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UTAH,
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Dugway Proving Ground
Dugway
Tooele County
Utah

HAER No. UT-35

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
Washington, DC 20013-7127

HAER
UTAH,
23-DUG
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HISTORIC AMERICAN ENGINEERING RECORD

Dugway Proving Grand

UT-35

Location: In Tooele County, Utah, about sixty-seven miles Southwest of Salt Lake City.

Date of Construction: Established in 1942.

Owner: Department of the Army

Significance: During World War II, the installation's mission consisted of testing toxic agents, flame throwers, incendiary bombs, chemical spray systems, and biological warfare weapons. In addition, scientist also tested various chemical antidotes and several types of protective clothing.

Historical Report Prepared by: David G. Buchanan and John P. Johnson, 1984

Prepared for Transmittal by: Robie S. Lange, HABS/HAER, 1985.

EXECUTIVE SUMMARY

Dugway Proving Ground is a major Army testing range located in an isolated section of west-central Utah, about 67 miles southwest of Salt Lake City. A part of the U.S. Army Test and Evaluation Command (TECOM), the installation is currently responsible for assessing the military value of chemical and biological defense systems and flame, incendiary, and smoke obscurant systems. Dugway controls about 850,000 acres of land. An additional 300,000 acres adjacent to the installation are available for certain operations. The proving ground maintains 574 buildings, including community facilities, laboratories, and highly specialized test equipment. The earliest buildings date from World War II when the installation was established by the War Department as a chemical warfare range. Permanent laboratory buildings were constructed primarily during the Korean War, while permanent housing and community buildings were erected during a major construction program following the war.

There are no Category I historic properties at Dugway Proving Ground. The Lincoln Highway Bridge, a pre-military structure constructed about 1900 as part of the original national road from Nebraska to California, is a Category II historic property and was listed on the National Register of Historic Places in 1975. The German Village, an incendiary bombing test site constructed during World War II, is a Category III historic property. This site, which is comprised of two buildings, is associated with a significant World War II program to develop an effective incendiary bomb.

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PREFACE

This report presents the results of an historic properties survey of Dugway Proving Ground. Prepared for the United States Army Materiel Development and Readiness Command (DARCOM), the report is intended to assist the Army in bringing this installation into compliance with the National Historic Preservation Act of 1966 and its amendments, and related federal laws and regulations. To this end, the report focuses on the identification, evaluation, documentation, nomination, and preservation of historic properties at Dugway Proving Ground. Chapter 1 sets forth the survey's scope and methodology; Chapter 2 presents an architectural, historical, and technological overview of the installation and its properties; and Chapter 3 identifies significant properties by Army category and sets forth preservation recommendations. Illustrations and an annotated bibliography supplement the text.

This report is part of a program initiated through a memorandum of agreement between the National Park Service, Department of the Interior, and the U.S. Department of the Army. The program covers 74 DARCOM installations and has two components: 1) a survey of historic properties (districts, buildings, structures, and objects), and 2) the development of archeological overviews. Stanley H. Fried, Chief, Real Estate Branch of Headquarters DARCOM, directed the program for the Army, and Dr. Robert J. Kapsch, Chief of the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) directed the program for the National Park Service. Sally Kress Tompkins was program manager, and Robie S. Lange was project manager for the historic properties survey. Technical assistance was provided by Donald C. Jackson.

Building Technology Incorporated acted as primary contractor to HABS/HAER for the historic properties survey. William A. Brenner was BTI's principal-in-charge and Dr. Larry D. Lankton was the chief technical consultant. Major subcontractors were the MacDonald and Mack Partnership and Melvyn Green and Associates. The authors of this report were David G. Buchanan and John P. Johnson.

The complete HABS/HAER documentation for this installation will be included in the HABS/HAER collections at the Library of Congress, Prints and Photographs Division, under the designation HAER No. UT-35.

Chapter 1

INTRODUCTION

SCOPE

This report is based on an historic properties survey conducted in 1983 of all Army-owned properties located within the official boundaries of Dugway Proving Ground. The survey included the following tasks:

- Completion of documentary research on the history of the installation and its properties, and general research on the history of chemical warfare in World War II.
- Completion of a field inventory of all properties at the installation.
- Preparation of a combined architectural, historical, and technological overview for the installation.
- Evaluation of historic properties and development of recommendations for preservation of these properties.

Also completed as a part of the historic properties survey of the installation, but not included in this report, are HABS/HAER Inventory cards for 30 individual properties. These cards, which constitute HABS/HAER Documentation Level IV, will be provided to the Department of the Army. Archival copies of the cards, with their accompanying photographic negatives, will be transmitted to the HABS/HAER collections at the Library of Congress.

The methodology used to complete these tasks is described in the following section of this report.

METHODOLOGY

1. Documentary Research

Dugway Proving Ground was established during World War II as a chemical and biological warfare testing range. Documentary research focused on the history of the installation and its role as an Army test facility. Research was conducted at the Library of the Utah State Historical Society in Salt Lake City and the Library of Congress in Washington, D.C. The Office of the National Register of Historic Places in Washington, D.C. and the Utah State Historic Preservation Office in Salt Lake City were both contacted about historic properties at the installation. These sources identified the Lincoln Highway Bridge as the only property listed on the National Register but also identified the German Village (Building 8100) as a potential historic property. No other properties were identified through these sources.

Army records used for the field inventory included current Real Property Inventory (RPI) printouts that listed all officially recorded buildings and structures by facility classification and date of construction; the installation's property record cards; and base maps and photographs supplied by installation personnel. A complete listing of this documentary material may be found in the bibliography.

2. Field Inventory

The field inventory was conducted by David G. Buchanan and John P. Johnson during a three-day period in March, 1983. Victor Pratt, the

Environmental Officer at Dugway Proving Ground, served as the point of contact for the survey team and supplied installation maps and background information. Tom Kincaid, of the Environmental and Life Science Division, escorted the survey team during its inventory of the installation. The Public Affairs Officer, Phil Hale, supplied brief histories of the proving ground; Reed Murray, Real Property Officer, provided access to the Real Property cards which supplied important information for the field inventory; and Elaine Nielsen of the Optical Data Branch of Dugway Proving Ground supplied the historic photographs that appear in this report. Jim Dykman, Cultural Resource Advisor with the Utah State Historic Preservation Office, supplied information about potential historic properties at Dugway Proving Ground.

Field inventory procedures were based on the HABS/HAER Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures.¹

All areas and properties were visually surveyed with the exception of the Carr Facility, a chemical ammunition storage area, which was not inventoried due to safety regulations (see Appendix A). Building locations and approximate dates of construction were noted from the installation's property records and field-verified.

Field inventory forms were prepared for, and black and white 35 mm photographs taken of, all buildings and structures through 1945 except basic utilitarian structures of no architectural, historical, or technological interest. When groups of similar ("prototypical") buildings were found, one field form was normally prepared to represent all buildings of that type. Field inventory forms were also completed for representative

post-1945 buildings and structures.² Information collected on the field forms was later evaluated, condensed, and transferred to HABS/HAER Inventory cards.

3. Historic Overview

A combined architectural, historical, and technological overview was prepared from information developed from the documentary research and the field inventory. It was written in two parts: 1) an introductory description of the installation, and 2) a history of the installation by periods of development, beginning with pre-military land uses. Maps and photographs were selected to supplement the text as appropriate.

The objectives of the overview were to 1) establish the periods of major construction at the installation, 2) identify important events and individuals associated with specific historic properties, 3) describe patterns and locations of historic property types, and 4) analyze specific building and industrial technologies employed at the installation.

4. Property Evaluation and Preservation Measures

Based on information developed in the historical overviews, properties were first evaluated for historical significance in accordance with the eligibility criteria for nomination to the National Register of Historic Places. These criteria require that eligible properties possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that they meet one or more of the following:³

- A. Are associated with events that have made a significant contribution to the broad patterns of our history.
- B. Are associated with the lives of persons significant in the nation's past.
- C. Embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction.
- D. Have yielded, or may be likely to yield, information important in pre-history or history.

Properties thus evaluated were further assessed for placement in one of five Army historic property categories as described in Army Regulation 420-40:⁴

Category I	Properties of major importance
Category II	Properties of importance
Category III	Properties of minor importance
Category IV	Properties of little or no importance
Category V	Properties detrimental to the significance of of adjacent historic properties

Based on an extensive review of the architectural, historical, and technological resources identified on DARCOM installations nationwide, four criteria were developed to help determine the appropriate categorization

level for each Army property. These criteria were used to assess the importance not only of properties of traditional historical interest, but of the vast number of standardized or prototypical buildings, structures, and production processes that were built and put into service during World War II, as well as of properties associated with many post-war technological achievements. The four criteria were often used in combination and are as follows:

- 1) Degree of importance as a work of architectural, engineering, or industrial design. This criterion took into account the qualitative factors by which design is normally judged: artistic merit, workmanship, appropriate use of materials, and functionality.
- 2) Degree of rarity as a remaining example of a once widely used architectural, engineering, or industrial design or process. This criterion was applied primarily to the many standardized or prototypical DARCOM buildings, structures, or industrial processes. The more widespread or influential the design or process, the greater the importance of the remaining examples of the design or process was considered to be. This criterion was also used for non-military structures such as farmhouses and other once prevalent building types.
- 3) Degree of integrity or completeness. This criterion compared the current condition, appearance, and function of a building, structure, architectural assemblage, or industrial process to its original or most historically important condition, appearance, and function.

Those properties that were highly intact were generally considered of greater importance than those that were not.

4) Degree of association with an important person, program, or event.

This criterion was used to examine the relationship of a property to a famous personage, wartime project, or similar factor that lent the property special importance.

The majority of DARCOM properties were built just prior to or during World War II, and special attention was given to their evaluation. Those that still remain do not often possess individual importance, but collectively they represent the remnants of a vast construction undertaking whose architectural, historical, and technological importance needed to be assessed before their numbers diminished further. This assessment centered on an extensive review of the military construction of the 1940-1945 period, and its contribution to the history of World War II and the post-war Army landscape.

Because technology has advanced so rapidly since the war, post-World War II properties were also given attention. These properties were evaluated in terms of the nation's more recent accomplishments in weaponry, rocketry, electronics, and related technological and scientific endeavors. Thus the traditional definition of "historic" as a property 50 or more years old was not germane in the assessment of either World War II or post-war DARCOM buildings and structures; rather, the historic importance of all properties was evaluated as completely as possible regardless of age.

Property designations by category are expected to be useful for approximately ten years, after which all categorizations should be reviewed and updated.

Following this categorization procedure, Category I, II, and III historic properties were analyzed in terms of:

- Current structural condition and state of repair. This information was taken from the field inventory forms and photographs, and was often supplemented by rechecking with facilities engineering personnel.
- The nature of possible future adverse impacts to the property. This information was gathered from the installation's master planning documents and rechecked with facilities engineering personnel.

Based on the above considerations, the general preservation recommendations presented in Chapter 3 for Category I, II, and III historic properties were developed. Special preservation recommendations were created for individual properties as circumstances required.

5. Report Review

Prior to being completed in final form, this report was subjected to an in-house review by Building Technology Incorporated. It was then sent in draft to the subject installation for comment and clearance and, with its associated historical materials, to HABS/HAER staff for technical review. When the installation cleared the report, additional draft copies

were sent to DARCOM, the appropriate State Historic Preservation Officer, and, when requested, to the archeological contractor performing parallel work at the installation. The report was revised based on all comments collected, then published in final form.

NOTES

1. Historic American Buildings Survey/Historic American Engineering Record, National Park Service, Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures (unpublished draft, 1982).
2. Representative post-World War II buildings and structures were defined as properties that were: (a) "representative" by virtue of construction type, architectural type, function, or a combination of these, (b) of obvious Category I, II, or III historic importance, or (c) prominent on the installation by virtue of size, location, or other distinctive feature.
3. National Park Service, How to Complete National Register Forms (Washington, D.C.: U.S. Government Printing Office January 1977).
4. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).

Chapter 2

HISTORICAL OVERVIEW

BACKGROUND

Dugway Proving Ground, located in west-central Utah about 67 miles southwest of Salt Lake City, is a materiel testing ground under the command of the U.S. Army Test and Evaluation Command (TECOM). It was officially established on February 12, 1942 by the War Department as a chemical warfare range. Major John R. Burns was designated the first commanding officer of the installation under the Technical Division of the U.S. Army Chemical Warfare Service.¹

During World War II, the installation's mission consisted of testing toxic agents, flame throwers, chemical spray systems, and biological warfare weapons.² In addition to developing toxic agents, scientists also tested various chemical antidotes and several types of protective clothing. The most important experiments conducted during the war included the development of incendiary bombs and flame-throwing weapons. The first incendiary bombs were dropped experimentally on simulated Japanese and German-type buildings constructed at Dugway. Similar incendiary bombs later fell on Japan and Germany.³

Another important chemical warfare activity conducted at Dugway during the war was aerial spraying of toxic agents and surveillance of chemical agents and munitions under temperate zone conditions. Researchers dropped phosgene, cyanogen chloride, and hydrogen cyanide bombs ranging in size from 100 to 4000 pounds from different altitudes under different meteorological conditions

to estimate the quantity of munitions required to lay down a lethal concentration of gas upon a given area. Gas and smoke clouds were also tested under meteorological conditions, and firing tables were established for the M-2 4.2-inch chemical mortar and chemical rockets.⁴

Other World War II activities at Dugway included biological warfare and munitions experiments conducted as part of the SPHINX project. The SPHINX project, conducted during 1945, examined the potential of gas munitions against mock Japanese cave fortifications, which were constructed in the mountains at the Proving Ground.⁵

Immediately following World War II, the Army began to phase out the installation. In January 1947, the Secretary of War established the Western Chemical Center to consolidate the operations of Dugway and the Deseret Chemical Depot (a storage depot established in 1942, and since 1955 a subinstallation of Tooele Army Depot). Dugway remained on inactive standby status from 1947 until it was reactivated in July 1950 with the outbreak of the Korean War.⁶ When reactivated, Dugway increased its programs for testing materiel and equipment for the Research and Development Command of the Army Chemical Corps, formerly the Chemical Warfare Service. The installation tested new weapon systems, including flame throwers, smoke generators, and flame bombs, and conducted experiments in micrometeorology.

In June 1953, the Army transferred its Environmental Test Programs from Edgewood Arsenal in Maryland to Dugway. During that same year the Chemical Corps also assigned Dugway its Program of Meteorological Research and Development. On July 1, 1954, Dugway Proving Ground became a permanent

Army installation under the jurisdiction of the Chief Chemical Officer. From 1958 until 1969, the Army Chemical Corps' CBR (Chemical-Biological Research) Weapons School was active at Dugway.⁷

In 1962, during a major reorganization, the Army assigned Dugway Proving Ground to the Army Test and Evaluation Command (TECOM), with headquarters at Aberdeen Proving Ground, Maryland. Currently, Dugway Proving Ground assesses the military value of chemical and biological defense systems and flame, incendiary, and smoke obscurant systems.⁸

PRE-MILITARY LAND USE

Prior to purchase by the Army in 1942, the land in this area was primarily used for sheep and cattle raising and mining. Early topographic maps and geologic reports reveal evidence of several small mining operations along the north edge of Granite Peak (7,000 feet), a large mountain in the center of the proving ground. At one time, lead, silver, and gold were mined in these granite veins.⁹ Livestock raising and mining operations ceased with military occupation of the land, and no buildings or structures associated with these activities remain within the proving ground boundaries.

The Lincoln Highway Bridge, located at the present Ditto Technical Center, is an engineering structure listed on the National Register of Historic Places. Built about 1900 and known locally as Government Creek Bridge, it was part of the original Lincoln Highway, a national road from Lincoln, Nebraska to Sacramento, California. The road, crossing the west edge of the salt flats,

was called the Goodyear Cut-Off, named for the Goodyear Tire and Rubber Company, a major supporter of the Lincoln Highway in Utah. Attempts to make this road the main route to the west coast were not successful. Local ranchers and miners used the bridge after the Lincoln Highway Association abandoned it in the early 1920's.¹⁰ This crude structure of hewn-log decking and circular log beams, resting on rock and concrete abutments added in the 1930's by local CCC workers, was listed on the National Register in May 1975 and is the only remnant in this area of the Lincoln Highway. (Illustration 1)

CONSTRUCTION AND SITE DEVELOPMENT

At the beginning of World War II the War Department expanded its capacity for chemical warfare defense. Because the Edgewood Arsenal in Maryland offered little room for further development or field testing, the Army looked for new sites for chemical warfare testing. From a study made by the Federal Grazing Service, the Army determined that the desert area in western Utah offered the advantages of climate, altitude, and expansion space not available at other locations. In early 1942, it selected a large tract of arid land about 85 miles southwest of Salt Lake City as the site for a new chemical warfare testing ground. The site lay partly in the Great Salt Lake Desert and was bounded by the Onaqui Mountains on the northeast and the Dugway Mountain Range on the southeast. The Dugway site was ideally suited for the classified and toxic tests the Army planned to conduct.¹¹

In February 1942, President Roosevelt ordered the transferral of 126,720 acres from the public domain to the Chemical Warfare Service, and Dugway Proving Ground was established. The name for the new installation was



Illustration 1: Lincoln Highway Bridge (c. 1900), located in the Ditto Area of Dugway Proving Ground (Source: Field Inventory Photograph, 1983, David G. Buchanan, Building Technology, Inc.).

derived from the serpentine trenches or "dugways" that the early emigrants constructed to transport their wagons over the mountain passes. Today, Dugway controls about 850,000 acres. An additional 300,000 acres adjacent to the installation are available for certain operations, giving Dugway a total area which is larger than the state of Rhode Island.¹² (Illustration 2)

Preliminary headquarters were first established in March 1942 at an existing CCC camp at Simpson Springs, Utah. By April, roads ran to the new site, and temporary buildings stood at Government Well near the Lincoln Highway Bridge. This area, named Dog Area (now Ditto Technical Center), served as the main troop housing and administrative area of Dugway Proving Ground during World War II. Many of its one and two story wood cantonment and supply buildings remain standing today.¹³ (Illustrations 3 and 4)

Laboratories for chemical, physical, and photographic experiments were constructed at Dog Area by August 1942. A permanent airfield built in February 1943 replaced an earlier dirt airstrip. In 1944, a large wood framed aircraft hangar (Building 4010) and a 54 foot wood control tower were built. The tower was replaced by the present 80 foot concrete control tower (Building 4007) in 1955.

Plans were also completed in 1942 for a toxic gas yard, known as Charlie Area (now Carr Facility). Originally planned as a yard 180 feet by 400 feet, this area was expanded by 1944 to a chemical storage area of about 100 acres.¹⁴

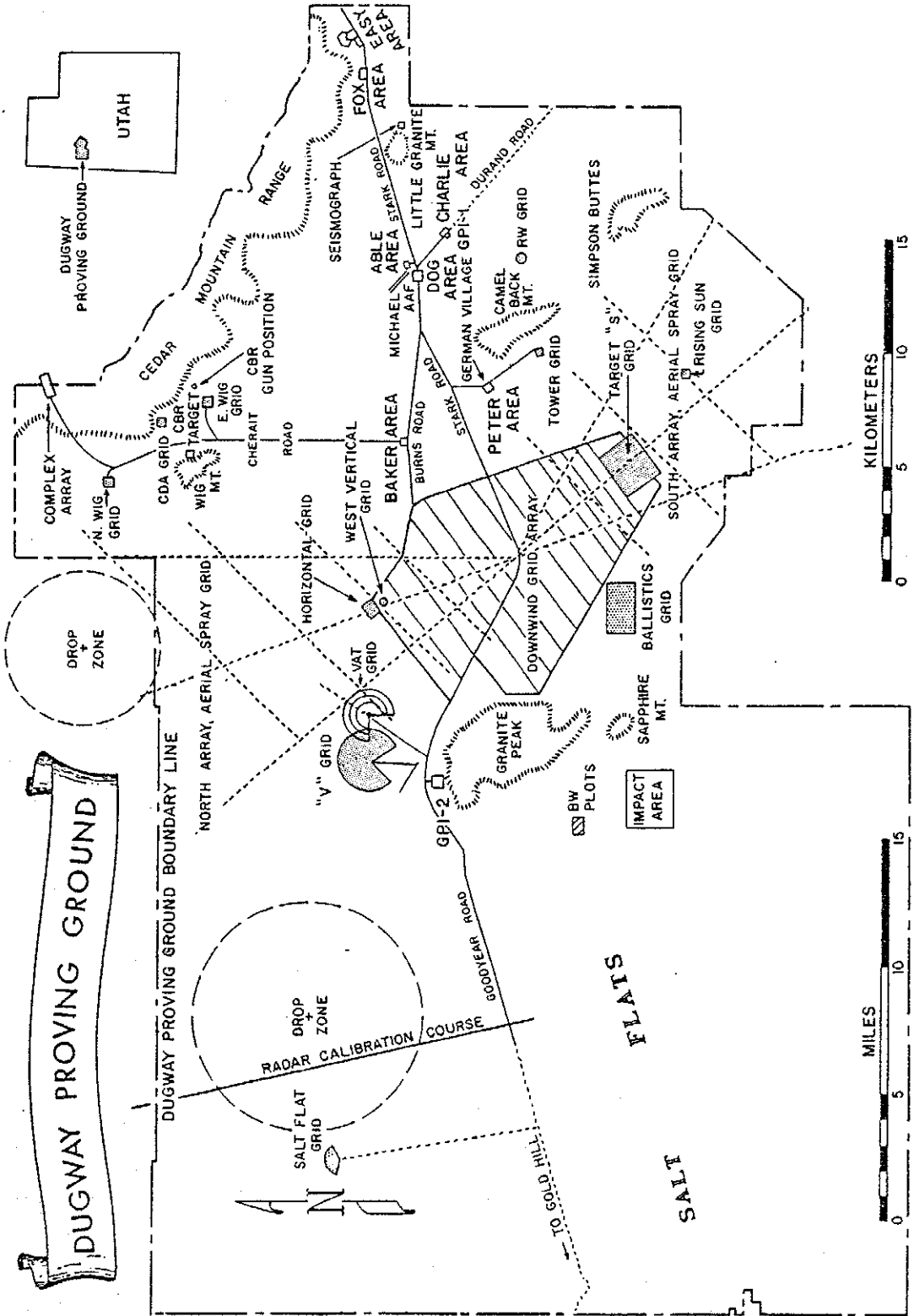


Illustration 2: Dugway Proving Ground Installation Map (Source: Facilities Engineer, Dugway Proving Ground).

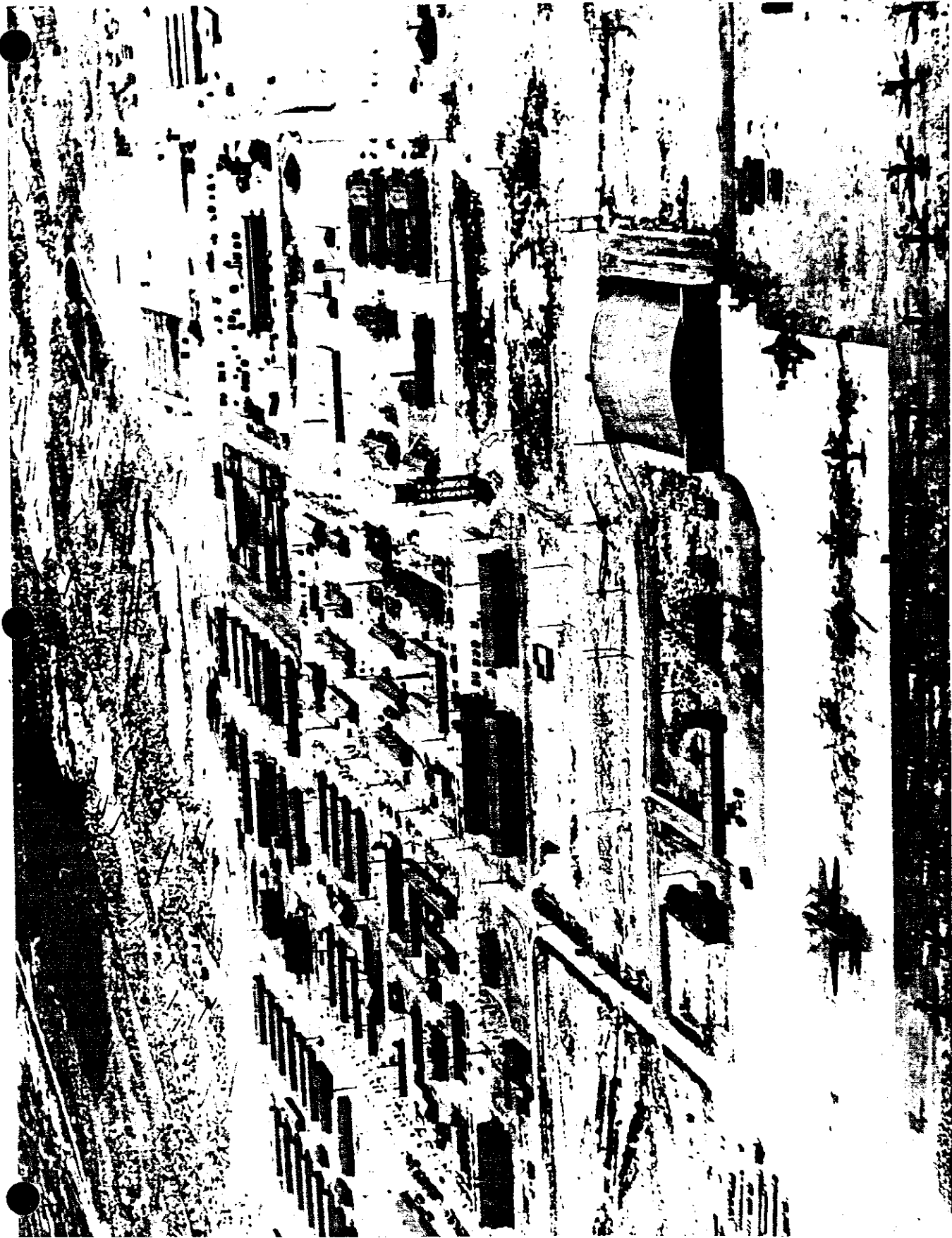


Illustration 3: Dugway Proving Ground in World War II. Photograph of Dog Area (now Ditto Area) looking south, with airfield in foreground (Source: Optical Data Branch, Dugway Proving Ground).

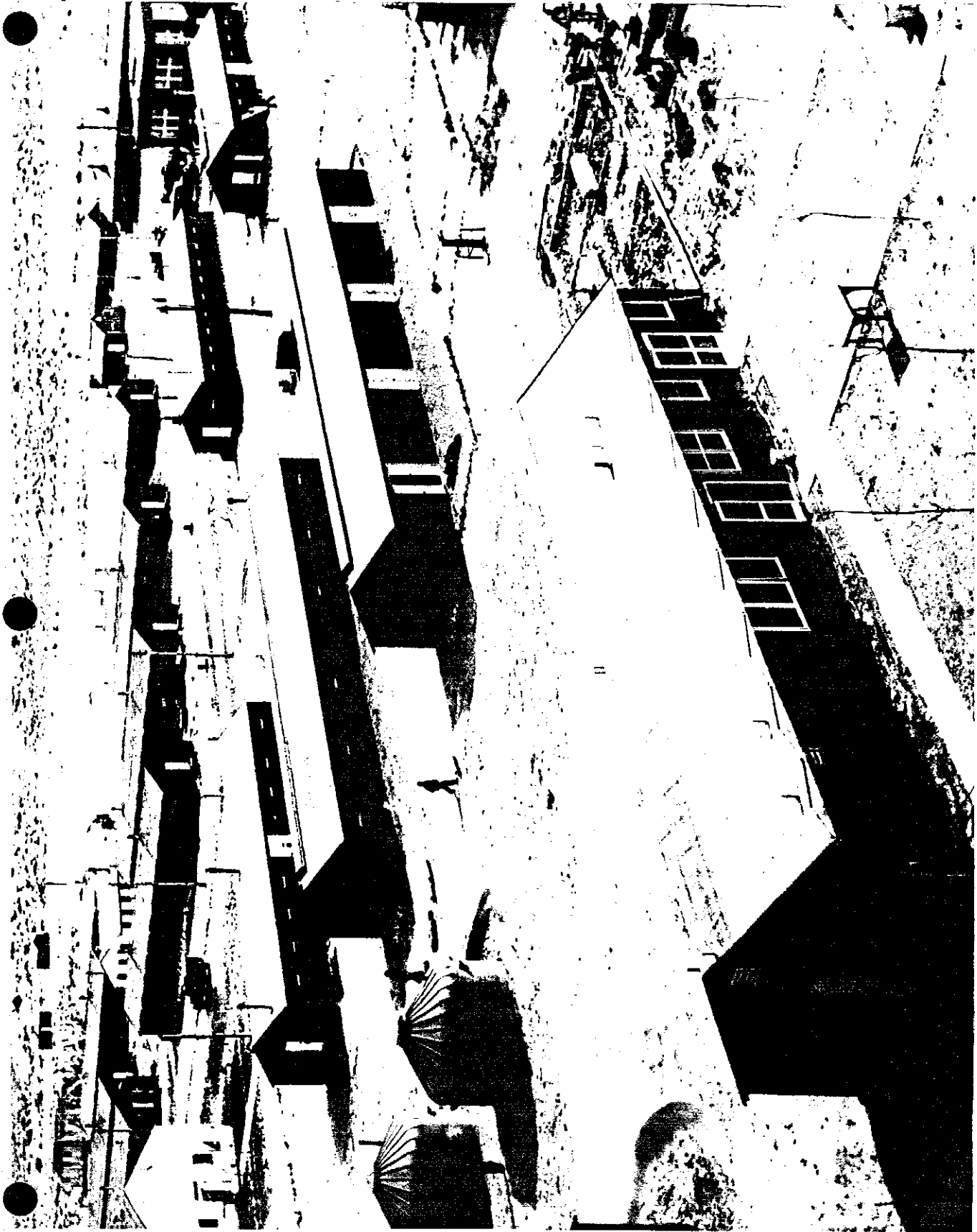


Illustration 4: Dugway Proving Ground in World War II. Photograph of buildings in Dog Area (now Ditto Area) looking northeast (Source: Optical Data Branch, Dugway Proving Ground).

In March 1943, construction began on twelve two-family Japanese-type houses, six German-type apartment buildings, and a concrete observation bunker capable of withstanding the impact of a 100-pound bomb. These buildings permitted testing of experimental incendiary bombs on typical Japanese or German buildings. The wood and brick used simulated German and Japanese construction, and even the furnishings, including "tatami" (Japanese straw floor mats) and replicas of German furniture, were chosen to provide a realistic test site. After extensive incendiary tests were conducted on these structures from May 17, 1943 until September 1, 1943, the Army Air Force formed plans for the bombing of Japan with small incendiary bombs (the AN-M-69) that used gasoline jelly as a fuel. This test area is now known as German Village; one two-story brick German apartment building (Building 8100) and the observation bunker (Building 8104) still remain.¹⁵ (Illustrations 5-7)

After June 1944, a separate research station constructed at the north edge of Granite Peak provided a center for biological warfare activities. The Granite Peak Installation (GPI-2) was located 30 miles west of Dog Area. Because of its isolation, the research station required its own utilities, living quarters, laboratories, and medical facilities. Only two buildings remain today from the GPI-2 research station: a pump house (Building 7000), and an underground igloo-storage building (Building 7046). (Illustration 8)

Toward the end of World War II, activity at Dugway Proving Ground increased. A major Operations Headquarters building (Building 4128) and a chemical laboratory building (Building 4129) were constructed in the Dog Area between 1944 and 1945. Both were built to accommodate expanded activities. The

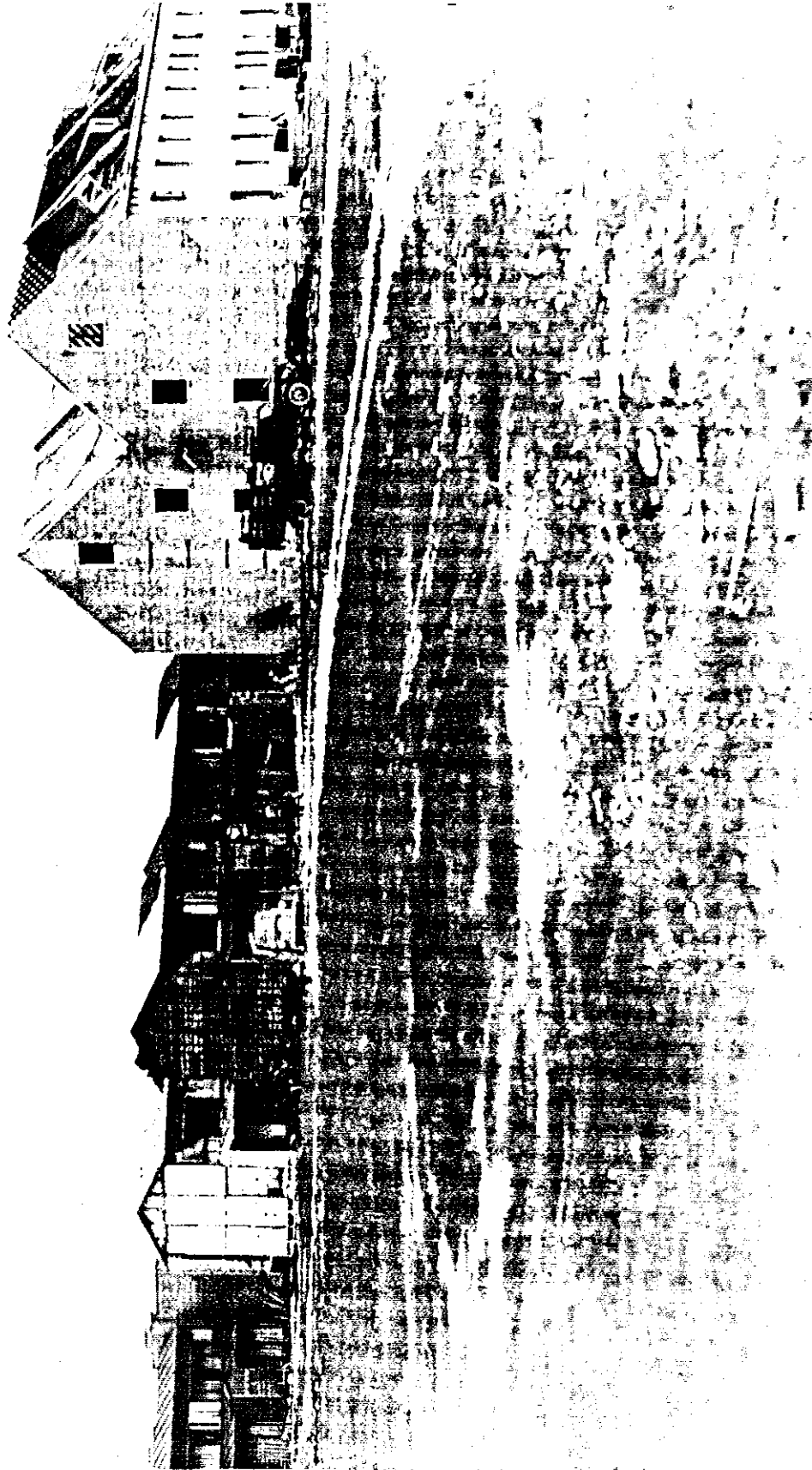


Illustration 5: Incendiary Test Area at Dugway Proving Ground during World War II. On the left are the two-family Japanese-type houses and on the right is a German-type Apartment Building (Source: Optical Data Branch, Dugway Proving Ground).



Illustration 6: The only remaining test building (Building 8100) in the World War II Incendiary Test Area of Dugway Proving Ground (Source: Field Inventory Photograph, 1983, David G. Buchanan, Building Technology, Inc.).



Illustration 7: Concrete Observation Bunker (Building 8104) in the World War II incendiary Test Area of Dugway Proving Ground (Source: Field Inventory Photograph, 1983, David G. Buchanan, Building Technology, Inc.).



Illustration 8: Granite Peak #2 Installation, a biological research station at Dugway Proving Ground during World War II. None of the buildings in this photograph remain (Source: Optical Data Branch, Dugway Proving Ground).

concrete block buildings, though now altered, still serve their original functions. In March 1945, the size of the installation was further increased when part of the Wendover Bombing Range, adjacent to the proving ground on the west, was transferred to Dugway in a five-year agreement that has been continually renewed.

Immediately following World War II, activity at Dugway ceased and no buildings were constructed until the installation was reactivated in July 1950 for the Korean War.

In 1951, a temporary mobile home park and temporary community facilities were constructed at Fox Area (now Fries Park Area). All of these structures, however, have been dismantled. Eight single-story, U-shaped steel-frame warehouses were also built in this area and still remain.

In 1952 construction of a new administration area began at Dugway to replace the outdated facilities in Dog Area. The new facilities, built in Easy Area (now known as English Village), included an administrative headquarters building, permanent barracks buildings, a hospital, a fire station, and maintenance facilities. Easy Area, ten miles east of Dog Area, was ready for occupation by December 1952. Two major laboratory areas, Able and Baker Areas (now Avery and Baker), also constructed in 1952, greatly expanded Dugway's chemical and biological warfare research facilities.¹⁶

A Wherry housing project begun in 1952 provided permanent living quarters for both military and civilian personnel. Additional Wherry housing units were completed in 1953, 1956, and 1959. A Capehart housing project was

completed in 1959. Other community facilities built during the 1950's included a gymnasium (Building 5111), a chapel (Building 5100), and a theater (Building 5126).

Since 1959, construction at Dugway Proving Ground has been limited. New buildings at Dog Area include a chemistry laboratory (Building 4110, completed in 1960) and a photo laboratory (Building 4117, completed in 1961). Additional housing for non-commissioned officers, constructed in 1964, and several other community facilities have since been built in Easy (English Village) Area.

NOTES

1. Leonard J. Arrington and Thomas G. Alexander, "Sentinels on the Desert: The Dugway Proving Ground (1942-1963) and Deseret Chemical Depot (1942-1955)," Utah Historical Quarterly, Vol. 32, No. 1, Winter 1964, pp. 32-33.
2. Ibid, pp. 36-37. See also Leo P. Brophy, Wyndham D. Miles, and Rexmond C. Cochrane, The Chemical Warfare Service: From Laboratory to Field (Washington, D.C.: U.S. Army, 1959), pp. 39-40.
3. William A. Noyes, Jr., Chemistry: A History of the Chemistry Components of the National Defense Research Committee, 1940-1946 (Boston: Little, Brown, 1948), pp. 392-394.
4. Brophy, The Chemical Warfare Services: From Laboratory to Field, p. 39.
5. Ibid, p. 40.
6. Arrington, "Sentinels on the Desert," pp. 37-38.
7. Arrington, "Sentinels on the Desert," p. 38; U.S. Army Test and Evaluation Command, "Dugway Proving Ground" (Dugway, UT: DARCOM Installation and Activity Brochure, 1981), pp. 5-6.
8. U.S. Army Test and Evaluation Command, "Dugway Proving Ground," p. 6.
9. Ronald L. Ives, "The Granite Peak Area, Utah", Rocks and Minerals, June 1946, pp. 339-344; Charles A. Mardirosian, Mining Districts and Mineral Deposits of Utah (Salt Lake City: University of Utah State Geological Survey, 1966); Historical Records Survey, Inventory of County Archives of Utah, No. 23, Tooele County, 1939, "#112, 113, Dugway Mining District, County Recorder Mining Records" (Ogden, UT: Historical Records Survey, 1939).

10. National Register of Historic Places, Inventory Nomination Form, "Lincoln Highway Bridge," May 21, 1975; Lincoln Highway Association, The Lincoln Highway: The Story of a Crusade That Made Transportation History (New York: Dodd, Mead, 1935), p. 287.
11. Arrington, "Sentinels on the Desert," pp. 32-34.
12. Ibid, p. 34.
13. Ibid, pp. 34-35.
14. Ibid, p. 36.
15. Ibid, pp. 36-37; Noyes, Chemistry, pp. 392-394.
16. Arrington, "Sentinels on the Desert," pp. 38-39.

Chapter 3

PRESERVATION RECOMMENDATIONS

BACKGROUND

Army Regulation 420-40 requires that an historic preservation plan be developed as an integral part of each installation's planning and long range maintenance and development scheduling.¹ The purpose of such a program is to:

- Preserve historic properties to reflect the Army's role in history and its continuing concern for the protection of the nation's heritage.
- Implement historic preservation projects as an integral part of the installation's maintenance and construction programs.
- Find adaptive uses for historic properties in order to maintain them as actively used facilities on the installation.
- Eliminate damage or destruction due to improper maintenance, repair, or use that may alter or destroy the significant elements of any property.
- Enhance the most historically significant areas of the installation through appropriate landscaping and conservation.

To meet these overall preservation objectives, the general preservation recommendations set forth below have been developed:

Category I Historic Properties

All Category I historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category I historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category I historic properties should not be altered or demolished. All work on such properties shall be performed in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).

- b) An individual preservation plan should be developed and put into effect for each Category I historic property. This plan should delineate the appropriate restoration or preservation program to be carried out for the property. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulation. Until the historic preservation plan is put into effect, Category I historic properties should be maintained in accordance with the recommended approaches of the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings² and in consultation with the State Historic Preservation Officer.

- c) Each Category I historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.³ When no adequate architectural drawings exist for a Category I historic property, it should be documented in accordance with Documentation Level I of these standards. In cases where standard measured drawings are unable to record significant features of a property or technological process, interpretive drawings also should be prepared.

Category II Historic Properties

All Category II historic properties not currently listed on or nominated to the National Register of Historic Places are assumed to be eligible for nomination regardless of age. The following general preservation recommendations apply to these properties:

- a) Each Category II historic property should be treated as if it were on the National Register, whether listed or not. Properties not currently listed should be nominated. Category II historic properties should not be altered or demolished. All work on such properties shall be performed in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation (ACHP) as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800).

- b) An individual preservation plan should be developed and put into effect for each Category II historic property. This plan should delineate the appropriate preservation or rehabilitation program to be carried out for the property or for those parts of the property which contribute to its historical, architectural, or technological importance. It should include a maintenance and repair schedule and estimated initial and annual costs. The preservation plan should be approved by the State Historic Preservation Officer and the Advisory Council in accordance with the above referenced ACHP regulations. Until the historic preservation plan is put into effect, Category II historic properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings⁴ and in consultation with the State Historic Preservation Officer.
- e) Each Category II historic property should be documented in accordance with Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER) Documentation Level II, and the documentation submitted for inclusion in the HABS/HAER collections in the Library of Congress.⁵

Category III Historic Properties

The following preservation recommendations apply to Category III historic properties:

- a) Category III historic properties listed on or eligible for nomination to the National Register as part of a district or thematic group should be treated in accordance with Sections 106 and 110(f) of the National Historic Preservation Act as amended in 1980, and the regulations of the Advisory Council for Historic Preservation as outlined in the "Protection of Historic and Cultural Properties" (36 CFR 800). Such properties should not be demolished and their facades, or those parts of the property that contribute to the historical landscape, should be protected from major modifications. Preservation plans should be developed for groupings of Category III historic properties within a district or thematic group. The scope of these plans should be limited to those parts of each property that contribute to the district or group's importance. Until such plans are put into effect, these properties should be maintained in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings⁶ and in consultation with the State Historic Preservation Officer.
- b) Category III historic properties not listed on or eligible for nomination to the National Register as part of a district or thematic group should receive routine maintenance. Such properties should not be demolished, and their facades, or those parts of the property that contribute to the historical landscape, should be protected from modification. If the properties are unoccupied, they should, as a minimum, be maintained in stable condition and prevented from deteriorating.

HABS/HAER Documentation Level IV has been completed for all Category III historic properties, and no additional documentation is required as long as they are not endangered. Category III historic properties that are endangered for operational or other reasons should be documented in accordance with HABS/HAER Documentation Level III, and submitted for inclusion in the HABS/HAER collections in the Library of Congress.⁷ Similar structures need only be documented once.

CATEGORY I HISTORIC PROPERTIES

There are no Category I historic properties at Dugway Proving Ground at this time.

CATEGORY II HISTORIC PROPERTIES

Lincoln Highway Bridge

- Background and significance. The Lincoln Highway Bridge is the only pre-military structure at Dugway Proving Ground. It was constructed about 1900 as a road bridge for the Lincoln Highway, a national road from Lincoln, Nebraska, to Sacramento, California, but was abandoned by the Lincoln Highway Association in the early 1920's because the highway was not successful in becoming the main route to the West Coast. The bridge was used by local ranchers and miners during the 1920's, and repaired by local CCC workers in the 1930's. It was listed on the National Register of Historic Places in 1975. The hewn-log

bridge is a Category II historic property because of its direct association with the Lincoln Highway, one of the early national roads. (See Chapter 2, Pre-Military Land Use, and Illustration 1.)

- Condition and potential adverse impacts. The Lincoln Highway Bridge is maintained by the Army as an historic property, and there are no current plans to alter or demolish this structure.
- Preservation options. Refer to the general preservation recommendations at the beginning of this chapter for Category II historic properties listed on the National Register.

CATEGORY III HISTORIC PROPERTIES

German Village

- Background and significance. The German apartment building (Building 8100) and observation bunker (Building 8104) at German Village are the only remaining structures from an experimental area built during World War II for testing incendiary bombs. Originally six "German-type" apartment houses and twelve "Japanese-type" two-family houses were built in the area. To provide a realistic test environment, the buildings were carefully constructed to replicate German and Japanese building types. Construction on the site began in March 1943, and extensive incendiary tests were conducted on the structures from May 17, 1943 until September 1, 1943. As a result of these tests, incendiary bombs were later used by the Army Air Force in bombing raids of Japan and

Germany. The remaining apartment building is an example of the "German-type" buildings constructed at the test site. The observation bunker, which was designed to withstand the effects of a 100-pound bomb, was constructed to shelter personnel working at the test site. Both structures are Category III historic properties because of their association with a unique World War II program to develop an effective incendiary bomb. (See Chapter 2, Construction and Site Development, and Illustrations 5, 6 and 7.)

- Condition and potential adverse impacts. Both structures are in good condition and remain essentially as they were when built. The only modification is the addition of a wood tower to the German apartment building, added in 1965 for subsequent testing purposes. There are no current plans to alter or demolish these properties.
- Preservation options. Refer to the general preservation recommendations at the beginning of this chapter for Category III historic properties.

NOTES

1. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).
2. National Park Service, Secretary of the Interior's Standards for Rehabilitation and Revised Guidelines for Rehabilitating Historic Buildings, 1983 (Washington, D.C.: Preservation Assistance Division, National Park Service, 1983).
3. National Park Service, "Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines," Federal Register, Part IV, 28 September 1983, pp. 44730-44734.
4. National Park Service, Secretary of the Interior's Standards.

5. National Park Service, "Archeology and Historic Preservation."
6. National Park Service, Secretary of the Interior's Standards.
7. National Park Service, "Archeology and Historic Preservation."

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APPENDIX A

April 22, 1983

Commanding General
Dugway Proving Ground
Dugway, Utah 84022

Attention: Victor Pratt, Plans and Operations

Dear Sir:

On March 17, while touring the installation with Tom Kincaid, we were denied access to the Carr Facility because we did not have gas masks.

Would you kindly send a simple letter, explaining the reason for the denial, to William Brenner, Project Director, at the above address.

Sincerely,

BUILDING TECHNOLOGY, INC.

John P. Johnson
David G. Buchanan

DEPARTMENT OF THE ARMY
U. S. ARMY DUGWAY PROVING GROUND
DUGWAY, UTAH 84022

Dugway Proving Grand
HAER No. UT-35
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April 25, 1983

REPLY TO
ATTENTION DF:

Plans & Operations
Directorate

BUILDING TECHNOLOGY INC
ATTN: William Brenner, Project Director
1109 Spring Street
Silver Spring, MD 20910

Dear Mr. Brenner:

In response to the letter of April 22, 1983, from your Mr. Johnson on the denial of access to Carr Facility, the following is provided:

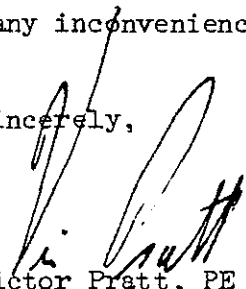
"Safety regulations of Dugway Proving Ground require that any person travelling west of the Ditto area (including Carr Facility) carry gas masks. This is to provide protection should there be an accident or incident which resulted in the inadvertant release of chemical agent from stored munitions or from laboratory operations involving chemical agents.

The masks are available to anyone requesting them at the Change House, which is near the Chemical Laboratory in Ditto."

Mr. Kincaid is a relatively new employee and I suspect that he was not aware of the requirement to provide masks to all visitors as noted above.

Please accept our apology for any inconvenience this slip up caused your staff.

Sincerely,


Victor Pratt, PE
Plans & Operations Directorate