**INDIVIDUAL PROPERTY/DISTRICT**
**MARYLAND HISTORICAL TRUST**
**INTERNAL NR-ELIGIBILITY REVIEW FORM**

Property/District Name: Building E5325 Survey Number: HA-1993

Project: Demolition of Bldg E5325 @ Aberdeen Proving Gd Agency: ARMY

Site visit by MHT Staff: _X_ no ___ yes Name _____ Date _____

Eligibility recommended __X__ Eligibility **not** recommended _____

Criteria: _X_A ___B _X_C ___D Considerations: ___A ___B ___C ___D ___E ___F ___G ___None

Justification for decision: (Use continuation sheet if necessary and attach map)

Building E5325 located in the Edgewood Area of Aberdeen Proving Ground is considered eligible for listing on the National Register of Historic Places under Criteria A and C. The Chlorine Liquification Plant was erected in 1918 as a chemical weapons manufacturing facility. The building was erected during the period of significance of Aberdeen Proving Ground and was directly associated with the primary mission of APG, that is the manufacturing of chemical weapons. The building qualifies for listing under Criterion A as representation of the chemical weapons manufacturing process at the close of World War I.

The building is a two-story concrete frame structure with hollow tile curtain walls. The building is characterized by a central monitor roof and steel sash windows. The building is representative of a manufacturing-type warehouse, and though altered by some replacement materials including new roof cladding and some wall infill, retains sufficient integrity to qualify for listing under Criterion C.

Documentation on the property/district is presented in: Project Review and Compliance

Prepared by: Mr. David Blick, Environmental Conservation and Restoration Division, Aberdeen Proving Ground, Aberdeen, Maryland

Kim Prothro Williams October 15, 1996
Reviewer, Office of Preservation Services Date

NR program concurrence: X yes ___ no ___ not applicable

Peter E. Kurtze 10/16/96
Reviewer, NR program Date

gmd

Survey No. HA-1993

**MARYLAND COMPREHENSIVE HISTORIC PRESERVATION PLAN DATA - HISTORIC CONTEXT**

**I. Geographic Region:**

| | | |
|---|---|---|
| ____ | Eastern Shore | (all Eastern Shore counties, and Cecil) |
| ____ | Western Shore | (Anne Arundel, Calvert, Charles, Prince George's and St. Mary's) |
| __X__ | Piedmont | (Baltimore City, Baltimore, Carroll, Frederick, Harford, Howard, Montgomery) |
| ____ | Western Maryland | (Allegany, Garrett and Washington) |

**II. Chronological/Developmental Periods:**

| | | |
|---|---|---|
| ____ | Paleo-Indian | 10000-7500 B.C. |
| ____ | Early Archaic | 7500-6000 B.C. |
| ____ | Middle Archaic | 6000-4000 B.C. |
| ____ | Late Archaic | 4000-2000 B.C. |
| ____ | Early Woodland | 2000-500 B.C. |
| ____ | Middle Woodland | 500 B.C. - A.D. 900 |
| ____ | Late Woodland/Archaic | A.D. 900-1600 |
| ____ | Contact and Settlement | A.D. 1570-1750 |
| ____ | Rural Agrarian Intensification | A.D. 1680-1815 |
| ____ | Agricultural-Industrial Transition | A.D. 1815-1870 |
| __X__ | Industrial/Urban Dominance | A.D. 1870-1930 |
| ____ | Modern Period | A.D. 1930-Present |
| ____ | Unknown Period ( ___ prehistoric | ___ historic) |

**III. Prehistoric Period Themes:**

| | |
|---|---|
| ____ | Subsistence |
| ____ | Settlement |
| ____ | Political |
| ____ | Demographic |
| ____ | Religion |
| ____ | Technology |
| ____ | Environmental Adaptation |

**IV. Historic Period Themes:**

| | |
|---|---|
| ____ | Agriculture |
| __X__ | Architecture, Landscape Architecture, and Community Planning |
| ____ | Economic (Commercial and Industrial) |
| ____ | Government/Law |
| __X__ | Military |
| ____ | Religion |
| ____ | Social/Educational/Cultural |
| ____ | Transportation |

**V. Resource Type:**

Category: Building

Historic Environment: Army Installation

Historic Function(s) and Use(s): Warehouse/Storage Facility

Known Design Source: Chemical Warfare Service

# Maryland Historical Trust
# Maryland Inventory of
# Historic Properties Form

Inventory No. HA-1993

## 1. Name of Property (indicate preferred name)

| | |
|---|---|
| historic | Building E5325-Liquid Chlorine Building |
| other | |

## 2. Location

| | | | |
|---|---|---|---|
| street and number | 5325 Hanlon Road | X | not for publication |
| city, town | Edgewood Area, Aberdeen Proving Ground | N/A | vicinity |
| county | Harford | | |

## 3. Owner of Property (give names and mailing addresses of all owners)

| | | | | | |
|---|---|---|---|---|---|
| name | U.S. Army Garrison, APG, Department of the Army, DoD | | | | |
| street and number | 2201 Aberdeen Boulevard | | | telephone | 410-278-6756 |
| city, town | Aberdeen Proving Ground | state | Maryland | zip code | 21005 |

## 4. Location of Legal Description

| | | | |
|---|---|---|---|
| courthouse, registry of deeds, etc. | Harford County Courthouse, Land Records | tax map and parcel | N/A |
| city, town | Bel Air | liber | folio |

## 5. Primary Location of Additional Data

_____ Contributing Resource in National Register District
_____ Contributing Resource in Local Historic District
__X__ Determined Eligible for the National Register/Maryland Register
_____ Determined Ineligible for the National Register/Maryland Register
_____ Recorded by HABS/HAER
_____ Historic Structure Report or Research Report at MHT
_____ Other: Edgewood Arsenal Industrial Area HA-2069

## 6. Classification

**Category**
_____district
__X__building(s)
_____structure
_____site
_____object

**Ownership**
__X__public
_____private
_____both

**Current Function**
_____agriculture
_____commerce/trade
_____defense
_____domestic
_____education
_____funerary
_____government
_____health care
_____industry
_____landscape
_____recreation/culture
_____religion
_____social
_____transportation
_____work in progress
_____unknown
__X__vacant/not in use
_____other:

**Resource Count**

| *Contributing* | *Noncontributing* | |
|---|---|---|
| 1 | _____ | buildings |
| _____ | _____ | sites |
| _____ | _____ | structures |
| _____ | _____ | objects |
| 1 | N/A | Total |

**Number of Contributing Resources previously listed in the Inventory**
N/A

## 7. Description

Inventory No. HA-1993

**Condition**

| | |
|---|---|
| ___ excellent | X_ deteriorated |
| ___ good | ___ ruins |
| ___ fair | ___ altered |

Prepare both a one paragraph summary and a comprehensive description of the resource and its various elements as it exists today.

Building E5325 (Old Building # 701) is located along the western edge of the World War I chemical production area in the Edgewood Arsenal Industrial Area (HA-2069). The building was constructed between July and September 1918 as a liquid chlorine building and was designed to house the compressors and refrigerating machinery to compress chlorine gas into a liquid.

Building E5325 is a two-story rectangular industrial building that measures overall 61 x 77 feet. The building comprised three sections: a two-story main building measuring 42 x 77 feet, a two-story extension along the north elevation measuring 19 x 77 feet, and a one-story board-and-batten lean-to addition measuring 26 x 36 feet located on the south elevation (foundation only extant) (HABS 1982).

Building E5325 rests on a concrete foundation that is 3 feet below grade. The first floor of the building has a 5-foot thick concrete slab laid on earthen fill reinforced with expanded metal. The exterior walls are constructed with a concrete frame infilled with eight-inch structural clay tiles. The second floor of the building has a 12-inch concrete slab, reinforced both ways and supported by reinforced concrete beams and concrete columns. The building has a monitor roof over the main section that extends as a shed roof over the two-story extension on the north elevation. The monitor roof is sheathed with composition roll roofing and has a clerestory with four sets of paired nine-light industrial sash windows that replaced the original double pivoted wood sash windows with 16 lights each. Steel purlins on standard structural steel roof trusses support the roof. The exterior walls have variously sized metal-frame, industrial sash windows; the second story of the south elevation has a row of industrial sash windows located just below concrete framing under the roof. One original doorway was located in the west end and three doorways were located along the north elevation of the extension; the north elevation currently is infilled with structural clay tile. The original doors were heavy double wood doors suitable for factories (Marshall and Ellicott 1919c:63). Currently, Building E5325 has a single metal personnel door with two lights in the east elevation. Paired sliding metal doors with lights occupy the first floor in the west elevation, while a set of paired metal doors with two lights have been inserted on the second story. The second story has no access, but the doorway suggests that there was an external stair at one time.

A massive freestanding chlorine tower that contained the piping used in compressing chlorine gas once stood along the north side of Building E5325; the tower has since been removed.

## 8. Significance

Inventory No. HA-1993

| Period | Areas of Significance | Check and justify below | | |
|---|---|---|---|---|
| __ 1600-1699 | __ agriculture | __ economics | __ health/medicine | __ performing arts |
| __ 1700-1799 | __ archeology | __ education | __ industry | __ philosophy |
| 1800-1899 | __ architecture | __ engineering | __ invention | __ politics/government |
| X 1900-1999 | __ art | __ entertainment/ recreation | __ landscape architecture | __ religion |
| __ 2000- | __ commerce | | __ law | __ science |
| | __ communications | __ ethnic heritage | __ literature | __ social history |
| | __ community planning | __ exploration/ settlement | __ maritime history | __ transportation |
| | __ conservation | | X military | __ other: ____ |

**Specific dates** 1918 **Architect/Builder** unknown

**Construction dates** 1918

Evaluation for:

__X__ National Register _____Maryland Register _____not evaluated

Prepare a one-paragraph summary statement of significance addressing applicable criteria, followed by a narrative discussion of the history of the resource and its context. (For compliance projects, complete evaluation on a DOE Form – see manual.)

SUMMARY

Building E5325 (Old Building # 701) was designed as a Liquid Chlorine Building and constructed in 1918 as part of the chemical production area of Edgewood Arsenal. Located on Gunpowder Neck in Harford County, Maryland, Edgewood Arsenal was founded by the U.S. Army in 1917 as the first chemical warfare production facility in the United States. It was established in response to the appearance of toxic gas weapons on the European battlefields during World War I. Because commercial chemical companies were reluctant to invest in such weapons, the U.S. government decided to build its own industrial production plant. Edgewood Arsenal remained the only government-owned and operated chemical warfare installation in the U.S. until World War II, when three other government-owned chemical warfare production arsenals were established. Edgewood Arsenal continued as the headquarters of the expanded chemical warfare program and the center for specialized and experimental tasks. Although established as a separate installation, Edgewood Arsenal currently is known as Edgewood Area of nearby Aberdeen Proving Ground. The two installations were joined administratively in 1971.

Because of its association with the World War I chlorine plant established at Edgewood Arsenal, Building E5325 was identified as a historic building during a building survey conducted by the Historic American Buildings Survey in 1982 (Grandine and Henry 1982).

Research to document Building E5325 was conducted at the Historical Office of the U.S. Army Soldier and Biological Chemical Command (Building E5027), at the Directorate of Installation Operations (DIO) at APG, and in the files and reports maintained by the APG Cultural Resources Manager (CRM). Sources examined included the individual building file, completion reports from World War I, documents from World War II, relevant CRM studies and reports, HABS documentation, published secondary sources, and real property records. All photography was completed by APG personnel.

RESOURCE HISTORY

Edgewood Arsenal was established as a new U.S. Army military installation in October 1917 in response to the introduction and use of toxic gas weapons on the battlefields in Europe during World War I. During the early years of the war, France, Britain, and Germany investigated the use of chemical agents for battlefield use. The German army first used chlorine gas successfully as a chemical weapon in April 1915 at Ypres. Chlorine gas was loaded into cylinders, which then were positioned to release a greenish-yellow gas cloud with a strong, suffocating odor that

caused debilitating and lethal choking when it floated over enemy troops. The Allied troops responded to this technological innovation by developing protective devices, such as gas masks, and chemical weapons and delivery systems of their own. The introduction of other chemicals soon followed. The Germans began using phosgene, a lethal choking and blistering agent, and, in July 1917, introduced mustard gas, a lethal blistering agent that affected the eyes and lungs (Smart 1997; Crowell 1919:399).

When the United States entered World War I on the side of the Allies on 6 April 1917, the U.S. Army had very little experience with chemical weapons. The U.S. Army had begun to study the use of protective masks in fall 1915, but no work was conducted on gases. On 3 April 1917, the military established the Subcommittee on Toxic Gases to investigate the use and production of toxic gases and their antidotes for combat purposes. The subcommittee began organizing research on chemical agents at universities and in industry. The subcommittee actively involved civilian chemists to meet the new challenge (Smart 1997). In addition, French and British Allies shared substantial information to the Trench Warfare Section of the U.S. Army Ordnance Department.

Initially, the U.S. War Department assigned responsibility for chemical defense to the Medical Department, while the Ordnance Department was responsible for chemical munitions. The Corps of Engineers was assigned the responsibility for deploying chemical weapons (Smart 1997). On 28 June 1918, the Chemical Warfare Service was established and assigned all oversight responsibilities for chemical gas production, chemical weapons, and protective devices (Smart 1997; Marshall and Ellicott 1919a:4-7).

No specific authorization for the establishment and construction of Edgewood Arsenal was located in the official records (Marshall and Ellicott 1919a:4). The arsenal grew from a proposal in June 1917 to construct an experimental filling plant. In August 1917, Lt. Colonel Edwin M. Chance of the Trench Warfare Section was assigned the task of preparing plans for a toxic gas filling plant. After studying the plans of filling plants in France and England, Chance studied American commercial bottling plants. He found that the task for filling milk bottles and carbonated beverage bottles was most relevant to filling projectiles with toxic gases (Smart 1995:21).

Gunpowder Neck was selected as the site for the new filling plant after Gunpowder and Bush Necks were acquired by presidential proclamation on 16 October 1917 and assigned to the Ordnance Department (Marshall and Ellicott 1919a:4). Bush Neck became a new ordnance proving ground named Aberdeen Proving Ground, while Gunpowder Neck became known as the U.S. Filling Plant, Gunpowder Reservation. In April 1918, the name of the reservation was changed to Edgewood Arsenal (Marshall and Ellicott 1919a:13-14).

Edgewood Arsenal was an experimental installation and was assigned new missions over the 18 months it was under construction. Initial War Department plans for the installation comprised a small filling plant. Construction contracts were signed with the Central Construction Corporation in October 1917 (Marshall and Ellicott 1919a:43). Actual work on shell filling plant # 1 began on 15 November 1917 (*Journal of Industrial and Engineering Chemistry* 1919:6-7; Marshall and Ellicott 1919b). Construction of shell filling plant # 1was begun before the final designs were completed. The overall size of the filling plant was expanded to include two additional filling plants, so that many changes to the overall building designs and overall installation layout occurred during the construction process (Marshall and Ellicott 1919a:43-44).

The War Department initially planned to purchase toxic gases from private industry to supply the shell filling plants at Edgewood Arsenal. The four primary chemical agents in World War I were chlorine, phosgene (a lethal choking and blistering agent), chlorpicrin (a lethal coughing and tearing agent), and mustard gas (a lethal blistering agent). However, phosgene, chlorpicrin, and mustard gas had no commercial value; only chlorine and a small amount of phosgene were produced commercially in the U.S. prior to World War I. Commercial chemical companies were reluctant to develop industrial production facilities with no post-war use. The dangerous nature of the agents used in chemical weapons also deterred commercial manufacturers. In addition, railroad operators placed restrictions on transporting chemical gases. Consequently, the War Department revised plans for Edgewood Arsenal to include chemical production plants. Designs for the new chemical production plants were readied during December 1917 (*Journal of Industrial and Engineering Chemistry* 1919:7; Crowell 1921:396). The chemical production plant area was sited west of the shell filling plants and present-day Hoadley Road. The first chemical production plants were designed to manufacture phosgene and chlorpicrin and were contracted for construction in the end of 1917 (Marshall and Ellicott 1919c:2). The mustard gas plant was added later to the chemical production area.

By early 1918, it was apparent to War Department planners that chlorine supplied by private industry was insufficient to meet the anticipated requirements for chemical weapons production. Chlorine was involved in the production of several gases, particularly chlorpicrin and phosgene. The War Department decided to build a chlorine and caustic soda manufacturing plant alongside the collection of shell filling plants and chemical plants at Edgewood Arsenal. The Foundation Company of New York City was notified in March 1918 to begin construction of the chlorine production area. By 27 March 1918, the site for the new plant was selected west of Canal Creek and northwest of the chemical production area. Plans for the chlorine plant were received in late April; construction began 1 May 1918. Machinery arrived in June and the plant was ready to operate by 15 July 1918. The plant comprised a cell house, an electric substation, a brine building, a boiler and evaporation building, a caustic fusion building, and a liquefying plant (Building E5325) to condense and liquefy 50 tons of chlorine per day. The chlorine plant actually began operations in September 1918 when the chemical plants were ready to receive the chlorine gas. At the time of its completion, the chlorine plant at Edgewood Arsenal was the largest chlorine production plant in the United States (Crowell 1919:397-400; Marshall and Ellicott 1919a:8, 25-26, 40-42).

Only Building E5325 remains from the chlorine plant that once comprised 28 buildings and structures. It was located apart from the main World War I chlorine plant on the east side of Canal Creek near the western edge of the chemical production area. Building E5325 was constructed between July and September 1918 to ensure the production of high-quality chlorine required to manufacture phosgene using either chlorine shipped from commercial manufacturers or from chlorine manufactured on site. The efficient manufacture of phosgene required 95 percent concentration of pure chlorine, while most commercial chlorine manufacturers achieved 75 percent concentration. The purpose of this building was to compress chlorine gas to achieve the correct percentage of purity.

As originally designed, Building E5325 had refrigerating machines and motor equipment on the first floor of the main section. A pump and condenser and eight storage tanks were placed in the extension on the north elevation. Coolers were placed in the board-and-batten shed addition on the south elevation. The second floor of the building contained brine coolers and chlorine condensing equipment.

The actual process of liquefying chlorine gas occurred in a massive freestanding chlorine tower located north of Building E5325. As described by Marshall and Ellicott (1919c:62), "The acid was pumped to the top of the chlorine tower by belt-driven centrifugal pumps. There an ejector of special design drew in the chlorine. After being separated at the bottom of the compression pipe that led down the tower, the gas was cooled by refrigeration. The gas, kept under the pressure obtained in the compression tower, liquefied as it was cooled to the proper temperature." This process of liquefying chlorine gas had been perfected in a plant in Niagara Falls, New York. The tower was removed by World War II, when an elevated water storage tank was constructed on the site.

Although Building E5325 was equipped to purify chlorine and was ready for operation by early September 1918, Edgewood Arsenal's chlorine plant produced 98 percent pure chlorine that could be piped directly to the phosgene plant. So Building E5325 was not placed into full-scale operation. Some equipment tests occurred in the building to prove that the plant operated as designed (Marshall and Ellicott 1919c:62-64).

By Armistice Day on 11 November 1918, Edgewood Arsenal functioned as an integrated production line to accommodate the multi-step process of chemical weapons manufacturing, even though it was built in various stages over 18 months. The installation included an area to assemble and produce raw materials, the chemical manufacturing plants, the shell filling plants, a finishing area where shells were tested for leakage and painted for labeling, and above-ground magazines to store chemical munitions prior to shipment. The installation contained 360 permanent buildings, 274 temporary buildings, and 31 miscellaneous structures, such as gasholders, tanks, scrubbing towers, stacks, and silos (Marshall and Ellicott 1919a:16, 53).

After Armistice, all production at the arsenal ceased. Although most of the buildings in the complex were operational, full production capacity was not anticipated until December 1918. As designed, the chemical plants at Edgewood Arsenal had a 24-hour daily production capacity of 40 tons of phosgene gas, 25 tons of chlorpicrin gas, 30 tons of mustard gas, and 50 tons of chlorine gas (Marshall and Ellicott 1919a:47).

After World War I, Building E5325 was used for storage. In May 1941, the building was transferred to the Production Division and used as an adamsite candle assembly plant. From November 1943 until June 1945, the building was used to fill bombs with napalm (PT1) ("History of Edgewood Arsenal" ca. 1945). Actual production was 7,000 500-lb bombs (Edgewood Arsenal Plant Status 1946). After World War II, the building was used to fill smoke pots with hexachloroethane (HC). In 1948, the building was used as an asbestos grinding plant (U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, building vertical file). By the early 1970s, the building was vacant (APG DOI real property records). No equipment was documented in the building during a survey conducted in 1997 (Grandine and Armstrong 1997).

## 9. Major Bibliographical References

Inventory No. HA-1993

SEE CONTINUATION SHEET

## 10. Geographical Data

| | | | |
|---|---|---|---|
| Acreage of surveyed property | < 0.5 acre | | |
| Acreage of historical setting | < 0.5 acre | | |
| Quadrangle name | Edgewood | Quadrangle scale: | 1:24,000 |

**Verbal boundary description and justification**

Building E5325 is located on Hanlon Road approximately two-tenths of a mile west of Hoadley Road.

## 11. Form Prepared by

| | | | |
|---|---|---|---|
| name/title | Katherine Grandine | | |
| organization | R. Christopher Goodwin & Associates, Inc. | date | April 2006 |
| street & number | 241 East 4th Street, Suite 100 | telephone | 301-694-0428 |
| city or town | Frederick | state | Maryland |

The Maryland Inventory of Historic Properties was officially created by an Act of the Maryland Legislature to be found in the Annotated Code of Maryland, Article 41, Section 181 KA, 1974 supplement.

The survey and inventory are being prepared for information and record purposes only and do not constitute any infringement of individual property rights.

return to: Maryland Historical Trust
DHCD/DHCP
100 Community Place
Crownsville, MD 21032-2023
410-514-7600

Aberdeen Proving Ground, Directorate of Installation Operations (DOI)
Real property records, drawings files.

Crowell, Benedict
1919 *America's Munitions 1917-1918*. U.S. Government Printing Office, Washington, D.C.
1921 *The Armies of Industry*. Yale University Press, New Haven.

Edgewood Arsenal Plant Status
1946 Report on file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

Goodwin, R. Christopher, and Associates, Inc.
2001 *Aberdeen Proving Ground Integrated Cultural Resources Management Plan*. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, in conjunction with the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Grandine, Katherine, and Jane Armstrong
1997 *Object Inventory, Edgewood Area, Aberdeen Proving Ground, Summary Report*. Prepared by R. Christopher Goodwin & Associates, Inc., Frederick, Maryland, on behalf of the U.S. Army Corps of Engineers, Baltimore District, Baltimore, Maryland.

Grandine, Katherine, Irene Jackson Henry, and William R. Henry, Jr.
1982 *DARCOM Historic Building Inventory: Aberdeen Proving Ground, Maryland.* Prepared by the National Historic American Buildings Survey/Historic American Engineering Record, U.S. Department of the Interior.

Historic American Buildings Survey/Historic American Engineering Record
1982 HABS/HAER Inventory records on file at the APG Cultural Resources Management Office, Building 5650, DSHE, Aberdeen Area and at the HABS/HAER collections of the Library of Congress, Washington, D.C.

Historical Branch, OC CWS
1943 "Edgewood Arsenal in Chemical Warfare Production (July 1940-December 1943)." Typescript on file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

"History of Edgewood Arsenal: 1939-1945"
1945ca. 2 Vols. Typescript on file at U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

*The Journal of Industrial and Engineering Chemistry*
1919 "Gas Offense in the United States: A Record Achievement." Vol. II, No. I, January, pages 5-12.

Marshall, R.C., Jr., and Edward B. Ellicott

1919a *Introduction to Report on the Construction of the Edgewood Plant of the Edgewood Arsenal*. Available at NARA, Record Group 77, and U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area, APG.

1919b *Report on the Construction of the Filling Plants at Edgewood Plant of the Edgewood Arsenal*. Available at NARA, Record Group 77, and U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area, APG.

1919c *Report on the Construction of the Chemical, Mustard Gas and Refrigeration Plants at Edgewood Plant of the Edgewood Arsenal*. Available at NARA, Record Group 77, and U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area, APG.

Smart, Jeffrey K., Command Historian

1994 *U.S. Army Chemical and Biological Defense Command Historical Highlights*. U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team, Building E5027, Edgewood Area.

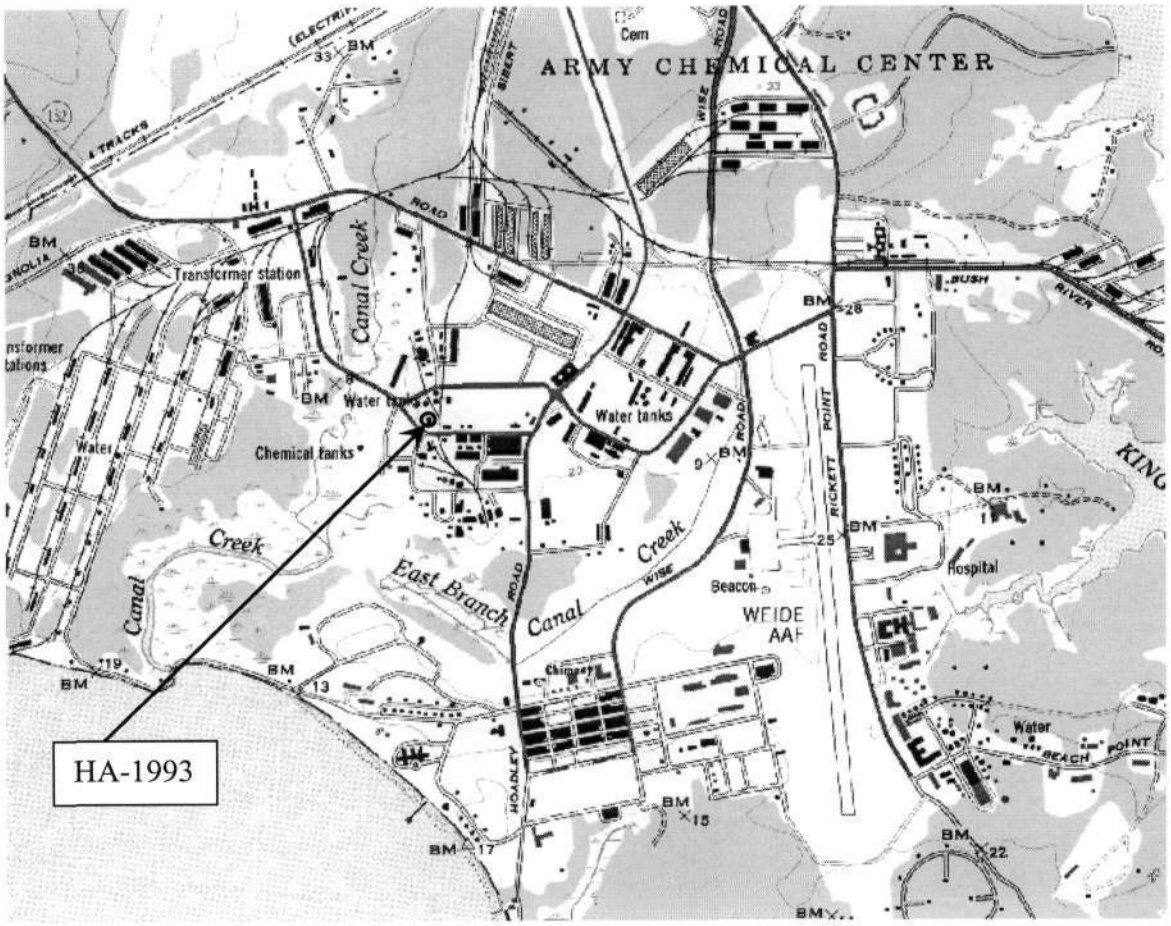
1995 "From Plowshare to Sword: Historical Highlights of Gunpowder Neck and Edgewood Arsenal to the End of World War I." *Harford Historical Bulletin*. Number 63, Winter 1995, Harford County, Maryland.

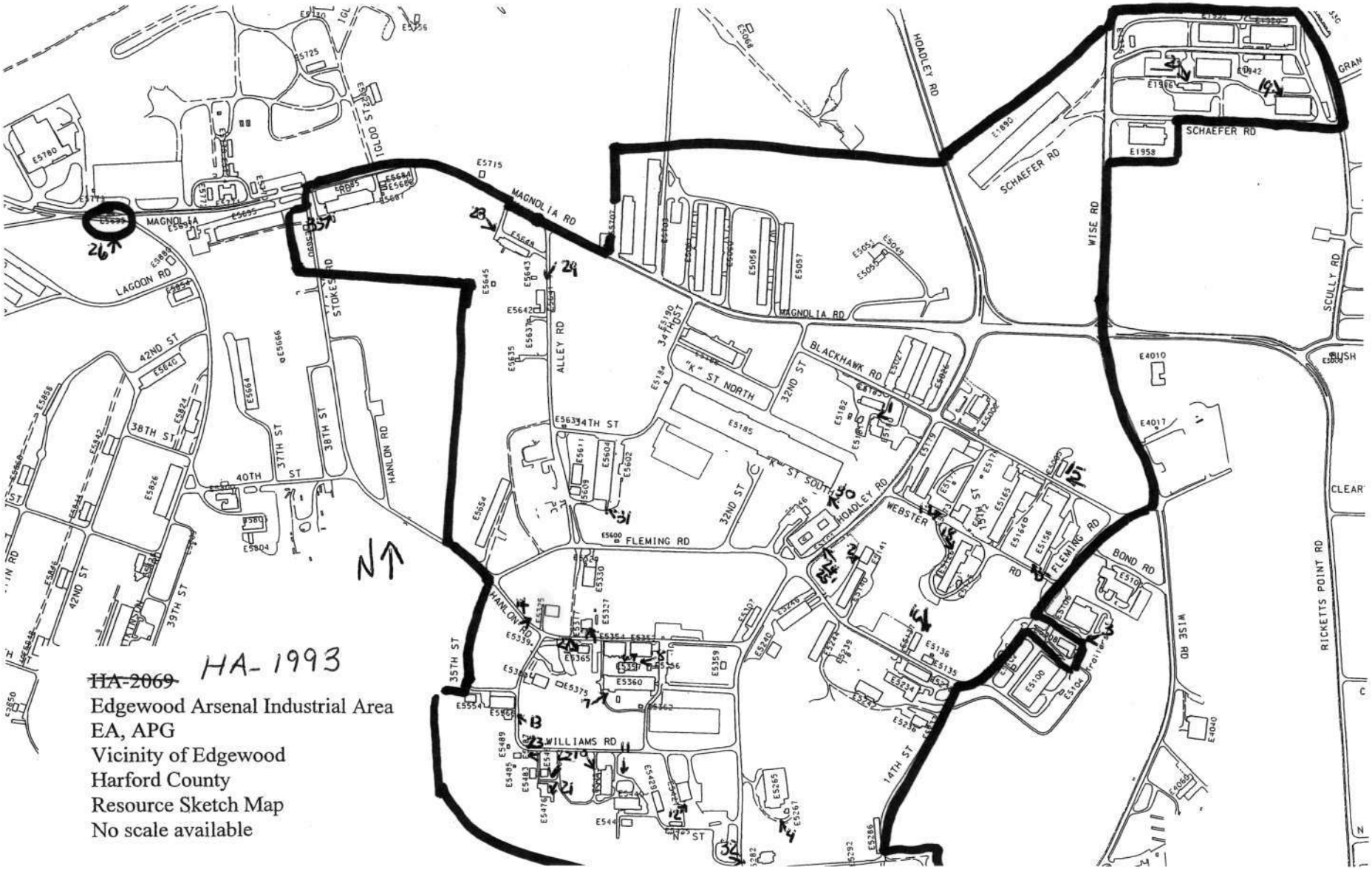
1997 "History of Chemical and Biological Warfare: An American Perspective." Published in *Medical Aspects of Chemical and Biological Warfare*. Available at http://www.cyber.acomp.usf.edu/sequence/feces/MedicalAspectsofNBC/chapters/chapter_2. Viewed 10/8/2004.

U.S. Army Soldier and Biological Chemical Command, Historical Research and Response Team

n.d. Building vertical files, historic photographs, historic maps. Located in Building E5027, Edgewood Area.

HA-1993
Building E5325
Hanlon Rd.
Aberdeen Proving Ground
Edgewood vicinity
Edgewood Quad.
Harford County






~~HA-2069~~ HA-1993

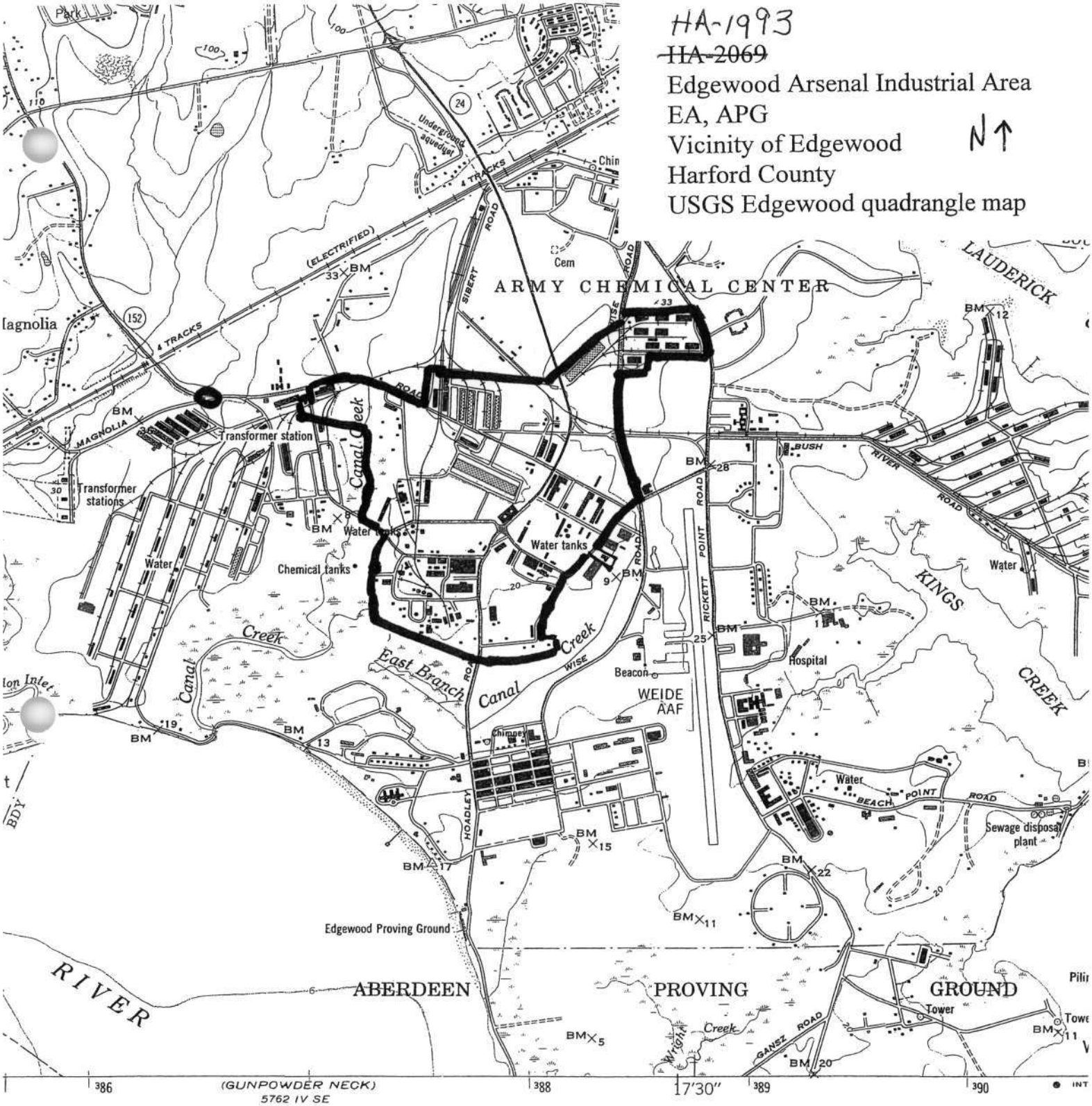
Edgewood Arsenal Industrial Area
EA, APG
Vicinity of Edgewood
Harford County
Resource Sketch Map
No scale available

HA-1993

~~HA-2069~~

Edgewood Arsenal Industrial Area
EA, APG
Vicinity of Edgewood
Harford County
USGS Edgewood quadrangle map

N ↑




SCALE 1:24000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES IN FEET DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIABLE
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE AVERAGE RANGE OF TIDE IS APPROXIMATELY 1.5 FEET

Primary h
hard surf
Secondar
hard surf


QUADRANGLE LOCATION

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225
OR RESTON, VIRGINIA 22092
FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

HA-1993
Building E 5325
Harford County, MD
Mark Gallihue, APG CRM
May 2005
APG CRM, DSHE office
View NE
1/4

HA-1993
Building E5325
Harford Co. MD
Bud Leasee, Ruth Golding, APG DSHE
May 2006
APG CRM office, DSHE
View SE
2/4

HA-1993
Bldg E5325
Harford Co. MD
Bud Keesee, Ruth Golding, APG DSHE
May 2006
APG CEM Office, DSHE
View W
3/4

HA-1993
Bldg E 5325
Harford Co MD
Bud Reese, Ruth Golding APG DSHE
May 2006
APG CRM office, DSHE
View W
4/4