DUGWAY PROVING GROUND, GERMAN-JAPANESE VILLAGE, GERMAN VILLAGE
(Dugway Proving Ground, German-Japanese Village, Building T-8100
Dugway Proving Ground, German-Japanese Village, Test Structure A)
South of Stark Road, in WWII Incendiary Test Area
Dugway
Tooele County
Utah

HAER No. UT-92-A

HAER
UTAH
23-DUG,
2A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

REDUCED COPIES OF MEASURED DRAWINGS

HISTORIC AMERICAN ENGINEERING RECORD
INTERMOUNTAIN SUPPORT OFFICE - DENVER
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HISTORIC AMERICAN ENGINEERING RECORD
DUGWAY PROVING GROUND, GERMAN-JAPANESE VILLAGE, GERMAN VILLAGE

HAER No. UT-~~35~~92-A

Location: The German Village test site, one component of the German-Japanese Village, is located within the boundaries of the Dugway Proving Ground, Tooele County, Utah, approximately four miles south-southeast of Baker Laboratory and 16 miles southwest of the installation's main gate. Willow Springs is the nearest neighboring community, and is situated 10 miles northeast of the Dugway gate on State Route 199.

UTM Coordinates: 12/ N 4444878.994, E 329088.449

Construction Date: 1943

Architects: Eric Mendelsohn [Consulting Architect, New York]
John F. Brandt [Standard Oil Development Company, Elizabeth, N.J.]

Builder: Ford J. Twaits Company, Salt Lake City

Present Owners: United States Army

Present Use: Varied tests conducted for the Chemical and Biological Defense Command, Army Materiel Command

Significance: The Dugway German Village was the primary American site for testing incendiary bombs prior to large-scale attacks near the end of World War II against civilian targets such as Dresden, Germany. The extant structure paralleled that of an adjacent, but no longer extant, Japanese Village, used to test incendiaries for the Pacific theater. The buildings in the German Village were constructed from materials and designs that replicated contemporary residential buildings in German urban industrial districts.

In order to build a facility that was an authentic reproduction, studies were conducted to determine which materials and furnishings available in the

U.S. would closely match those in use in Germany. A group of German-American architects affiliated with the "Gropius group at Harvard," including prominent Jewish architects Eric Mendelsohn and Konrad Wachsmann, were employed to design the facility. Both men had been associated with the prominent architectural group *der Berliner Zehner-Ring* [the Berlin Circle of 10, or the Ring] while living in Europe. The Ring included among its members Walter Gropius and Mies van der Rohe.

The AN-M50 model of incendiary bomb, extensively tested at the German Village, accounted for more than 97 percent (by number) of the incendiary bombs dropped on Germany by American forces.

I. HISTORICAL INFORMATION

The Dugway German Village[4]: Architectural and Engineering Design

The Army Corps of Engineers awarded the contracts to build and maintain the German-Japanese Village at the Dugway Proving Ground. Financed by the Standard Oil Development Company, the Axis test structures' group chiefly supported the development of the AN-M69 and AN-M69X, both also Standard Oil research and development contracts. The primary construction contract of March 1943 included stipulations for research studies to authenticate German and Japanese residential structures in contemporary urban industrial districts. For the German test structure, studies focused on overall construction; choice of specific American materials that could closely imitate those in the buildings to be bombed; and simulation of furnishings, in size, materials, room placement, and relative spatial density. Multiple government documents reference ex-German architects as responsible for the primary Standard Oil studies. The actual size of this group is as yet undetermined, but it was clearly acknowledged as affiliated with the "Gropius group at Harvard" and pointedly included Jewish architects Eric Mendelsohn and Konrad Wachsmann. Mendelsohn provided the CWS information on German industrial structures' characteristics; drew up the details of German residential industrial-area construction; and signed the drawings for the Dugway German test structure as the consulting architect. Wachsmann gave advice on the choice of wood for the Bayway-Linden and Dugway German structures; confirmed Mendelsohn's work for the Dugway design, and was acknowledged by Standard Oil as a generic consultant. His seminal work on German wood construction, *Holzhausbau—Technik und Gestaltung*, was published in 1930. German consultants also provided Standard Oil a key survey of 16 large German cities: Augsburg, Berlin and surroundings, Breslau, Danzig, Dresden and surroundings, Duisburg, Frankfort-am-Main, Halle, Hannover and surroundings, Koenigsberg, Leipzig and surroundings,

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[4] The German "village" was a single building, divided longitudinally into two halves, one of Rhineland (West German) design, the other of Central German design.

Magdeburg, Mannheim, Munich, Nuremberg, and Stuttgart. Authorship of this survey remains unknown, but is unlikely to be either Mendelsohn or Wachsmann, directly; pre-existing military studies commissioned by the British Ministry of Home Security are referenced explicitly. Architectural costs for the Dugway German test structure were estimated in existing documentation at $35,000 (Standard Oil Development Company February 1943; N.D.R.C. Miscellaneous Publication 282 May 1943; N.D.R.C. Miscellaneous Publication 316 May 1943; Baum 1947).

German architects Mendelsohn and Wachsmann were the primary acknowledged members of the research team for the German test structure at Dugway. Both men were of Eastern European extraction, who had participated in the architectural circles of Berlin during the 1920s and into the 1930s. After leaving Germany in 1933, Eric Mendelsohn spent time in London and in Jerusalem. Mendelsohn immigrated to the U.S. in March 1941 at the age of 54; he commenced work for the Department of Defense shortly after his arrival. During his early architectural career in Munich and Berlin, where he designed sets and costumes for the theater, he also enlisted in the German engineering corps during World War I and worked on the Russian front. Although not a member of the Bauhaus, Mendelsohn participated in a prominent architectural group, *der Berliner Zehner-Ring* [the Berlin Circle of 10 or, the Ring], during 1923-1932. The Ring included Walter Gropius and Mies van der Rohe, both of whom immigrated to the U.S., Boston (Harvard) and Chicago (Armour Institute of Technology/Illinois Institute of Technology), respectively, in 1938. Mendelsohn set up an architectural office with the Museum of Modern Art in New York for several years, hosting a retrospective exhibition of his work at the time the U.S. formally entered the war. More than a decade younger than Mendelsohn, Konrad Wachsmann had also immigrated to the U.S. in late 1940. Wachsmann had been in France as it faced occupation and was helped into the U.S. by Albert Einstein; both Mendelsohn and Wachsmann had designed structures for Einstein outside Berlin in East Germany during the 1920s. Wachsmann had early experience in wood-frame industrial housing and was particularly interested in modern, modular systems of construction. Although he had not been a member of *der Ring* with Mendelsohn, he had participated in it indirectly through his mentor, Hans Poelzig. Upon entering the U.S., Wachsmann was the guest of Walter Gropius and later became

his business partner. Wachsmann and Mendelsohn became acquainted in January 1942, through gatherings held at the New School for Social Research in New York (Giedion 1954; Von Eckardt 1960; Zevi 1985; Gruning 1986). Once in the U.S., members of *der Ring* continued to be in contact with one another.

The German-Japanese Village at Dugway included three free-standing blocks of urban industrial-area housing, separated by fire breaks 40 feet wide which allowed access of fire-fighting equipment and prevented the destruction of the entire target cluster. Two of the blocks imitated Japanese construction and one imitated German construction. Described as six dwellings in the Standard Oil documentation, the individual units in the German test structure actually represented 12 apartments. Six apartments, three on the first floor and three on the second, imitated Rhineland (West German) construction, while another six imitated Central German construction in the same pattern. A common party wall separated the Rhineland and Central German apartment blocks, reflecting how each block would actually have interfaced with urban neighbors nearly identical to itself. Although Rhineland and Central German urban housing was never really found together in Germany as configured at Dugway; the composite block closely adhered to the authentic German construction, including framing, outer masonry and inner firewall construction, flooring, mortise and tenon joinery, and roof sheathing. The German test structure at Dugway was directly based on the design of the Rhineland and Central German one-and-one-half story structures built by Standard Oil at its Bayway-Linden, New Jersey, site several months in advance of the full-scale construction in Utah. The East German test structure, which did achieve design but was not built at Bayway-Linden, was not incorporated into the Dugway German test block. Most likely it was assumed that the distinctions in red-clay roof tiling were not enough to merit erection of a third apartment block, and that the Central German test block could represent both the Central and East German types of urban industrial-area housing. The key distinction between the Dugway and Bayway-Linden German test structures, aside from the shift from a partial scale to a full scale, and the conflation of the Central and East German prototypes, was the careful attention paid to brick exterior and interior walls. In particular, the targeted German urban industrial housing, both stone and brick, contained a very high number of masonry fire

divisions between not only blocks but also rooms. Since the German test structure was erected to accommodate aerial bombing from as high as 20,000 feet, and since the German-Japanese Village sat on the desert floor of the Dugway Proving Ground, Standard Oil added a broadly painted, vertical stripe on one end of the southern block for use as a high-altitude targeting indicator. Bombers had to drop a large number of small incendiaries so that individual rooms within apartment blocks were set ablaze through the attic floor, thus not allowing a fire to be contained by the multiple firewalls. A reinforced concrete observation bunker, also referred to as a bomb shelter, was erected east of the test structures with the requirement that it be able to withstand the impact of a 500-pound incendiary dropped from 20,000 feet (Baum 1947; Kleber and Birdsell 1966).

A local building contractor, Ford J. Twaits Company, handled site construction and repair for the German-Japanese Village. A contract with the Army Corps of Engineers on March 22, 1943, included the construction of three test blocks, pipe line and pumps, the water tank, the observation bunker, a temporary office and warehouse, furnishings, and replacement materials needed to effect repair after fire damage. Approximated at just over a half million dollars, the March contract did not include some individual subcontracts for particular features, such as the 100,000-gallon redwood water tank. The Corps awarded Twaits a series of contracts in early May, late June, early September, and mid-September 1943 for repairs to the test structures totaling about $440,000. No repair contracts are documented for 1944-45. Thus, the entire construction and repair costs at the site approximated one million dollars for the German-Japanese Village. It is unlikely that either Mendelsohn or Wachsmann actually ever visited the Dugway site. The role of Standard Oil architect John F. Brandt, whose initials are on all extant Bayway-Linden and Dugway German test structure drawings, remains unknown (Baum 1947).

By the time that the CWS, NDRC, and Standard Oil decided full-scale German and Japanese test structures were required for precision development of incendiaries, it had become clear that the building materials themselves, not just their size and placement, needed to be scientifically understood and calibrated. Roof sheathing was fairly easy to replicate, with Ludovici red-clay tiles shipped in

from Chicago and gray slate acquired from an unknown source. Wood for framing, however, was a much more complicated matter. Actual German woods could not be used to build either the Bayway-Linden or the Dugway test structures. Konrad Wachsmann had worked in East Germany for Christoph & Unmack, the largest wood building manufacturer in Europe, and was well known in European architectural circles for his expertise in wood construction. Wachsmann, in conjunction with a Mr. Slutz of Princeton University; Otto Kress of the Institute of Paper Chemistry in Appleton, Wisconsin; and Dr. W.N. Sparhawk of the U.S. Forest Service, Forest Products Laboratory, Madison, Wisconsin, analyzed available American lumber, evaluating them against the predominant lumber used in German construction, Scotch pine (*Kiefer*) and European spruce (*Fichte*). Under consideration were American-grown Norway pine, Douglas fir, Western white pine, Eastern spruce, New England red spruce, Eastern red pine, Southern yellow pine, and, Eastern hemlock. Wachsmann recommended Southern yellow pine, as closely imitating the pine of Poland and Russia used in most German wood-frame buildings; Standard Oil's second choice was that of Douglas fir, which was evaluated as appropriately imitating European spruce. For the Bayway-Linden test structures, Standard Oil shipped in green Virginia Loblolly as appropriately representative of the Southern yellow pines. Before construction, the pine was force dried to bring its moisture content to between 7 percent and 12 percent. By the time of construction at Dugway, the issue of a carefully measured moisture content had become of increasing concern (Standard Oil Development Company February 1943; N.D.R.C. Miscellaneous Publication 282 May 1943; Standard Oil Development Company *Moisture Content of Wood* December 1944; Baum 1947; Gruning 1986).

Intensive study for the German test structure at the Dugway Proving Ground was conducted, including analysis of the moisture content of the woods found in a variety of German industrial-area housing, the wide age range of the woods, and their conditions at varying times of year. Lumber chosen for the full-scale test structure at Dugway was not the yellow pine used at the preliminary Bayway-Linden site. Instead, Standard Oil employed yard-dried coastal Douglas fir from the Pemberton Lumber and Millwork Co. near Vancouver, British Columbia. Milled stock was required to have a 14 to 18 percent moisture content; at the Dugway site, exposure to the sun further

reduced the moisture content to the desired 10 to 15 percent range. Standard Oil made final moisture adjustments by temporarily placing steam radiators in spaces judged to be too damp, thereby additionally desiccating the lumber over several days back to a 10 to 15 percent moisture content. Roof battens, rafters, and all levels of flooring were metered for moisture content throughout the testing. The intent was to replicate and sustain a moisture content paralleling the known moisture content of wood-frame structures on the northeastern U.S. coast of 10 to 100 years in age. Climatic studies indicated that the temperature conditions of the northeastern U.S. and Germany were similar, but that humidity was considerably less in Germany. Weather data taken from *Handbuch der Klimatology* (1932), compiled from 30-year averages for industrial German cities, provided relative humidity and temperature information. The moisture content for the interiors of "old" urban housing in Germany was thought to be less than 12 percent. The Forest Service measured burn rates in fire tube tests of different wood specimens conditioned at varying humidities. Such rates were critical in the short amount of time, two to six minutes, allowed to establish a Class A fire. Factors such as the typically lower winter room temperatures in Germany and the dryness of the Dugway test setting were figured into the incendiary test results. Comparison of the Dugway test results, combined with analyses of British-gathered data from actual raids over Germany, showed that Standard Oil scientists had erred on the conservative side, estimating German interior construction to be drier than it actually was proved to be (N.D.R.C. Miscellaneous Publication 282 May 1943; United States Forest Service May 1943; Standard Oil Development Company June 1943; Standard Oil Development Company *Report of Discussions at Incendiary Meeting* December 1944; Lower 1968).

The final consideration in the design of the German test structure at the Dugway Proving Ground was in its furnishing. Although no attempt was made to replicate the incidentals of domesticity, such as small housewares and clothing, it was deemed essential to partially set the stage in tables and chairs typical of German worker housing. Here American maple was evaluated as sufficiently similar in its combustible qualities to the wood of German home products manufacture. Chosen furniture included appropriate pieces for kitchen, living room, dining room, and bedroom spaces, with the

living-dining area combined into a single room. Relative density of furniture placement was considered significant. Because incendiaries typically broke through the roof to lodge in the attic or in the second floor apartments, furnishing the first floor test apartments was not considered necessary. Standard Oil hired two furniture makers who had learned their craft in Germany and the Authenticity Division of RKO Studios in Hollywood. In addition, several of the subcontractors supplying the stipulated furniture were of Eastern European extraction. The ex-German furniture makers are not explicitly named in any reviewed documentation. However, in Standard Oil's acknowledgments, three individuals are grouped between Mendelsohn and Wachsmann and RKO Studios: Dr. Paul Zucker, Hans Knoll, and George Hartmueller. Subcontractors to Ford J. Twaits Company included the George Jocknowitz Store, Brooklyn (sofa), J. Stefanik, Buffalo (chairs), and Mr. Bjerk of the Jamestown Mattress Company, Jamestown, New York. Most of the furniture construction was contracted with Union-National, Inc., of Jamestown, New York. The penultimate contributor to the furnishing of the German test structure at Dugway was RKO Studios. Just prior to providing professional advice on the furniture appropriate for German urban dwellings, RKO released *Hitler's Children* (1942). Directed by Edward Dmytryk, the film made more money for the studio than any movie it had produced up to that date. Its anti-Hitler plot was set domestically; it is unknown whether furniture appearing in *Hitler's Children* also completed the theatrics at Dugway (N.D.R.C. Miscellaneous Publication 282 May 1943; Baum 1947; Neibaur 1994).

II. ARCHITECTURAL INFORMATION

The German Village at the Dugway Proving Ground was one of three test structures on the site and the only one which is extant today. The complete site measured 252', northwest to southeast, by 590', northeast to southwest, with historic names for the overall test location including Peter ["P"] Area (ca.1944-1962) and Buchanan Place (1963 - to date) (U.S. Army Corps of Engineers, Sacramento District July 1944; Dugway Proving Ground April 1963). Structures built at the location in 1943 included the German Village at the northwest edge, with a footprint of 60' (northwest/southeast) by 106'8" (northeast/southwest); a Japanese Village comprised of two

multi-dwelling blocks on the southernmost two-thirds of the site (no longer extant); and an observation bunker at the eastern edge of the northwest-southeast site centerline, with an irregular footprint of approximately 20' (northwest/southeast) by 14' (northeast/southwest). The German and Japanese villages were 46' apart, while the observation bunker was 450' from the two villages (see drawing HAER No. UT-35, Sheet 1 of 1). The Standard Oil Development Company referenced the entire infrastructural grouping as the "A" Structure(s), or Axis type test structures, in its earliest mapping and test reports. On the 1943 drawings, the German Village itself was titled the "A" Structure. Theodolites needed to determine the height of the released bombs also occupied the general test site, but are of unknown historic number and placement, and likely sustained no permanent infrastructure. A water pump system, with four hydrants located north and south of the observation bunker centerline, served the test structures and connected the site via a six-inch cast iron piping to a large, hilltop storage tank approximately one mile to the southeast. Fragments of the pump system exist today above ground, but the tank has been removed. Approximately centered between the test site and the tank, on the northwest-to-southeast axis, the construction camp of the Ford J. Twaits Company provided structures of unknown temporary type during 1943-45. Twaits' men not only erected the German and Japanese test buildings, but they also put out the fires started by the incendiary bombs; repaired damage to the German Village as needed (it was never completely destroyed); and repeatedly rebuilt the Japanese Village as the more flammable wood buildings were several times destroyed during testing (Mendelsohn and Brandt *DP-25-1* March 1943; D.P.G.S.R. No. 14 September 1943; *Dugway Proving Ground Water Layout Test Structures* May 1945).

The immediate German-Japanese test area measured 252' by 140', with approximately 50 percent of the designated target represented by the structures' rooflines. Although two Japanese villages of 24 units each contrasted with only a single German village of 12 units, the Army weighted actual attained target roof areas only slightly toward those of the Japanese Village (57 percent went towards the Japanese structures while 43 percent went towards German structures). Structurally and materially, the villages' most important features were roofs and walls, although interior spatial configurations and furnishings were of high secondary

significance. The German Village featured brick walls with plastered interiors; the Japanese Village exhibited mud plaster (also referenced as adobe), and wood siding over mud plaster. The critical tested roof systems for the German test structure were tile over batten and slate over wood sheathing; the critical tested roof systems for the Japanese test structures were tile over plaster on wood sheathing and sheet metal on wood sheathing. Forty-foot fire breaks segregated the three villages to allow damage control. The addition of internal, non-historic firewalls to each of the villages further modulated the burn rate and allowed for maximum retesting (N.D.R.C. Miscellaneous Publication 282 May 1943; D.P.G.S.R. No. 14 September 1943).

Designed and engineered as two, three-unit (six-flat) apartment buildings sharing a common wall, the two-and-one-half story German Village rests on a three-foot, raised brick-wall foundation with concrete footings. The 12-inch concrete footings are defined as perimeter walls and as an interior hollow-box wall-grid. Stressed to 2,000 pounds per square-inch, the footings supporting the perimeters of the two buildings are 28" thick. Interior cross-wall footings, running both the widths and depths of the individual apartment units, vary between 16", 22" and 24" in thickness. Raked and leveled earthen floors comprise the interiors of the foundation grid, partially overlaying the footings to a full depth of 1'4". Brick walls laid with lime mortar extend up from the footings in varied thicknesses of 16", 12", and 8", generally corresponding to the patterning of the concrete footing system (Mendelsohn and Brandt *DP-25-14* March 1943).

The German Village measures 106'8" by 60', and stands 42' high inclusive of the raised foundation and the attic. Exterior detailing is focused on the village's two formal facades, northwest (rear) and southeast (front), and features eight-pane, 3'8"-wide by 4'10"-high wood casement fenestration and partially glazed, 3'-wide by 7'2"-high wood doors. Flattened segmental, triple-row brick arches and wood lintels/steps enframe both windows and entrances. Each unit has two flats, one on each story, and a dormered attic. Formal facades are divided into two exterior bays per story, reflective of the interior room arrangement. Apertures punctuate these facades of each three-unit apartment block in an asymmetrical bay rhythm alternating between a single window and paired window

and door in a 1/2/2/1/2/1 pattern. End facades feature clustered fenestration toward the common wall, centered attic windows, a vertical painted bombing-identifier pattern from roof ridge to the ground (below and above the attic window on the eastern side of the southern apartment block), and anchored ladders at each end at the common wall. Walls throughout are brick, laid in lime mortar; lintels are brick with rowlock arches. Bricks have a face size of 2 ¼" by 8 ½", with ½" mortar joints, and laid in a running bond with headers every five courses. Framing is entirely coastal Douglas fir and is mortised, tenoned, and doweled. Doors, windows, floors, and stairs are exclusively wood. All interior rooms feature a plaster wall and ceiling finish, with the exception of the attics. A 16-inch brick firewall separates the two apartment buildings, running continuously through all of the apartment units; the firewall continues up through the roofline as a freestanding feature four inches thick. Additional brick firewalls, 12" thick and placed at right angles to the main firewall, separate the six flats on each floor from one another. These firewalls continue through the attics 12" above the roofline, capped in a ½" cement coping. A structural distinction exists between the northwest-facing, tile-roofed, six-flat apartment block and the southeast-facing, slate-roofed, six-flat apartment block. While both blocks have 3 ½" of cinder fill between each level's joists and finished flooring, size and spacing of headers and joists is different for each: the tile-roofed block has headers and joists of equal 6" by 8" dimensions, set 3' on center; the slate-roofed block has headers of 8" by 10" dimensions and joists of 4" by 10" dimensions, set 2' on center (Mendelsohn and Brandt *DP-25-10, -11, -12, -15, -16, -17* March 1943; N.D.R.C. Miscellaneous Publication 282 May 1943; T.D.M.R. 713 July 1943).

Interior spatial patterning featured six apartments on the first floor and six on the second, with 50 percent accessed from the northwest facade and 50 percent from the southeast. Each apartment has three rooms, one large to the rear and two small at the front, with a vestibule at right angles along the side. The main living rooms on the first floor measure 27'4" by 13'8", with their lengths paralleling the dual faces of the building. The two smaller rooms in these apartments are of equal size and are nearly square, measuring 13'4" by 13'6" with a 2" by 4" stud partition wall between them. Room sizes are slightly different on the second

floor, with the living rooms of the flanking apartments measuring 27'8" by 13'8", and those on the interior maintaining the 27'4" by 13'8" dimensions of those on the first floor. The smaller rooms on the second floor are slightly differentiated at 13'8" by 13'10" and 13'8" by 13'6" for those paired in the flanking apartments, and of continued equal size on the interior at 13'8" by 13'6". A public vestibule flanks each apartment on both floors, with 6' by 9' landings, a 15-riser stairway, and a 2'8" entrance hall. Each room in every apartment has a single window, as does each vestibule. All windows are centered with respect to the rooms they punctuate. The windows of the four corner rooms of the German Village are placed on the primary facades, thus creating end facades with fenestration tightly clustered toward the common wall between the apartment blocks. The three-room flats are interconnected by two doors between the large living space and each of the two smaller rooms, with two additional doors opening directly into the public vestibule. Doors are uniformly 3' wide and 7'7" high. Interior room height on each level is 10'4" from finished flooring to finished flooring. All structural walls are brick; firewalls are 16" and 12" thick as noted above. Exterior walls are 16" thick on the first story and 12" thick on the second story. The walls separating each apartment's living space from its two smaller rooms are also 12" thick. Walls between vestibules and the three-room configuration of each flat are 8" thick brick (Mendelsohn and Brandt *DP-25-10, -11, -17* March 1943).

The attic spaces complete the interior configuration of the German Village. Each of the six vertical pair of apartments features an attic comprised of a public vestibule mirroring those directly below it and a single open room. The four flanking attic spaces measure 35'10" by 30', while the two interior attics are slightly smaller at 35' by 30'. Centered end-facing windows continue the size and proportions of those that articulate the first and second stories. Each attic also has a 2'4"-wide by 2'8"-high dormer centered over the partition walls between the rooms below. A single door, 2'8"-wide by 7'-high, enters each attic from the vestibule; no other apertures connect attics to one another. Attic walls are dramatically distinct from those of the first and second stories. Exterior end walls and parallel interior fire walls continue from the second story through the roof at 12" thick. Northwest and southeast facade walls, and a 16" common wall

dividing the two apartment blocks, are each replaced by the faces of the steeply angled roofs, with the common wall extending approximately 34" through the attic flooring as a 4" fire wall. Interior 4" by 4" skeleton partitions parallel the northwest and southeast facades, 2' on center for the north block and 3' on center for the south block, all at a height of 4'6" with posts mortised into the cinder fill of the flooring. Walls separating the public vestibules from the attics are no longer the 8" brick of the lower two stories, but instead are 2" by 4" stud partition walls finished in lath and plaster on their vestibule faces only (Mendelsohn and Brandt *DP-25-11, -12,* 17 March 1943).

Roof framing and sheathing is distinctive for the north and south apartment blocks. The northwest-facing block is framed in 4 ¾" by 5 ½" rafters and collar beams, 3' on center; the southeast-facing block is framed in 4" by 4 ¾" rafters and collar beams, 2' on center. A system of diagonal 1 ¼" by 4" braces complements the framing. Rafters and collar beams are tied elegantly, with collar beams halved to fit around narrowed sections of the rafters in a crafted, deep mortise and tenon joint double-doweled with ¾" pegs. Rafters are tied at the two ridges with one surmounting the other, again in a mortise and tenon joint, but single-doweled with 1" pegs. At the common wall between the two blocks, rafters are mortised and doweled into the cinder fill of the flooring; a second ¾" peg is deeply cross-doweled back into the 6" by 8" floor joists of the northwest-facing block and into the 4" by 10" floor joists of the southeast-facing block. At the eaves, finishing is complex, augmented by 4'-long 4" by 4" false rafters doweled into both the true rafters and the floor joists with ¾" pegs. Joists extend through the exterior walls, providing the mortise for the tenon of the rafters and deeply doweled to the false rafters projecting out over them, the whole forming a boxed exterior eave. For the north block, sheathing is red clay shingle tile of 7 ½" by 15" dimension, ½" thick, manufactured by Ludovici Tile, Chicago. Individual tiles are finished with a fine graining on their upper and side surfaces, and five shallow ribs on their under surfaces. Each clay shingle is fastened to a 1 ½" by 2 ½" wood tile-lath by two nails near its upper edge, leaving a 6" exposure after overlap. For the south block, sheathing is medium-gray slate of 10" by 14" dimension, ⅜" thick, and of unknown quarrying. Slate is fastened by two nails to a wood tongue and groove underlay clad in two layers of red rosin

building paper. Nails are set near the sides of the tiles, five inches from the upper edges. Weather exposure is 5 ½". Ridge header courses for both blocks are set in an elastic cement. Roof pitch for both blocks is 12/12 (Mendelsohn and Brandt *DP-25-13, -15, -16, -19* March 1943).

Permanent exterior and interior decorative detailing is minimal for the German Village, with each three-room flat only partially resembling the actual industrial housing upon which the mock-up test structure was based. Brick facades are neither plastered, nor painted. All aperture trim is simple, offsetting the casement fenestration and paneled doors. Voissours, articulated as triple rowlock segmental arches over the windows and doors, present the most sophisticated exterior detailing. Dormers accent the formal facades in an evenly spaced rhythm, shed-roofed. For the most part, inside walls and ceilings were plastered historically without wainscoting, cornice trim, or papering. Flooring is tongue and groove, with no linoleum, tile or carpet. No lighting, heating, or plumbing wiring or piping accent the rooms. Wood balusters, railings, and newel posts of stairwells are square-cut, without elaborate faceting. Stair risers are wood without additional coverings (Mendelsohn and Brandt *DP-25-15, -16, -17* March 1943). The room configuration of each flat primarily fulfilled a generic spatial function, placing authentic construction materials in a proper solid-void relationship to one another. Only the second story apartments were furnished for incendiary testing. For these more finished spaces, the large room of each apartment served as a combined living and dining room, while the two nearly identical smaller rooms were designated a kitchen and a bedroom. German furniture was replicated, placed in the second story apartments in a density and pattern emulating actual households. Windows were curtained on the second story; the living-dining room was given removable area rugs (N.D.R.C. Miscellaneous Publication 282 May 1943; T.D.M.R. No. 713 July 1943).

Furnishings were of a dummy type, meeting specifications as to moisture content of the lumber; minimal joint construction to withstand shipping and handling; rough interior woodwork without finishes, drawers, shelves, or internal pieces; sanded exterior finishes with all fronts solid; and, omission of exterior hardware, trim, and "artistic devices." For the German Village, a total of

19 pieces of furniture, manufactured in multiples, completed the mock up of the second floor flats. Furniture included an upholstered sofa (7); an upholstered easy chair (14); a settee (14); a kitchen buffet (7); a chest of drawers (7); a side table (7); a straight chair (77); an oval table (7); a dining table (14); a wardrobe (14); a single bed, with mattress, springs, and bolsters (28); a crib, with mattress and springs (14); a wicker chair (7); a bed table (28); a radio cabinet (7); a 9' by 13' rug (28); a 2' by 3' throw rug (28); window drapes (24 pairs); and incidental cushions (42). Quantities reflected an understanding that some furnishings would be lost in the fires set by the incendiary tests, and would then be replaced in kind. In the bedroom, the single beds were placed together in pairs, with a crib adjacent, reflective of a young family with an infant. During preliminary penetration tests with dummy bombs all furnishings except the rugs were removed, with windows and doors closed (Standard Oil Development Company *Specifications for Special Test Furnishings* April 1943; Standard Oil Development Company *Inspection Report on Furnishings* April 1943; T.D.M.R. No. 713 July 1943).

Alterations

As of late autumn of 1994 when field inspections were conducted for the HAER documentation, alterations to the German Village have been minor. Generally, the structure suffers from lack of use, although some of the rooms function as Army storage. The physical deterioration is predictable, tied to the incendiary testing: attics show remnants of fire damage, while the second story is water damaged in places, exhibiting cracked and fallen plaster. After World War II, several of the rooms also served as isolated test chambers for the precursors of today's Chemical and Biological Defense Command. In mid-1953, the Air Force Vulnerability Program planned a chemical warfare trial at the German Village grid (Dugway Proving Ground June 1953). One of the rooms in the middle first-story flat in the southern block of the Village is sealed due to more recent test use.

The main permanent change to the German Village is the replacement of the first story corner fenestration with double-doors. Each of the four windows was removed ca.1950-55; new wider triple rowlock

segmental arches replicated those that were originally over each window. Doors, with their lower wood panels and upper glazing, were also sympathetic to the historic design and materials of the German Village. These doors would not have been appropriate to the World War II incendiary tests, but would have made the structure more accessible for warehouse use and area chemical tests during the Cold War period. Sometime during the later 1950s the Army added a wooden water tower on the roof, documented in an Army photograph taken in 1969 (Evans 1974). Within the near past, gutters have been added at the ends of the building to aid in its stabilization, and some sheet metal paneling has replaced missing slate on the interior roof slope of the south block (Murphey 1992).

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Architectural and Engineering Drawings, UT-35-A

Surviving blueprints for the German Village, 14 in number, are listed herein individually. These invaluable documents are stored at the Dugway Proving Ground. From reviewed documents, the full original blueprint set is presumed to have included over 100 drawings, inclusive of furniture and furniture layout. Eric Mendelsohn served as consulting architect for the design and signed all drawings; drawings each contain the same generic identifying information and date.

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_____. *Typical Wall Sections. DP-25-18.*

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CONTROL CODE

HABS NO.

HAER NO. UT-~~35~~ 92-A

STATE UT COUNTY ___TOELE COUNTY ___ CITY/TOWN DUGWAY

RECORD NAME Dugway Proving Ground, German-Japanese Village, German Village

SECONDARY NAME (OLD) (Dugway Proving Ground, German-Japanese Village, Building T-8100)

SECONDARY NAME (CURRENT) (Dugway Proving Ground, German-Japanese Village, Test Structure A)

SECONDARY NAME

SECONDARY NAME

ADDRESS South of Stark Rd, in WWII ~~Incendiary~~ Test Area

DOCUMENTATION # DRAWINGS 3 # PHOTOS 14 # PAGES 21 # PHOTO CAPTION PAGES 1

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NAMES ASSOCIATED WITH BUILDING/STRUCTURE

NAME 1:

NAME 2:

NAME 3:

NAME 4:

NAME 5:

NAME 6:

BUILDING/STRUCTURE RELEVANT DATES

1: 1943 (c) 2: 3:

4: 5: 6:

DATE CODES: C=CONSTRUCTION; A=ALTERATION; R=RELOCATION; D=DEMOLITION; N=ABANDONED; P=PERIOD OF SIGNIFICANCE

BUILDING/STRUCTURE USE

1: 2:

3: 4:

USE CODES: I=INITIAL; S=SUBSEQUENT

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Dugway Proving Ground, German-Japanese Village, German Village

HAER UT-92-A

UT0568	HAER	UT	92	A		IMDE	W-F	3/2/2001
CCN	PROGRAM	STATE	NUMBER	EXT	LC SHELFLIST	OFFICE	AGENT	DATE

NAME

Dugway Proving Ground, German-Japanese Village, German Village

OTHER

Dugway Proving Ground, German-Japanese Village, Building T-8100

Dugway Proving Ground, German-Japanese Village, Test Structure A

NR NUMBER

PARK

DISTRICT/UNIFIER

ADDRESS

South of Stark Road, in WWII Incendiary Test Area

CITY/VIC & COUNTY

Dugway, Tooele County

UTM COORDINATES

RELATED NAME(S)

RELATED DATE(S)

I: -1943

CREATOR NAME(S) & DATES

CLASSIFICATIONS

ELEMENTS

CULTURE

GENRE

HABS/HAER NOTES

PETERSON/FOUNDERS PRIZE

ACCESSION & TRANSMITTAL INFORMATION

ACC	TRANS	DRWG	BW	PGI	CT WRITTEN	CAP	FN	FN No.	M	P	PG	CT	W
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