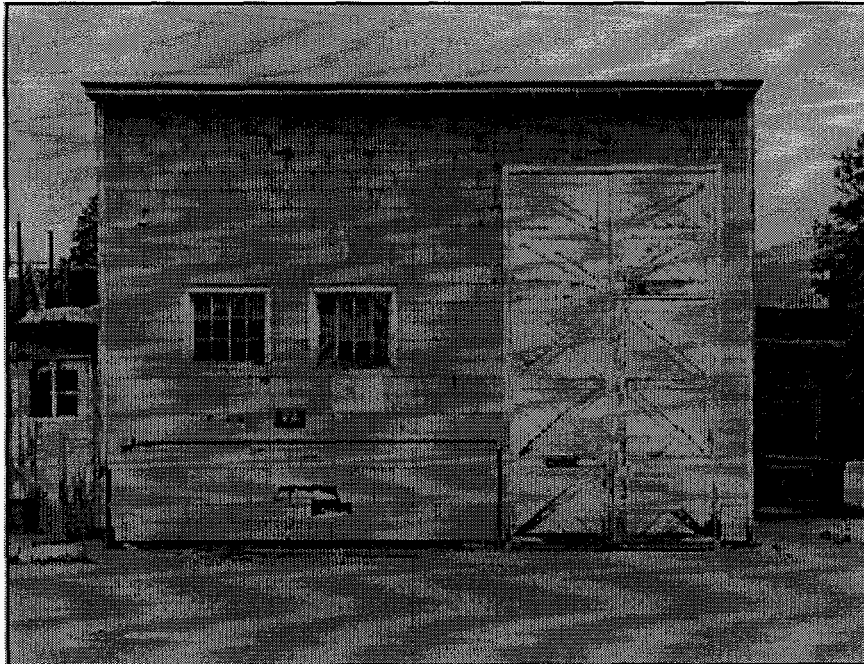


Figure 6. Building TA-16-516, assembly facility

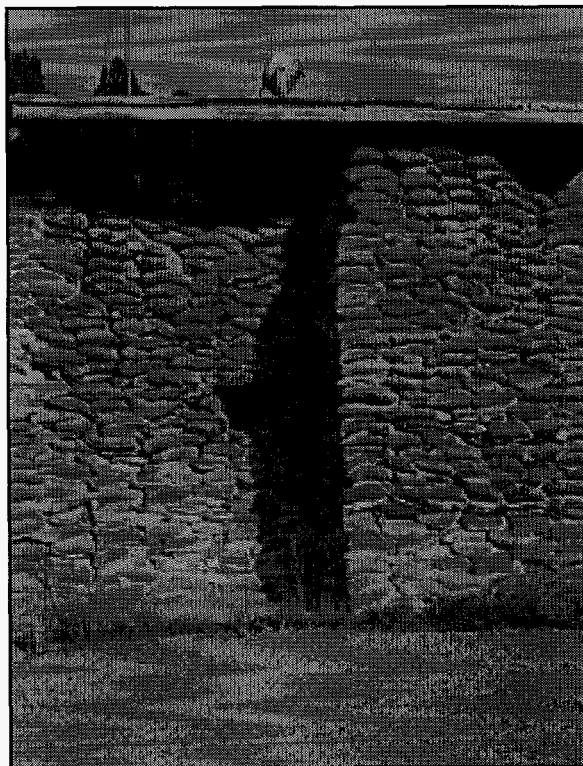


Figure 7. Building TA-16-101, guard station (fortified with concrete-filled sand bags)

3. National Historic Preservation Act (NHPA) Status

As a first step in the D&D process and in compliance with Section 106 of the NHPA, LANL cultural resource personnel had to determine the eligibility of the properties for inclusion in the National Register of Historic Places. The evaluation of the 28 S-Site properties identified for D&D was accomplished in several phases. In early 1995, an initial eligibility report was submitted to the New Mexico State Historic Preservation Officer (SHPO) for concurrence. In order to prepare this report, field visits were made to the various building and structure locations. The 27 buildings and 1 structure were recorded on New Mexico Historic Building Inventory Forms and color photographs were taken. Records research at LANL's engineering records group (FSS-9) was also carried out. Building plan information was obtained and historical research was conducted in order to assess the significance of the original activities conducted at TA-16. Historical and construction information were also provided by D&D project personnel.

Based on the information gathered during the building surveys, all 28 properties were determined to be eligible for inclusion in the National Register of Historic Places (Taylor to Kirkman, March 24, 1995). Seven buildings were at least fifty years old and were eligible for inclusion in the National Register under criterion A (properties associated with important historical events). Nine buildings were less than fifty years old and were eligible under criterion A (criteria consideration G) due to their association with events of exceptional importance during Manhattan Project and early Cold War years at Los Alamos (properties that have achieved significance within the last fifty years)(DOI 1991). Eleven additional buildings and 1 structure, although not individually eligible under criterion A, were determined eligible as contributing elements to a historic district under criterion A and criterion C (properties that represent a significant and distinguishable entity). Because of this eligibility, demolishing these properties would constitute a major impact, one having an adverse effect.

4. National Environmental Policy Act (NEPA) Status

The DOE's regulations implementing NEPA permit a categorical exclusion from the requirement to prepare either an environmental assessment (EA) or environmental impact statement for many routine actions, including removal of contaminated materials under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and other authorities (10 CFR 1021.410, Subpart D, Appendix B6.1, DOE 1992). These abandoned and deteriorated buildings would have been logical candidates for such a categorical exclusion determination except for their association with significant historic events. The DOE Los Alamos Area Office (DOE/LAO) staff determined that the DOE NEPA regulations would not support either a categorical exclusion or an EA and Finding of No Significant Impact as appropriate for an action that would have a significant effect on the human environment (10 CFR 1021, DOE 1992). As the demolition of properties eligible for the National Register would be an adverse effect, this situation constituted an opportunity to negotiate a reasonable compromise.

5. A Compliant and Effective Solution

Despite the buildings' association with historic events, restoration was not feasible due to the extent of contamination and deterioration. A separate document outlining the proposed effects to the buildings and a proposed treatment plan for the mitigation of these effects was submitted to the New Mexico SHPO in April 1995. The SHPO was requested to concur in a determination of adverse effect for the TA-16 D&D project since most of the properties would be destroyed. The SHPO was further requested to concur that the treatment of effects proposed in the report

constituted a mitigation of the adverse effects.

A Memorandum of Agreement (MOA) between the New Mexico SHPO and the DOE was prepared and implemented prior to the actual D&D of the 28 properties. This MOA, under provisions contained in 36 CFR Part 800.7, was subject to a State of New Mexico review process in lieu of compliance with the Advisory Council's regulations (NM SHPO 1993). Key measures of the MOA included the compilation of Historic American Building Survey/Historic American Engineering Record (HABS/HAER)-quality documentation ("Level 1") including the generation of measured drawings; the completion of an extensive black-and-white photodocumentation effort, using a large-format camera; the completion of an architectural evaluation of the individual buildings; the creation of an in-depth site history document; and the renovation of one of the buildings, the "Back Gate Guard Station" (TA-16-1451), to a usable state. Final photographs, drawings, and reports would be placed on file at the New Mexico SHPO's office (DOE 1995).

By signing the MOA, the New Mexico SHPO and the DOE agreed that the DOE would ensure that the mitigation measures would be carried out. Complying with the stipulations of the MOA would be evidence that the effects of the D&D project on historic properties had been taken into account. The MOA was signed by both parties in May 1995. This is equivalent to a determination that a significant adverse effect would be prevented by taking the agreed-upon actions.

Based on the terms of the MOA, the DOE/LAAO was able to categorically exclude the decommissioning and then demolition of these historic properties from further NEPA documentation. This determination was made on June 6, 1995.

5.1 MOA between DOE and NM SHPO

The purpose of the MOA was to ensure that the adverse effects to the 28 properties were mitigated to the fullest extent possible. Mitigation measures contained in the MOA were based on documentation requirements contained in the Secretary of the Interior's Guidelines for Architectural and Engineering Documentation (Keune 1984).

Descriptions of the mitigation measures are as follows:

- ***Measured Drawings***

HABS/HAER-quality measured drawings would be drafted as needed (adequate drawings already existed for some of the properties). Since six of the bunkers were identical in size and design, only one representative drawing would be necessary. The measured drawings would be produced in ink on archivally stable material. Buildings would be measured and the measurements would be recorded in field notebooks. All field notes would be archived. A complete set of existing LANL drawings for each eligible building and for any associated equipment would be compiled.

- ***Photodocumentation***

Large-format, archival-quality, black-and-white photographs would be taken. The negatives would be 4" X 5", 5" X 7", or 8" X 10" in size and the photographs would be perspective-corrected and fully captioned. The final prints would be processed and labeled in accordance with HABS/HAER guidelines. Original negatives would be archived at LANL's photographic archives.

- ***Architectural Assessment***

An architectural assessment of each National Register-eligible property would be conducted by an architectural historian. This assessment would identify significant architectural features and styles for each property with a determination of Register eligibility under criterion C (properties

that embody the distinctive characteristics of a type, period, or method of construction). Architectural comparisons with historic properties at other DOE facilities would also be made.

- **Site History**

A written history would be prepared. This document would include a use history of each National Register-eligible building along with a historical account of the early years at S-Site and Los Alamos' role during the Manhattan Project and Cold War eras. This documentation would come from several sources: LANL engineering drawings and records, information from the LANL and Los Alamos Historical Museum archives, published histories of the Manhattan Project and Cold War periods, and oral interview data from former building or project workers.

- **TA-16-1451 Renovation**

The Back Gate Guard Station would be renovated following the *Secretary of Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (DOI 1990). This building is contaminated with asbestos-containing roofing material and pipe insulation. Rodent droppings are also present and a thorough cleaning of the building was proposed. Other decontamination measures included the replacement of the roof and the removal of asbestos insulation. This building would be renovated to a usable state. The doors and windows would be repaired and the interior and exterior of the building would be painted. All repair work would be compatible with historic materials and colors.

5.2 Implementing the Terms of the MOA

5.2.1 Measured Drawings

An architectural/engineering firm was contracted to prepare the measured drawings. Field measurements were taken and existing file drawings were compared to current building conditions. The architectural documentation is still in the process of being compiled. The end result will include existing LANL as-builts, modified LANL as-builts, and new HABS/HAER-quality drawings. Computer-aided drawing (CAD) technology was used in order to modify as-builts to reflect current conditions. Existing as-builts were scanned-in and field measurements were added directly to the computer files. The completed drawings will be printed on archival-quality media. The figure labeling of measured drawings will be in accordance with HABS/HAER guidelines. Figure 8 shows an example of a measured drawing for TA-16-27, the "casting" building.

5.2.2 Large-Format Archival Photographs

LANL photographers, assisted by a member of LANL's Cultural Resource Team, documented all 28 properties using large-format (4" X 5" negative) cameras. Photographs of the buildings' exteriors were systematically taken in order to document all sides of the affected properties. Large-format photographs of the buildings' interiors were also taken, often using hand-held flashes since the buildings no longer had electrical lighting. The large-format photographs were also supplemented with standard 35-mm color and black-and-white prints. These 35-mm photographs do not meet HABS/HAER "Level 1" documentation standards; however, given the size and complexity of some of the buildings and the nature of the remaining equipment, additional photodocumentation was warranted.

Polaroid film was used in the field to determine the correct exposure for the large-format photographs. These instant photographs were labeled with the building and, if appropriate, room number, the direction of the shot, the photographer's name, and the date. The Polaroids were kept in a notebook and eventually proved to be very useful to the architects when final changes were being made to the measured drawings.

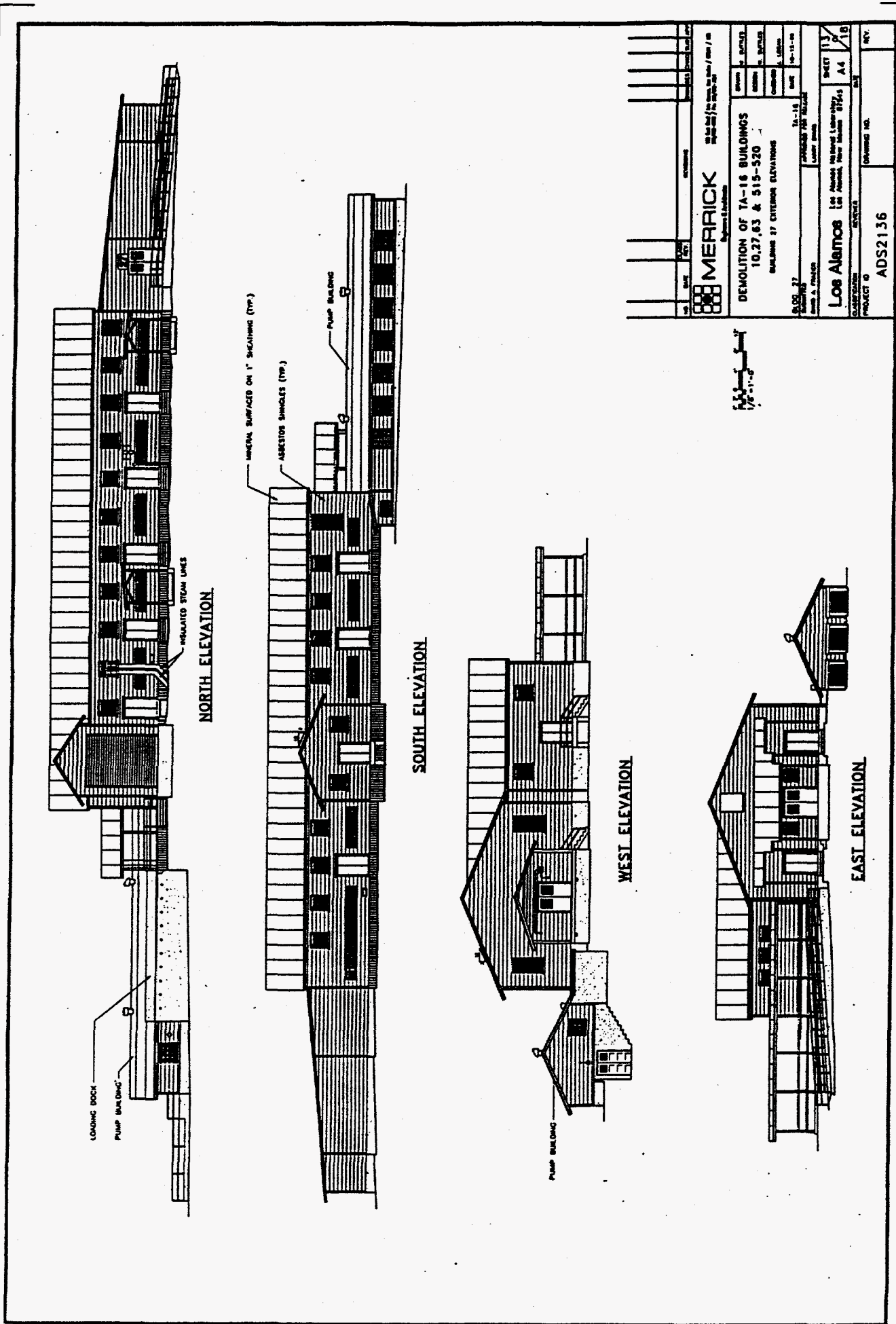


Figure 8. Draft measured drawing of TA-16-27, the "casting" building

The processed large-format photographs were hand printed using HABS/HAER paper and rinse guidelines. One set of the finished photographs will be sent to the New Mexico SHPO. The negatives for the large-format photographs and the 35-mm photographs have been placed in LANL's photographic archives.

5.2.3 Architectural Assessment

An architectural assessment of the 28 properties was conducted by an architectural historian. The following information is excerpted from the draft assessment report (Harvey 1995).

Most of the facilities have retained their physical integrity due to minor levels of exterior structural modifications. This was probably due to the fact that most of the later and secondary uses of many of the buildings did not require extensive remodeling. Many of the properties in TA-16 were used as storage areas prior to their abandonment. Several properties, however, have suffered considerably due to neglect and are in poor condition. The warehouses, ordnance storage facilities, guardhouses, HE-processing buildings, and miscellaneous shops at TA-16 convey industrial functional/vernacular styles found at other DOE and Department of Defense installations around the country.

The following buildings were recommended for eligibility under criterion C.

TA-16-61 is a distinctive example of wood-frame, functional/utilitarian magazine storage facilities. This building is eligible for the Register under criterion C by retaining a sufficient level of physical integrity of its exterior facades, and exhibiting distinctive architectural features reflected in its three wooden cupolas (vents) on the roof line, symmetrically placed windows, and functional design.

Three of the seven bunkers, TA-16-73, -77, and -80, meet the physical integrity standards to be eligible for the Register under criterion C. Considerably different than the other bunkers at TA-16, TA-16-73 possesses a high degree of integrity of design, materials, workmanship, and association, and exhibits significant industrial/engineering characteristics, distinctive functional design, and notable methods of concrete construction under the Register's criterion C. Bunker TA-16-77, the most intact of all the TA-16 bunkers, possesses a high degree of integrity of design, materials, workmanship, and association, and exhibits significant industrial/engineering characteristics, distinctive functional design, and notable methods of construction under the Register's criterion C. This bunker has intact concrete construction, a distinctive wooden porch enclosure at the front entrance, and a well-preserved wooden door and multipane glass windows. Bunker TA-16-80 also has intact concrete construction along with a distinctive wooden porch enclosure at the front entrance.

The "90s" buildings, TA-16-89, -90, -91, -92, -93, and -99, were evaluated as a single complex under the Register's criterion C because of their similar construction methods and materials, compatible building designs, and connective site layout. The one-story, wood-frame, HE-processing buildings convey a sense of industrial functionalism blended with surrounding historic landscape features that include rock walls, sidewalks, steamlines, metal and earthen barricades, driveways, and other industrial features. These utilitarian/functional buildings have maintained their physical integrity. Their exterior features are intact and exhibit distinctive functional designs. Thus, the entire complex is eligible for the Register under criterion C due to distinctive architectural/design features, significant methods of construction, and a site layout that incorporates the surrounding historic natural landscape and cultural landscape.

All of the "V-Site" buildings, TA-16-515, -516, -518, -519, and -520, are eligible for the Register under criterion C, except building TA-16-517 (due to a loss of physical integrity). The complex exhibits distinctive architectural features, a significant site layout/landscape situated around a hardtop "plaza", and notable methods of construction. The buildings/complex reflect a significant

blend of industrial functionalism and Classical/Colonial Revival influences in their flat exterior surfaces, precise geometric lines, and symmetrical designs.

6. Status of MOA Mitigation Measures

All field work has been completed and final preparation of the photographs and drawings is in progress. The history document and the renovation of building TA-16-1451 have not yet been started. To date, over half of the properties have been decontaminated and demolished.

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