

Milan Army Ammunition Plant  
Milan  
Gibson County  
Tennessee

HAER No. TN-9

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TENN,  
27-MILAN,  
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WRITTEN HISTORICAL AND DESCRIPTIVE DATA

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

HAER  
TENN  
27-MILAN,  
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HISTORIC AMERICAN ENGINEERING RECORD

Milan Army Ammunition Plant

TN-9

**Location:** In Gibson County, about thirty miles north of Jackson and five miles east of the city of Milan.

**Date of Construction:** Established in 1941.

**Owner:** Department of the Army

**Significance:** The Milan Army Ammunition Plant was originally established as two separate facilities during World War II: Milan Ordnance Depot, which stored conventional ammunition; and Wolf Creek Ordnance Plant, which loaded, assembled, and packed a variety of minor and major caliber ammunition. Placed in standby after the war, the unified installations were reactivated during the Korean War.

**Historic Report**  
**Prepared by:** Jeffrey A. Hess, 1984.

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

## EXECUTIVE SUMMARY

Milan Army Ammunition Plant (MAAP) is a government-owned, contractor-operated installation occupying a 22,500-acre site in west Tennessee. MAAP is part of the Army's Armament, Munitions, and Chemical Command (AMCCOM). Located about thirty miles north of the City of Jackson and five miles east of the City of Milan, the plant was originally designed and operated as two separate but contiguous facilities: Milan Ordnance Depot, which stored conventional ammunition, and Wolf Creek Ordnance Plant, which loaded, assembled, and packed a variety of minor and major caliber ammunition. The two facilities were constructed in 1941-1942 and consolidated in 1943. Placed in standby condition after V-J Day, MAAP was reactivated for major manufacturing runs during the Korean and Vietnam Wars, and has continued in production to the present time. As a result of rehabilitation and modernization programs during the 1960s and 1970s, most of the plant's original technology has been dismantled and removed.

Currently, MAAP comprises approximately 1,430 structures. About twenty percent of these buildings are production facilities that were off limits to the present historical survey for security reasons. The installation also contains five structures that antedate military use of the site. The most significant is a brick, Italianate residence known as the Browning House (Building Z-183-A). Constructed in 1873, the building was the boyhood home of the notable Tennessee statesman Gordon Browning, who served three terms as governor during 1937-1938 and 1949-1953. Because of its association with Governor Browning, the building is listed on the National Register Of Historic Places and is a Category II historic property. On the

basis of the buildings surveyed, there are no Category I, no other Category II, and no Category III historic properties at MAAP.

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## PREFACE

This report presents the results of an historic properties survey of the Milan Army Ammunition Plant (MAAP). 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 the MAAP. 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 archaeological 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 Jeffrey A. Hess. The author of this report was Jeffrey A. Hess. The author would like to thank the many employees at MAAP who graciously assisted him in his research and field surveys. He especially acknowledges the help of the following individuals: on the government staff, Lt. Col. John A. Adams, Commander; Capt. David T. Richardson, Executive Officer; William B. Jones, Security Officer; Frank Claytor, Civilian Assistant; and on the Martin Marietta Aluminum Sales Inc. staff, William L. Pittman, Engineering Director; Harold J. Jowes, Engineering Services Supervisor; Donald M. Barger, Engineering Draftsman; June B. Ford, Chief of Administrative Office; W. S. Stevenson, Forester.

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. TN-9.

## Chapter 1

### INTRODUCTION

#### SCOPE

This report is based on an historic properties survey conducted in February 1984 of all accessible Army-owned properties located within the official boundaries of the Milan Army Ammunition Plant (MAAP). The survey included the following tasks:

- . Completion of documentary research on the history of the installation and its properties.
- . 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 21 individual properties. These cards, which constitute HABS/HAER Documentation Level IV for the buildings surveyed, 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

MAAP was one of several government-owned, contractor-operated facilities constructed during 1940-1942 for the manufacture and storage of conventional ammunition. Since the plant was part of a larger manufacturing network, an evaluation of its historical and technological significance requires a general understanding of the nation's wartime munitions industry. To identify relevant published sources on ammunition manufacturing during World War II, the Korean War, and the Vietnam War, research was conducted in standard bibliographies of military history, engineering, and the applied sciences. Unpublished sources were identified by researching the historical and technical archives of the U.S. Army Armament Material Readiness Command (AMCCOM) at Rock Island Arsenal.<sup>1</sup>

In addition to such industry-wide research, a concerted effort was made to locate sources dealing specifically with the history and technology of MAAP. This site-specific research was conducted primarily at the AMCCOM Historical Office at Rock Island Arsenal; the

contractor's historical and public relations files at MAAP; the Mildred G. Fields Public Library in Milan, Tennessee; the Gibson County Memorial Library in Trenton, Tennessee; the Jackson-Madison County Public Library in Jackson, Tennessee; and the Carroll County Public Library in Huntington, Tennessee. Information on MAAP was also obtained from the Tennessee State Historic Preservation Office (Tennessee Historical Commission, Nashville), which noted that the installation contains the Browning House, an 1870s structure listed on the National Register of Historic Places.

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; base maps and photographs supplied by installation personnel; and installation master planning, archaeological, environmental assessment, and related reports and documents. A complete listing of this documentary material may be found in the bibliography.

2. Field Inventory

An architectural field survey was conducted in February 1984 by Jeffrey A. Hess. Following a general review of the project by the installation's executive and security personnel, plant commander Lt. Col. John A. Adams determined that, for security reasons, no production facilities were to be surveyed, photographed, or described by building number (see Appendix). On an escorted basis, the surveyor

was permitted to inspect all pre-1940 structures surviving at the installation as well as the plant's general administrative, housing, storage, and maintenance facilities (Areas A-K, Q, R, T, Y). William L. Pittman and Donald M. Barger of Martin Marietta Aluminum Sales Inc. served as escorts.

Field inventory procedures were based on the HABS/HAER Guidelines for Inventories of Historic Buildings and Engineering and Industrial Structures.<sup>2</sup> All accessible areas and properties were visually surveyed. 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 accessible 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.<sup>3</sup> Information collected on the field forms was later evaluated, condensed, and transferred to HABS/HAER Inventory cards.

### 3. Historical 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, and 3) describe patterns and locations of historic property types. Because the surveyor was denied access to production areas and requested not to refer to specific production facilities by building number, the overview did not attempt to analyze specific construction 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:<sup>4</sup>

- 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:<sup>5</sup>

- 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 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 also 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 archaeological contractor performing parallel work at the installation. The report was revised based on all comments collected, then published in final form.

NOTES

1. The following bibliographies of published sources were consulted: Industrial Arts Index, 1938-1957; Applied Science and Technology Index, 1958-1980; Engineering Index, 1938-1983; Robin Higham, ed., A Guide to the Sources of United States Military History (Hamden, Conn.: Archon Books, 1975); John E. Jessup and Robert W. Coakley, A Guide to the Study and Use of Military History (Washington, D.C.: U.S. Government Printing Office, 1979); "Military Installations," Public Works History in the United States, eds., Suellen M. Hoy and Michael C. Robinson (Nashville: American Association for State and Local History, 1982), pp. 380-400. AMCCOM (formerly ARRCOM, or U.S. Army Armament Materiel Readiness Command) is the military agency responsible for supervising the operation of government-owned munitions plants; its headquarters are located at Rock Island Arsenal, Rock Island, Illinois. Although there is no comprehensive index to AMCCOM archival holdings, the agency's microfiche collection of unpublished reports is itemized in ARRCOM, Catalog of Common Sources, Fiscal Year 1983, 2 vols. (no pl.: Historical Office, ARRCOM, Rock Island Arsenal, n.d.).
2. 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).

3. 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.
4. National Park Service, How to Complete National Register Forms (Washington, D.C.: U.S. Government Printing Office, January 1977).
5. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).

## Chapter 2

### HISTORICAL OVERVIEW

#### BACKGROUND

Milan Army Ammunition Plant (MAAP) is a government-owned, contractor-operated installation occupying a 22,500-acre site in Gibson and Carroll Counties in west Tennessee. Located about thirty miles north of the City of Jackson and five miles east of the City of Milan, the plant was originally designed and operated as two separate but contiguous facilities: Milan Ordnance Depot, which stored conventional ammunition, and Wolf Creek Ordnance Plant, which loaded, assembled, and packed a variety of minor and major caliber ammunition. The two facilities were constructed in 1941-1942, and consolidated in 1943. Placed in standby condition after V-J Day, MAAP was reactivated for major manufacturing runs during the Korean and Vietnam Wars, and has continued in production to the present time. As a result of rehabilitation and modernization programs during the 1960s and 1970s, most of the plant's original technology has been dismantled and removed. Currently, MAAP comprises approximately 1,430 structures, more than eighty percent of which date from the original construction program.

#### WORLD WAR II

When war broke out in Europe in the fall of 1939, the United States had virtually no industrial capacity for manufacturing military ammunition. As historians Harry C. Thomson and Lida Mayo observe in their authoritative work on American munitions production:

Only a handful of small plants were making propellant powder and high explosives, and there were virtually no facilities for the mass loading and assembling of heavy ammunition. American industry was just beginning, through educational orders, to learn techniques for forging and machining shells and producing intricate fuze mechanisms. The only sources for new artillery ammunition were Frankford and Picatinny Arsenals, while a few ordnance depots were equipped to renovate old ammunition. Private [military] ammunition plants did not exist, and, because of the specialized nature of the process, there were no commercial plants that could be converted to ammunition production.

To meet this situation the Ordnance Department took steps in the summer of 1940 to create something new in American economic life -- a vast interlocking network of ammunition plants owned by the government and operated by private industry. More than 60 of these GOCO (government-owned, contractor-operated) plants were built between June 1940 and December 1942.

In December 1940, MAAP was authorized under this construction program.

#### Site Selection and Former Land Use

MAAP is located in Gibson and Carroll Counties in western Tennessee, about thirty miles north of the City of Jackson and five miles east of the City of Milan. The installation originally comprised two contiguous but separate facilities: Milan Ordnance Depot, which stored conventional ammunition, and Wolf Creek Ordnance Plant, which loaded, assembled, and packed a variety of minor and major caliber ammunition, ranging from 20 mm armor-piercing shot to 155 mm howitzer projectiles.\* The depot

\* In 1943 the two facilities were consolidated as Milan Ordnance Center. Shortly after V-J Day, the installation was renamed Milan Arsenal, and so remained until 1961, when the manufacturing and storage portions were redesignated, respectively, as Milan Ordnance Plant and Milan Ordnance Depot Activity. The installation's present name, Milan Army Ammunition Plant (MAAP) dates from 1963. Except for a few cases where clarity demands the use of historical nomenclature, this report refers to the installation and its previous sub-units as MAAP.

site was chosen primarily because "its nearness to the Wolf Creek loading plant made possible great savings in freight and in employees for policing the two areas."<sup>2</sup> The selection of the ordnance plant site was governed by the same basic criteria used in evaluating locations for all load, assemble, and pack facilities. These considerations included:

- (1) a mid-continental location as a defense against enemy bombardment
- (2) proximity to main railroad lines
- (3) availability of an ample water supply and sufficient electrical power for processing purposes
- (4) availability of suitable labor
- (5) remoteness from large centers of population
- (6) availability of large tracts of land to permit necessary safe distances between facilities in both production and storage areas.<sup>3</sup>

The MAAP site satisfied all criteria. When the government took possession of the land in January 1941, the boundaries enclosed approximately 28,500 acres of rolling farm land and over 1,500 farm buildings.<sup>4</sup> The site also included a "country village" known as Whitthorne, which consisted of "two stores, a post office, a junior high school, Church of Christ, and ten homes." The school building is the only Whitthorne structure surviving within the plant's present boundaries. Constructed about 1900, the one-story brick building was enlarged "in 1916 [, when] a room was added [and] the school became a two teacher school." About 1930, the school was enlarged again, with the addition of a one-story brick gymnasium at the

rear, or south elevation.<sup>5</sup> Because of its sound structural condition, the school building was retained for the military construction program and incorporated into the otherwise wood-frame Administration Building (Building T-1) (Figures 1, 2). In similar fashion, a brick bungalow-style farm residence, constructed about 1925, was expanded and converted into a Fire Station (Building F-50) (Figure 3). These remodelings completely altered the architectural character of the two buildings.

MAAP also contains three other buildings that antedate military use of the site. The most significant is the Browning House (Building Z-183-A) (Figure 4), a two-story, brick residence that was the boyhood home of Tennessee statesman Gordon Browning, who served three terms as governor during 1937-1938, and 1949-1953. Constructed in 1873, the modest Italianate building is listed on the National Register of Historic Places primarily because of its association with Governor Browning.<sup>6</sup> Previously used for office space by the plant's contractor staff, the building is currently vacant. Another former residential structure (Building Q-60) (Figure 5), built in the late 1930s as a cabin or lodge, now serves as a "club house" for plant personnel and community groups. Originally situated in the MAAP's production area near Line B, this two-story log structure was dismantled and moved to its present location in the housing district (Q Area) during the 1940s.<sup>7</sup> It has experienced considerable remodeling. The fifth, and last, pre-military structure at MAAP is a 1930s wooden barn (no building number assigned) (Figure 6) bordering U. S. Highway 45 in the west-central section of the plant. Presently used by tenant farmers for feeding and sheltering livestock, the building is in severely deteriorated condition.



Figure 1: North elevation of the Administration Building (Building T-1). The central section of the building, with its two perpendicular gabled wings, is the former Whitthorne school. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 2: Detail of the Administration Building (Building T-1), showing former Whitthorne school building. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 3: During the original construction program, a bungalow residence at the MAAP site was remodeled into the plant's fire station (Building F-50). (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 4: East elevation of the Browning House (Building Z-183-A). (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 5: Club House (Building Q-60), looking north. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 6: This barn (no building number assigned) is located in the west-central section of the plant, near U. S. Highway 45. (Source: Field inventory photograph, Jeffrey A. Hess, MacDonald and Mack Partnership.)

## Construction

Under the general supervision of the Quartermaster Corps, construction work at Milan Ordnance Depot and Wolf Creek Ordnance Plant commenced in January 1941 and concluded twelve months later. The H. K. Ferguson Construction Company of Cleveland provided architectural-engineering services and also assumed the duties of general contractor in a partnership arrangement with Oman Construction Company of Nashville.<sup>8</sup> The depot, which occupied the southern half of the MAAP site, contained about 800 buildings, 700 of which were standard, earth-sheltered, reinforced-concrete, igloo magazines grouped into eight storage yards (Areas A-H). To guard against the possibility of sympathetic detonations, the igloos were spaced approximately 150 feet apart in staggered parallel rows (Figures 7, 8). The depot also included two other major areas: in the northwest section, a storage yard (Area K) of standard, clay-tile magazines (Buildings 201-206) (Figure 9) used for inert materials; and in the east-central section, an administration-and-maintenance area (Area I) containing several brick offices and shops.<sup>9</sup> The most prominent of these were the Administration Building (Building IU-1) (Figure 10), Fire and Guard House (Building IU-2), Machine Shop (Building IU-4) (Figure 11), and Locomotive Shop (Building IU-5).

The northern half of the MAAP site was given over to the Wolf Creek Ordnance Plant, which comprised about 660 buildings. Over forty percent of these structures formed thirteen production lines in the central part of the plant (Lines A-I, K, O, X, Z) (Figure 12).<sup>10</sup> Storage areas north and south of the production lines contained about 170 earth-sheltered,

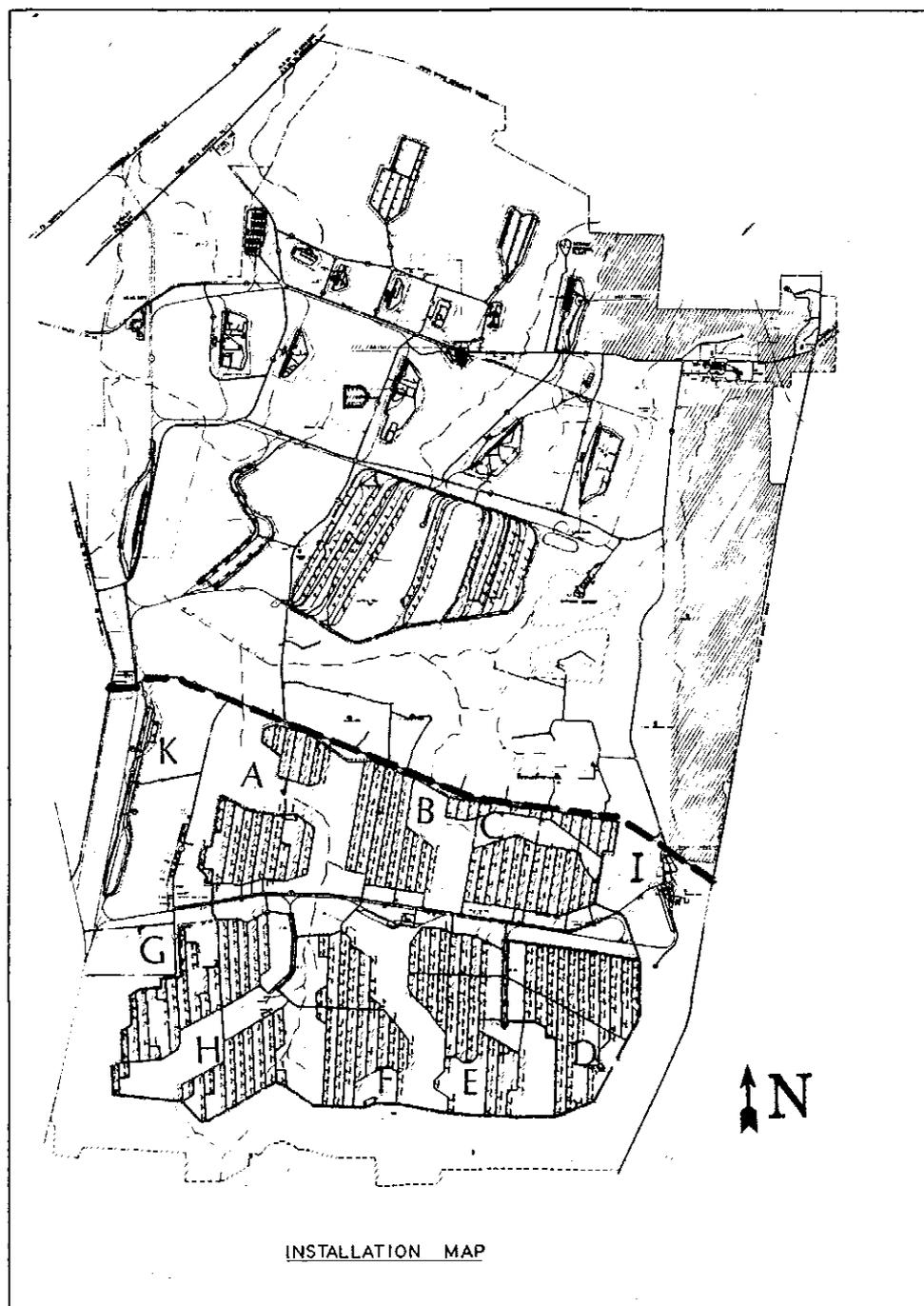


Figure 7: Site plan of Milan Army Ammunition Plant. The heavy dotted line marks the former boundary between Wolf Creek Ordnance Plant on the north and Milan Ordnance Depot on the south. Areas A-H are earth-sheltered igloo yards. Area K is an above-ground, clay-tile magazine yard, and Area I is an Administration-and-Shop compound. (Source: MAAP Facilities Engineer's Office.)

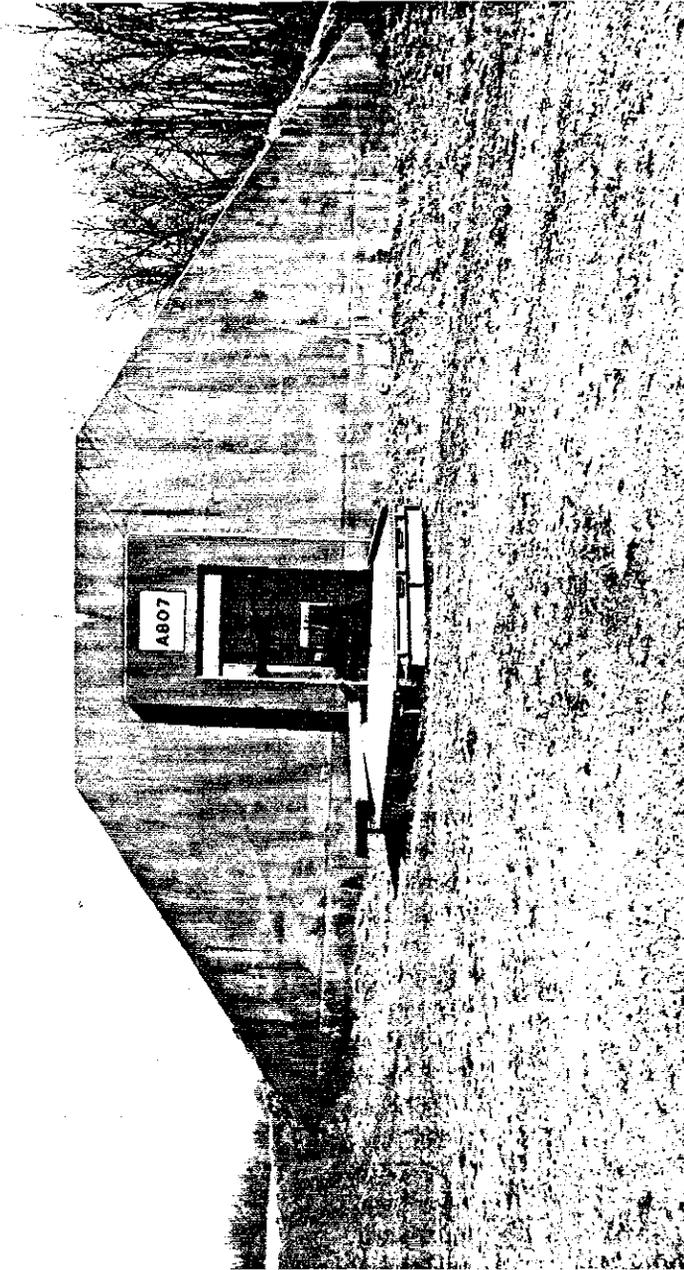


Figure 8: A typical igloo at MAAP. (Source Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)

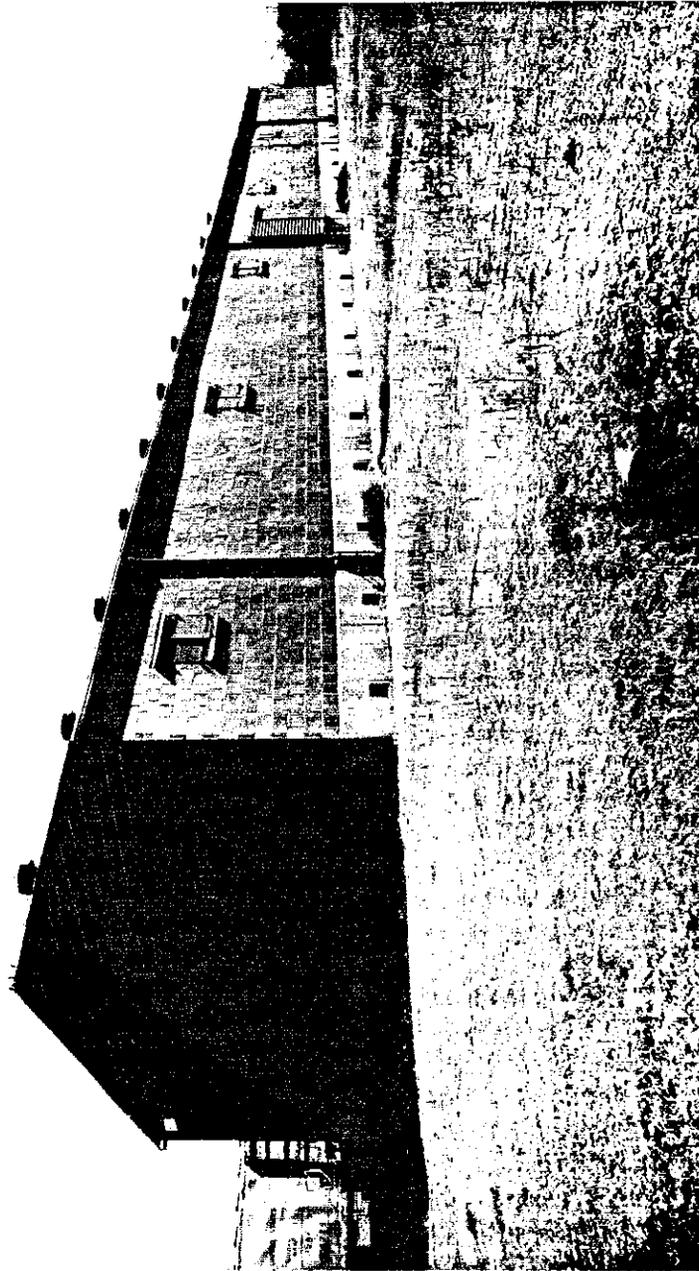


Figure 9: This structure at MAAP is typical of the plant's clay-tile magazines and inert materials warehouses. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 10: Originally the Administration Building for the depot section of the Plant, Building IU-1 is now leased to the National Guard. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)

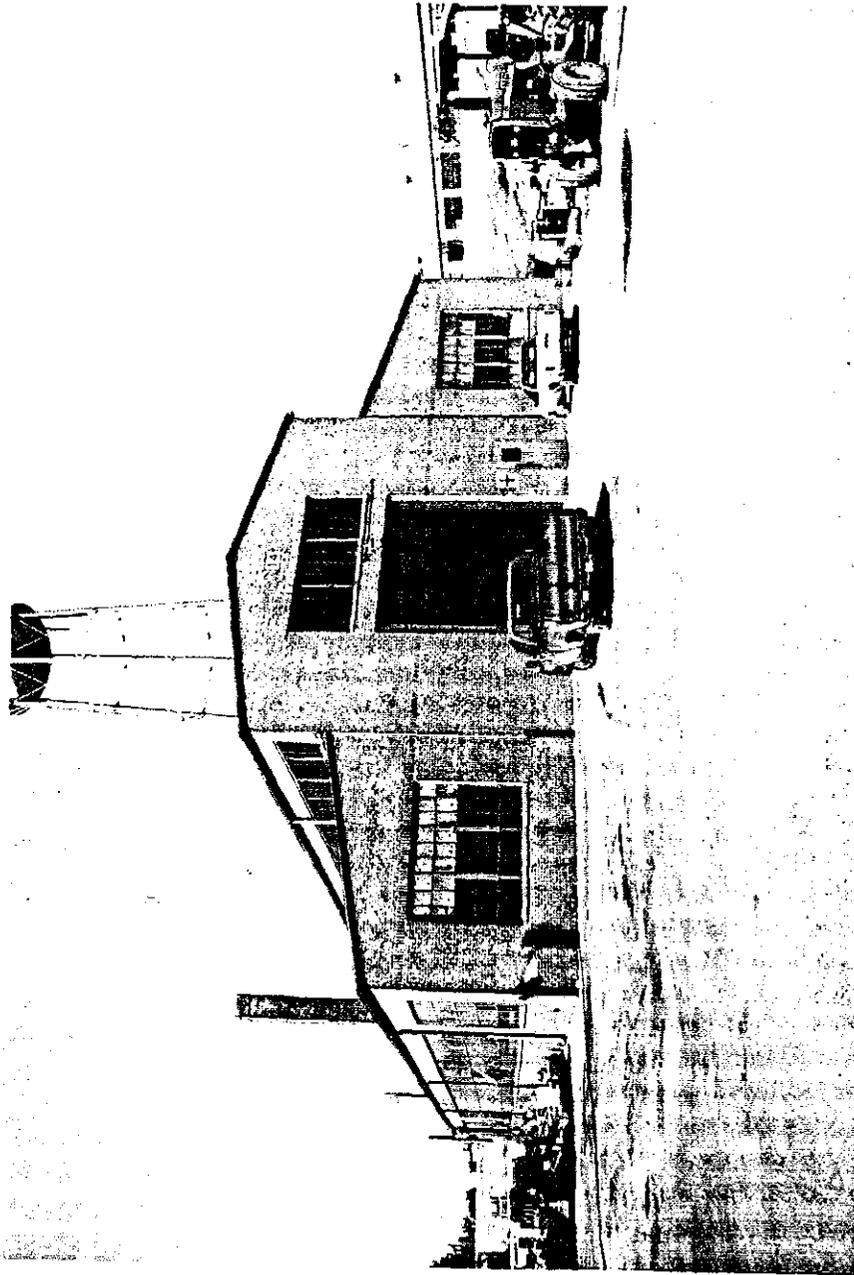


Figure 11: Originally designed and used as a Machine Shop for the depot section of the plant, this building currently serves as a general purpose Heavy Equipment Garage. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)

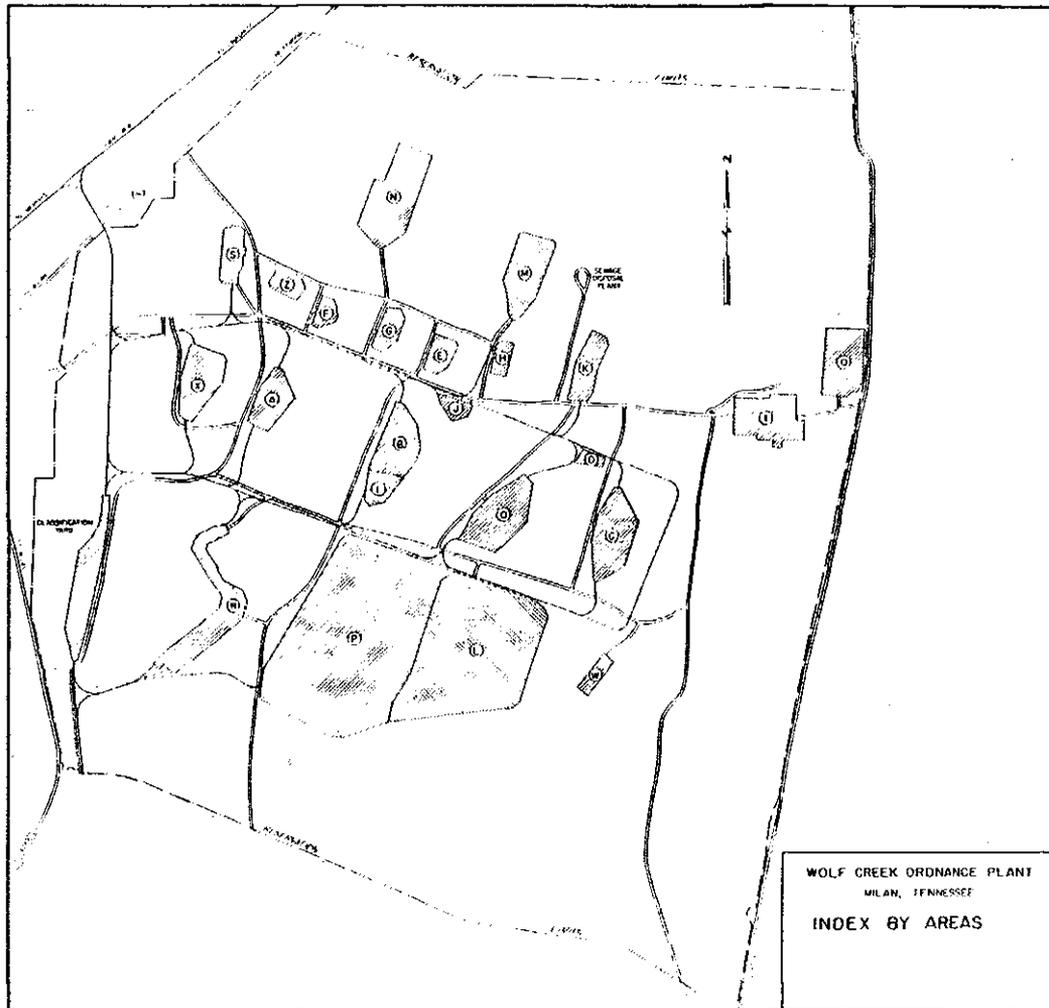


Figure 12: Area layout of the installation's manufacturing facility, formerly known as Wolf Creek Ordnance Plant. Areas A-I, K, O, X, and Z contained production lines. Areas N, M, L, P, R, and S were storage enclaves. Areas J, Q, T, and W were, respectively, shop, housing, administration, and burning compounds. (Source: "Industrial Facilities Inventory, Milan Ordnance Center," unpublished report prepared by U. S. Army Corps of Engineers, 1944, ARRCOM Historical Office, Rock Island Arsenal.)

reinforced-concrete, igloo magazines (Areas N, M, L, P) and 40 clay-tile magazines (Areas R, S). In the center of the production area was a small maintenance compound (Area J) of primarily clay-tile structures, including a Machine Shop (Building J-1), Laboratory (Building J-3), Laundry (Building J-4), and Cafeteria (J-10) (Figure 13). The plant also contained two other areas of major significance, both located directly west of the production lines: an administration enclave (Area T) whose utilitarian, wood-frame structures included an Administration Building (Building T-1), Hospital (Building T-2), and Security Headquarters (Building T-10); and a staff residential district (Area Q) consisting of thirty-two wood-frame houses, displaying colonial-revival detailing (Buildings Q1-Q32) (Figure 14).

### Technology

MAAP began manufacturing munitions in September 1941, and remained in production until V-J Day, when the installation was shut down and most of its manufacturing facilities placed in either "standby" condition or in "extended storage."<sup>11</sup> Over this four-year period, the plant operated thirteen manufacturing lines: three for minor caliber items, three for fuzes, two for major caliber items, one for renovating rejected ammunition, one for primers, one for boosters, one for x-raying completed rounds for quality control purposes, and one for producing crystallized ammonium nitrate, which was mixed with TNT to form the explosive amatol. Final products for shipping included 20 mm armor-piercing shot, 60 mm trench mortar shells, 155 mm howitzer projectiles, 250 pound bombs, and

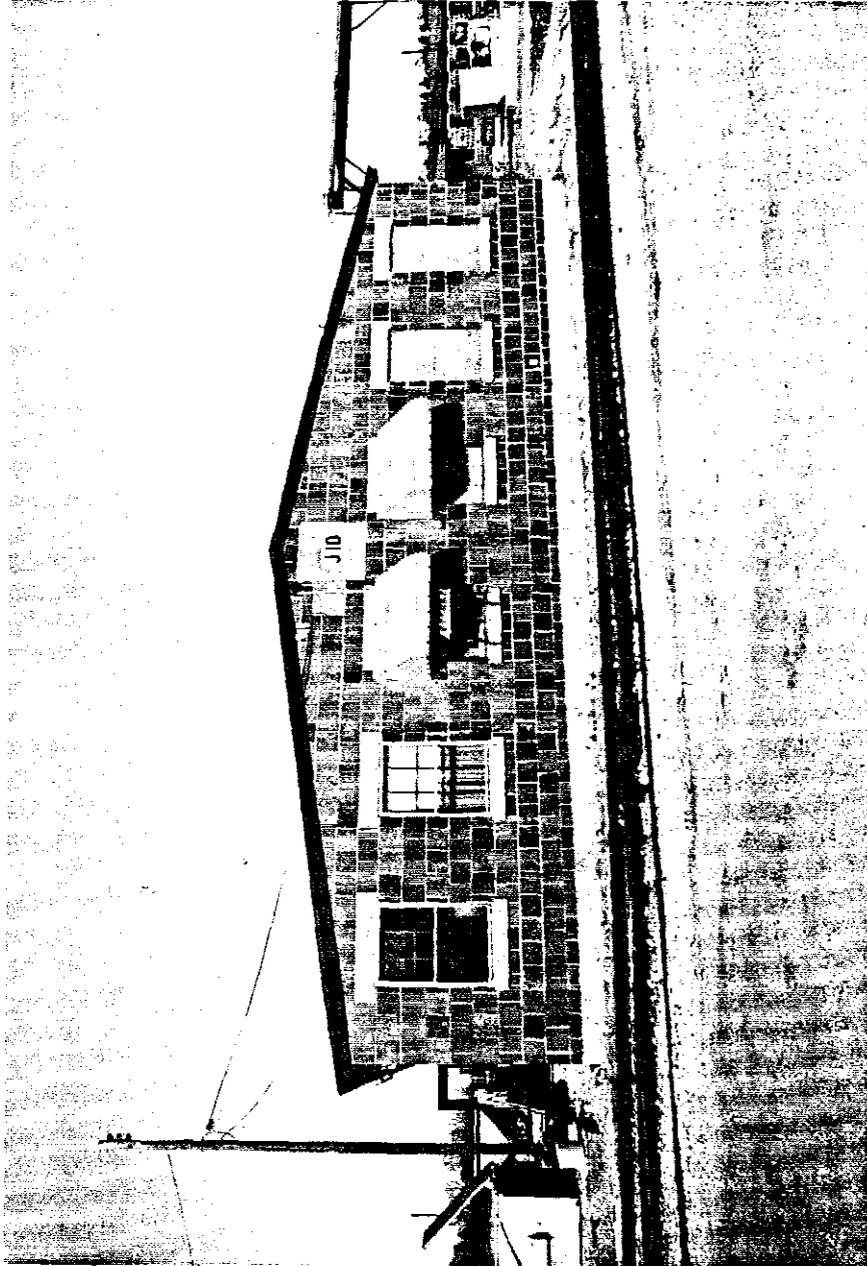


Figure 13: Designed and used as a Cafeteria, this clay-tile building is similar to the Laundry and Laboratory in Area J, which serves as a shop area for the plant's production lines. (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)



Figure 14: Building Q-17 is typical of the thirty-two residences in the plant's housing district (Area Q). (Source: Field inventory photograph, 1984, Jeffrey A. Hess, MacDonald and Mack Partnership.)

anti-tank rockets. The original production equipment no longer survives at the installation.<sup>12</sup>

The load, assemble and pack process at MAAP primarily consisted of the assembly of component parts and materials into complete ammunition. This process has been described in the following way:

The explosives, shell or bomb casings, cartridge cases, fuzes, primers, boosters, and detonators are received from outside manufacturers. They are then inspected and stored, until required, in the loading departments. The loading and assembling of these materials is carried on as an assembly-line process. Various departments or so called "load lines" are maintained for the processing of each particular type of ammunition. Thus, a plant may have, in addition to one or more shell- or bomb-load lines, separate lines for loading such component parts as detonators, fuzes, primers, and boosters. . . .

The main loading operation for shells and bombs is generally performed by either the melt-load or the press-load process. On the load line, the shell or bomb casings are cleaned, inspected, and painted. Large-caliber shells and bombs are usually filled by the melt-load process, the major operation of which consists in screening, melting, and pouring the main explosive or bursting charge into the shell or bomb cavity. The most commonly used bursting charge is TNT, which is readily melted either alone or with ammonium nitrate. After the TNT has hardened, the booster and fuze are inserted. Some large-caliber shells are shipped to combat zones unfuzed, and the fuze is assembled in the field prior to firing the shell. In the case of fixed and semifixed rounds of ammunition, the projectile is assembled to the cartridge case, which contains the propellant charge and artillery primer. The final operations involve labeling and packing or crating for storage or shipment. Inspection is carried on continuously at each stage of the operation.

The operations performed on the lines loading shells by the press-load process differ somewhat from those where the melt-load process is used. The main explosive charge is loaded into the projectile in a dry, rather than molten state, and consolidated into the shell by means of a hydraulic press. Press loading is most generally applied to smaller-caliber shells, such as those used in 20 mm and 40 mm cannon.

The process of loading such component parts as fuzes, boosters, detonators, and primers is largely confined to very simple assembly work. Artillery primers, the bodies of which are metal tubes filled with a specified amount of black powder, are generally loaded on a

volumetric loading machine. The heads, containing a small percussion element which ignites upon friction from the firing pin, are staked to the loaded bodies. Most of the operations on the primer-load lines are mechanized.<sup>13</sup>

In selecting contractors to operate MAAP and other new shell-loading plants, the Ordnance Department "did not attach any great importance to the nature of their peacetime functions, but gave first consideration to their managerial ability, reputation for efficient operation, integrity, and financial stability." As historians Thomson and Mayo explain, "The idea was that such firms knew the fundamentals of mass production and good business management, had competent plant managers on their staff, and could soon learn all they needed to know about the special problems of loading shells and bombs."<sup>14</sup> On this basis, the Proctor and Gamble Defense Corporation, a wholly-owned subsidiary of the Procter and Gamble Company of Cincinnati, was chosen to manage MAAP. The firm continued in such capacity until V-J Day, when the government assumed sole responsibility for the installation.<sup>15</sup>

#### KOREAN WAR TO THE PRESENT

MAAP's main production areas resumed operation early in the Korean War, with the Proctor and Gamble Defense Corporation once again serving as contractor-operator. Apart from the erection of a few storehouses (Buildings K-50, K-51, E-43, F-53, Z-17, there was no major new construction or significant technological innovation. Following sharp decreases in production schedules in 1954, three manufacturing lines were placed in layaway status and in 1955, two more lines were placed in standby condition. All major manufacturing activities ceased in the fall of 1957,

at which time Proctor and Gamble Defense Corporation terminated its contract and was replaced by Harvey Aluminum Sales, Inc. of Torrance, California. In 1969, Harvey Aluminum Sales, Inc. was acquired by Martin Marietta Corporation of Bethesda, Maryland, and in 1972, the contracting firm adopted its present name of Martin Marietta Aluminum Sales, Inc.<sup>16</sup>

Reactivated for production in 1960, MAAP experienced considerable technological renovation and new construction during the 1960s and 1970s.<sup>17</sup> These new facilities, however, were off limits to the present historical survey and cannot be described (see Appendix).

#### NOTES

1. Harry C. Thomson and Lida Mayo, The Ordnance Department: Procurement and Supply (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1960), pp. 104-105.
2. Thomson and Mayo, p. 370. For a list of items produced by the plant as of March 1944, see William Voight, Jr., "The Ordnance Organization in World War II," p. 325, unpublished report prepared for the Ordnance Department, 1945, on microfiche, AMCCOM Historical Office, Rock Island Arsenal.
3. Thomson and Mayo, p. 108.
4. "Milan Army Ammunition Plant, Basic Unit History Covering the Period from Establishment (1941) thru 31 December 1967," p. 6, unpublished report, n.d., MAAP Administrative Archives. At present, MAAP contains approximately 22,500 acres. As "The Basic Unit History" notes (p. 6): "In 1946, Line 'G', containing approximately 42 acres was sold to the United States Rubber Company. Approximately 2,600 acres were sold in 1947 to the original owners or to high bidders; in 1949, 377 acres were set aside for an airport and golf course for the city of Milan; in 1955, 137.28 acres along the outside perimeter were sold to individuals; in 1963, 1,998.5 acres were deeded to the Tennessee National Guard; and in 1964, 471.41 acres went to the University of Tennessee."

5. Carroll County (McKenzie, Tenn.: McKenzie Banner, 1972), pp. 167-168.
6. Bobby R. Browning, National Register Nomination for the Browning House, unpublished, 1974, in Tennessee State Historic Preservation Office files, Tennessee Historical Commission, Nashville.
7. Author's interview with Donald M. Barger, Martin Marietta Aluminum Sales, Inc., February 15, 1984. The structure (described as a "Cabin Lodge") is listed as part of the plant's housing district in "Industrial Facilities Inventory, Milan Ordnance Center," n. p., unpublished report prepared by U. S. Army Corps of Engineers Office of the District Engineer, Mobile, Ala., 1944, in AMCCOM Historical Office, Rock Island Arsenal.
8. "Basic Unit History," p. 4. After the completion of MAAP, the Ferguson-Oman partnership built the Gulf Ordnance Plant, a shell-loading facility in Mississippi; see Lenore Fine and Jesse A. Remington, The Corps of Engineers: Construction in the United States (Washington, D.C.: Office of the Chief of Military History, United States Army, 1972), p. 568.
9. A list of buildings, with plot plans for the various areas, is found in "Industrial Facilities Inventory," n. p. For brief descriptions of the standard igloo and clay-tile magazine or warehouse, see E. E. MacMorland, "Ordnance Supply System," Mechanical Engineering, 67 (December 1945), 791-792.
10. "Industrial Facilities Inventory," n. p.
11. "Basic Unit History," p. 11.
12. Voight, pp. 325-326; author's interview with Harold J. Jowes, Martin Marietta Aluminum Sales, Inc., February 15, 1984. "At the beginning of World War II, shortage of TNT for a time necessitated substitution in large bombs of amatol, a mixture of TNT and ammonium nitrate. Amatol had slightly less shattering power --brisance--than TNT, and somewhat less sensitivity to detonation. Later, increased production permitted the use of straight TNT"; see Constance McLaughlin Green and others, The Ordnance Department: Planning Munitions for War (Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1955), pp. 452-453.
13. "Hourly Earnings in the Ammunition-Loading Industry, 1944," Monthly Labor Review, 60 (April 1945), 840-841.
14. Thomson and Mayo, p. 113.
15. "Basic Unit History," p. 12. Milan Ordnance Depot was government-operated until its consolidation with Wolf Creek Ordnance Plant in 1943. After the merger, both facilities were operated by Proctor and Gamble.

16. "DARCOM Installation and Activity Brochure [for Milan Army Ammunition Plant]," p. 6, unpublished, 1980, AMCCOM Historical Office, Rock Island Arsenal.
17. "During the 1960s, necessary rehabilitation of existing facilities and some plant modernization was accomplished to carry out the mission in the production of the following items of ammunition: fuzes, primers, delay plungers, delay elements, boosters, 40MM, 60MM, 81MM, 90MM, 105MM, 106MM, mine, grenade, CBU dispensers, ADU canisters, demolition kits, . . . pelleting of explosives, and rework and renovation of various items. . . . Emphasis has been placed on the Modernization Program which is essentially automation of production. . . . In March 1978, funds were received for modernization/expansion of Line "A" to establish capability for load, assemble and pack of the M509, ICM, 8-Inch projectile, and modernization/expansion of Line "C" to automate the load, assemble and pack of the M374A3, 81MM mortar and the M720, 60MM mortar. On site work on these two projects began in April 1978 with equipment "prove out" scheduled for late 1980 for Line "A." In March 1979, funds were received for an expansion program at Line "E" to establish capability for load, assemble and pack of the M739, PD, fuze and for an expansion effort at Line "Z" to establish capability for load, assemble and pack of the mortar fuze, M734. On site work on these two projects began in March 1979 with equipment "debug" for the M739 scheduled to be completed in December 1980 and that for the M734 in November 19980. Also received in March 1979 were funds for an entirely new multi-million dollar Central X-Ray Facility. The project included 14 new buildings located on a 19-acre site. Work began in April 1979 and the facility is expected to be fully operational by April 1981"; see "DARCOM Installation and Activity Brochure," pp. 5-6. Approximately 115 new buildings were erected at MAAP during the period 1960-1981; see Milan Army Ammunition Plant Real Property Inventory, unpublished computer printout, March 31, 1982, AMCCOM Historical Office, Rock Island Arsenal.

## 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.<sup>1</sup> 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 Interior's Standards for Rehabilitation and

Revised Guidelines for Rehabilitating Historic Buildings<sup>2</sup> 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.<sup>3</sup> 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 Buildings<sup>4</sup> and in consultation with the State Historic Preservation Officer.
- c) 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.<sup>5</sup>

### 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 Buildings<sup>6</sup> 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.<sup>7</sup> Similar structures need only be documented once.

#### CATEGORY I HISTORIC PROPERTIES

There are no Category I historic properties at the MAAP.

CATEGORY II HISTORIC PROPERTIES

Browning House (Building Z-183-A)

- . Background and significance. The Browning House (Figure 4) is a two-story brick structure of irregular plan. Its modest Italianate detailing includes a shallow-pitched gable roof with projecting eaves; vertically elongated windows with segmental-arch headers; bulls-eye medallions centered in each of the four gable ends; and a flat-roof, wood-frame porch with wide eaves and a classically accented column. Constructed in 1873 by "a Mr. Cunningham," the building owes its present name to James and Melissa Browning who, in 1903, purchased and occupied the dwelling with their four-year-old son Gordon, a future three-term governor of Tennessee.<sup>8</sup>

Considered "one of the most colorful, controversial, and tenacious public figures" in the history of the state, Gordon Browning spent his boyhood and high-school years on the Gibson County homestead, which remained in the Browning family until its acquisition by the government for MAAP. A graduate of Cumberland Law School, Browning was elected to the first of six terms in Congress in 1922, and became state governor in 1937. During World War II, he served in military government in Belgium and Luxembourg, and then returned for two more terms in the Tennessee statehouse in 1949-1953. A strong reform governor who broke the political machine of E. H. "Boss" Crump in west Tennessee, Browning was known for developing the state's farm-to-market road system, energetically supporting public education,

reorganizing and retiring the state debt, and promoting a number of major state office construction projects.<sup>9</sup> Because of Governor Browning's significant contributions to Tennessee, the Browning House was listed on the National Register of Historic Places in 1974.<sup>10</sup> For the same reasons, the structure is a Category II historic property.

- . Condition and potential adverse impact. Formerly used for office space by the plant's contractor staff, the building is currently vacant. It receives routine maintenance and is in good condition. There are no current plans to alter or demolish this property.
  
- . Preservation options. See the general preservation recommendations at the beginning of this chapter for Category II historic properties listed on the National Register. Within recent years, the building has experienced inappropriate repointing of its masonry, which underscores the need for the development of a comprehensive preservation plan, and for future repair work to be supervised by qualified preservation professionals. Although located in a production area (Area Z), the building is sufficiently removed from manufacturing buildings to warrant the investigation of ways to increase its public accessibility.

#### CATEGORY III HISTORIC PROPERTIES

There are no Category III historic properties at the MAAP.

NOTES

1. Army Regulation 420-40, Historic Preservation (Headquarters, U.S. Army: Washington, D.C., 15 April 1984).
2. National Park Service, Secretary of 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."
8. Jackson Sun, September 2, 1953.
9. Editorial on the life and eath of Governor Browning, Nashville Banner, May 24, 1976.
10. Bobby R. Browning, National Register Nomination for the Browning House, unpublished, April 1974, in Tennessee State Historic Preservation Office, Tennessee Historical Commission, Nashville.

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- "Hourly Earnings in the Ammunition-Loading Industry, 1944." Monthly Labor Review, 60 (April 1945), 841-842. Contains excellent overview of load, assemble, and pack operations at MAAP and similar facilities.
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Milan Army Ammunition Plant Installation Map. Unpublished drawing, n.d. MAAP Facilities Engineer's Office Archives.

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National Park Service. "Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines." Federal Register, Part IV (September 28, 1983), 44730-44734.

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DEPARTMENT OF THE ARMY  
MILAN ARMY AMMUNITION PLANT  
MILAN, TENNESSEE 38358

Milan Army Ammunition Plant  
HAER No. TN-9  
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REPLY TO  
ATTENTION OF:

February 17, 1984

SMCMI-XO

[APPENDIX]

Mr. Jeffrey A. Hess  
Historical Consultant  
215 Grain Exchange Building  
Minneapolis, Minnesota 55415

Dear Mr. Hess:

The week of February 13-16, 1984, you conducted a historic and technological survey at Milan Army Ammunition Plant. During this visit, you requested to view and photograph production lines and modern equipment/facilities. You also requested detailed information concerning the modern processes involved in the load, assemble and pack of ammunition at Milan Army Ammunition Plant. Your request was denied due to the sensitivity of the data you required.

It is our policy that we do not release any information or photographs which may be of some benefit to persons, organizations, or governments outside the United States Government.

Sincerely,

David T. Richardson  
Captain, Ordnance Corps  
Executive Officer