Maryland Inventory No. HA-1991
Historic Name- Zone of the Interior Impregnating Plant / Bldg. #73
Preferred Name- E5238
Location- 5238 Fleming Road, Aberdeen Proving Ground
Date of Construction- 1941
Public access

Building E5238 is a two-story rectangular industrial building with a concrete foundation and a flat concrete roof covered with tar and gravel. Fifty-one bays in length, this building is constructed of a steel and reinforced concrete frame with 11 inch corrugated transite siding. The building measures 202' x 140' and incorporates industrial steel projecting windows which run the length of the building on all four sides, most have which have been painted over for security reasons. This building has two centrally located exterior staircases, within the north and south elevations, for access to the second floor. Both, north and south exteriors have a set of two flat, fixed roof awnings anchored to the building at the first floor level, which provide overhead protection for the loading dock platform and the numerous loading bays (most of which have been infilled with glass tile block). The east and west elevations have a single door entrance located at the south and north ends respectively; the west elevation also has a loading bay located at the south end.

Historic Context: Edgewood Arsenal- WWII

The nature of the industrial mission at Edgewood Arsenal changed; as a result, the facilities at Edgewood Arsenal no longer functioned as an integrated chemical production line. The bulk of chemical warfare production shifted to other Army installations.

Edgewood Arsenal became the center for specialized and experimental tasks.

The shift in mission at Edgewood Arsenal resulted in the construction of a smaller number of self-contained production plants. Production lines were either housed in one building or in a series of separate buildings, each containing a different step in the production process. Instead of the entire installation functioning as an integrated, cohesive industrial plant, each manufacturing process functioned independently, as in the case of the Impregnating Plant. Locations for the new plants were selected wherever space was available.

Summary and Statement of Significance

Building E5238 (formerly Building 73) was built in 1941 and served as a 'protective clothing impregnating and laundering' facility. This facility was part of the production subsystem as an industrial operation and was responsible for producing protective clothing for soldiers. Clothing was treated with an impregnite that provided protection by reacting with chemical agents and preventing hazardous amounts of liquid or vapor from reaching the skin. This production facility was the largest facility of its kind in the Edgewood area and was referred to as the Zone of the Interior Impregnating Plant (Z of I plant). This was one of only four Z of I plants in the United States in operation during the same time period, 1941-1942. Based on this information, Building E5238 is eligible for listing on the National Register of Historic Places under Criterion A because of its association with World War II expansion, the rarity of the large-scale type of activity that was conducted within the building and the integrity that it exhibits.

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

Inventory No. HA-1991

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

| | |
|---|---|
| historic | Zone of the Interior Impregnating Plant, Building 73 |
| other | Building E5238 (preferred) |

## 2. Location

| | | | |
|---|---|---|---|
| street and number | 5238 Fleming Road | X | not for publication |
| city, town | Aberdeen Proving Ground, Edgewood Area | N/A | vicinity |
| county | Harford | | |

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

| | | | | | |
|---|---|---|---|---|---|
| name | Directorate of Public Works | | | | |
| street and number | 2201 Aberdeen Boulevard | | | telephone | 410-306-1195 |
| 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:_____

## 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-1991

**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.

Architectural Description

Building E5238, a clothing impregnation facility, was originally known as Building No. 73. Covering an area of approximately 28,300 square feet, construction on the building was begun and completed in 1941, for a total cost of $787,497 (equipment was valued at $260,824, inclusive in the total construction cost).[1] During 1942, it was one of only four clothing impregnation facilities in operation in the Unites States and the only clothing impregnation facility at the Edgewood Arsenal.

Building E5238 is a two-story rectangular industrial building with a concrete foundation and a flat concrete roof covered with tar and gravel. Fifty-one bays in length, this building is constructed of a steel and reinforced concrete frame with 11 inch corrugated transite siding. The building measures 202' x 140' and incorporates industrial steel projecting windows which run the length of the building on all four sides, most have which have been painted over for security reasons. All of the window units on the first floor are three lights wide and three lights tall, the top six lights are operable as the projecting portion and the bottom three lights are fixed. The second floor window units on the east and west elevations are configured and operate the same as the first floor units. The window units on the north and south elevations differ, as they are three lights wide and five lights tall, only the third and fourth rows from the top are operable and all others are fixed.

This building has two centrally located exterior staircases, within the north and south elevations, for access to the second floor. Both, north and south exteriors have a set of two flat, fixed roof awnings anchored to the building at the first floor level, which provide overhead protection for the loading dock platform and the numerous loading bays (most of which have been infilled with glass tile block). The east and west elevations have a single door entrance located at the south and north ends respectively; the west elevation also has a loading bay located at the south end.

# 8. Significance

Inventory No. HA-1991

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

**Specific dates** 1941-1942 **Architect/Builder** unknown

**Construction dates** 1941

Evaluation for:

_____ National Register _____ Maryland Register ___X___ 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 E5238 (formerly Building 73) was built in 1941 and served as a 'protective clothing impregnating and laundering' facility. This facility was part of the production subsystem as an industrial operation and was responsible for producing protective clothing for soldiers. Clothing was treated with an impregnite that provided protection by reacting with chemical agents and preventing hazardous amounts of liquid or vapor from reaching the skin. This production facility was the largest facility of its kind in the Edgewood area and was referred to as the Zone of the Interior Impregnating Plant (Z of I plant). This was one of only four Z of I plants in the United States in operation during the same time period, 1941-1942.[2] Based on this information, Building E5238 is eligible for listing on the National Register of Historic Places under Criterion A because of its association with World War II expansion, the rarity of the large-scale type of activity that was conducted within the building and the integrity that it exhibits.

Edgewood Arsenal- WWII

During World War II, Edgewood fulfilled more chemical functions than it had during World War I. President Roosevelt declared that the United States would not use chemical weapons offensively, but would retaliate with chemical weapons defensively. This deterrent capability had its desired effect; the Axis powers never resorted to the use of toxic gases on military targets.[3]
Although the nature of the industrial mission at the installation had changed, Edgewood Arsenal was prepared. As a result, the facilities at Edgewood Arsenal would no longer function as an integrated chemical production line. The bulk of chemical warfare production shifted to other Army installations. Edgewood Arsenal became the center for specialized and experimental tasks.[4]
The shift in mission at Edgewood Arsenal resulted in the construction of a smaller number of self-contained production plants. Production lines were either housed in one building or in a series of separate buildings, each containing a different step in the production process. Instead of the entire installation functioning as an integrated, cohesive industrial plant, each manufacturing process functioned independently, as in the case of the Impregnating Plant. Locations for the new plants were selected wherever space was available.[5]

Building E5238 was constructed in 1941 as the Zone of the Interior Impregnating Plant, designed for the purpose of impregnating clothing with $CC_2$. This plant was equipped to impregnate underwear, coveralls, woolen shirts and trousers.[6] To produce protective clothing, it was necessary that the impregnite be placed on the clothing in a uniform manner with the proper concentration and be fixed to the clothing with a binding agent, which would not interfere with the action of the $CC_2$. The binding agent, which was used following the mid-1920's, was chlorinated paraffin. The chlorinated paraffin was non-toxic, was a very good non-volatile solvent for the $CC_2$ and was immiscible with water.
The chlorinated paraffin also protected the $CC_2$ from the leaching action of moisture and was miscible with chemical agents such as mustard. The impregnite could be applied to the clothing using either an organic solvent process or a water suspension process. The Z of I Plant performed the impregnation process incorporating the organic solvent process using 1,1,2,2-tetrachloroethane as the

solvent, with the exception of nineteen days when experimentation with the water suspension process occurred.[7]

In the solvent impregnation process, the impregnating solution consisted of the organic solvent, $CC_2$, and chlorinated paraffin. The major steps in the solvent impregnation process were pre-drying the clothes, soaking the clothes in the impregnating solution, draining the clothes, centrifuging the clothes to remove excess solution, tumbling the clothes to distribute the impregnite uniformly, final drying, and folding and packing the clothes. The solvent removed from the clothes in the final drying process was commonly recovered for reuse in large-scale operations.
In the water suspension process, the impregnating solution (actually a suspension) contained water, $CC_2$, zinc oxide, chlorinated paraffin and polyvinyl alcohol. In some early operations, the suspension was created using a pebble mill instead of micronized $CC_2$. In this process there was no need for pre-drying the clothing or recovering solvent. As the ingredients in the suspension were depleted, ingredients were added to maintain the desired concentration in suspension.[8]

The capacity designed and intended for the impregnation facility was impregnation of 9,000 suits per 24 hours or the laundering and decontamination of 4,500 suits per 24 hours.[9] The plant was in operation 24 hours per day for 278 days, using the organic solvent process and the experimental water suspension process to impregnate 3,874,918 and 83,688 pounds of clothing, respectively.[10]

In November 1942, the plant was shut down as it was no longer needed; as a parallel, the cost of maintenance was excessive, due to the highly corrosive action of the chemicals used. Building E5238 was later converted to a shipping warehouse (1943)[11], an inert material storage warehouse (1946)[12], a laundry and dry cleaning facility (1946)[13], an office building (1950)[14], and finally a warehouse (1980) for the National Security Agency[12], all in an effort to support peacetime operations.

## 9. Major Bibliographical References

Inventory No. HA-1991

SEE CONTINUATION SHEET

## 10. Geographical Data

| | | | |
|---|---|---|---|
| Acreage of surveyed property | 1.298 acres | | |
| Acreage of historical setting | 1.298 acres | | |
| Quadrangle name | Edgewood | Quadrangle scale: | 1:24,000 |

**Verbal boundary description and justification**

Building E5238 is situated on Fleming Road approximately one-quarter mile due south/ south-east from the intersection of Fleming and Hoadley Roads, where the Soldiers Biological and Chemical Command (SBCCOM) Headquarters Building (E5101) is located.
Building E5238 is bounded on the north-east by Fleming Road, on the south-east by Buildings E5232 and E5234, on the south by an access road from Fourth Street that dead-ends halfway behind E5238, on the south-west by Building E5242 and on the north-west by E5244.

## 11. Form Prepared by

| | | | |
|---|---|---|---|
| name/title | Tracy Dunne | | |
| organization | Directorate of Safety, Health and Environment | date | 17 July 2000 |
| street & number | Building 5650 | telephone | 410-278-2479 |
| city or town | Aberdeen Proving Ground | 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

NOTES

1. *History of Edgewood Arsenal Production Division*, Edgewood Arsenal, 1943, 5.

2. Gary Nemeth, *RCRA Facility Assessment, Edgewood Area, Aberdeen Proving Ground, MD*, United States Army Environmental Hygiene Agency, No. 39-26-0490-90, 1989, 58.

3. Jeffrey Smart, *U.S. Army Chemical Research, Development and Engineering Center: Historical Highlights*, Chemical Research, Development and Engineering Center, 1988, quoted in R. Christopher Goodwin, *Aberdeen Proving Ground Cultural Resource Management Plan*, Atlantic Division Naval Facilities Engineering Command, 1996, vol. 1, 1-111-88.

4. R. Christopher Goodwin, *Aberdeen Proving Ground Cultural Resource Management Plan*, Atlantic Division Naval Facilities Engineering Command, 1996, vol. 1, 1-111-88.

5. Goodwin, 1-111-104.

6. *History of Edgewood Arsenal Production Division*, Edgewood Arsenal, 1943, 5.

7. Nemeth, 54.

8. Nemeth, 55.

9. *Clothing Impregnation Plant (Z of I) 1941 Design*, Edgewood Arsenal, 1941.

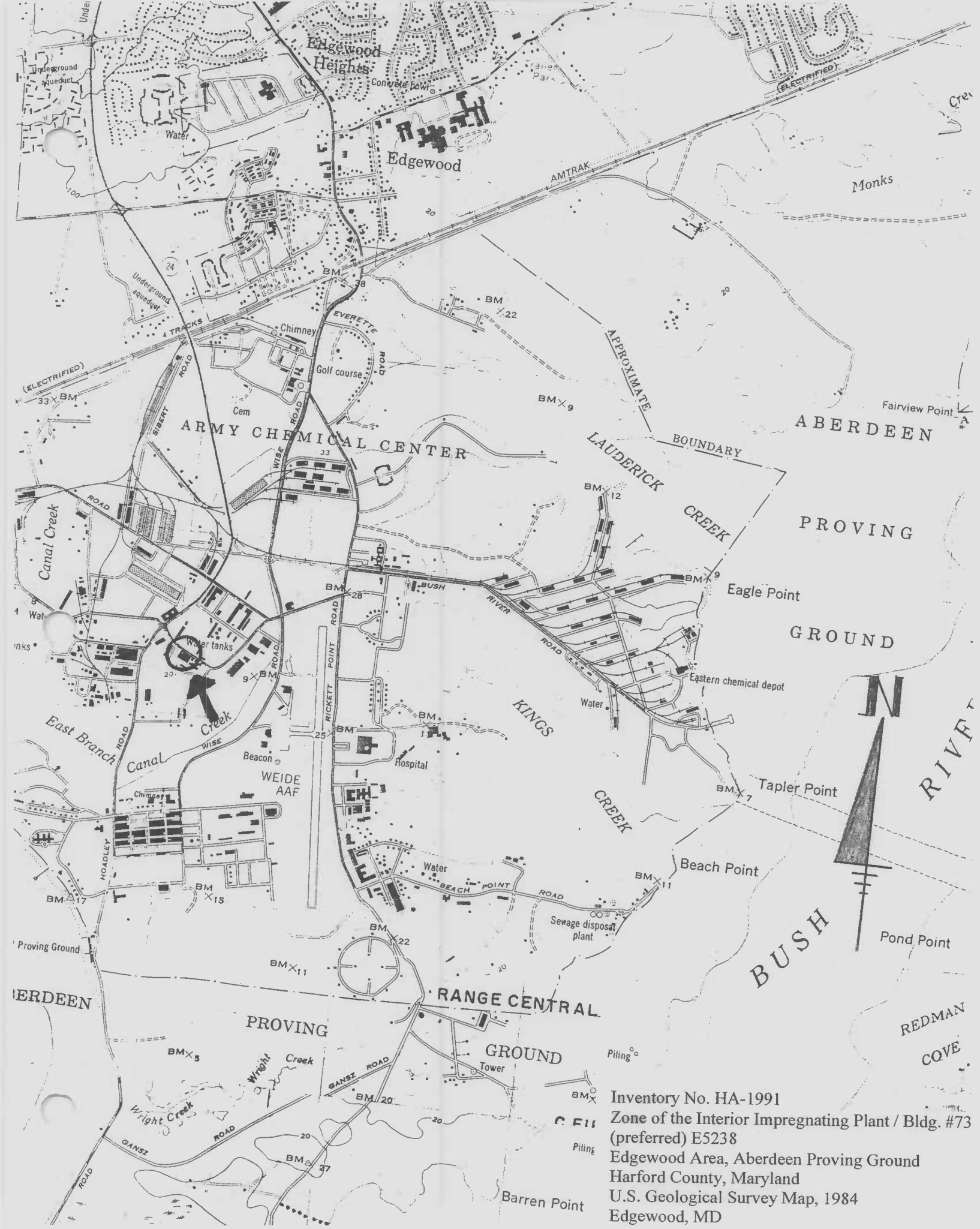
10. Frank Gaus, *Report of Operations, Clothing Impregnating Plant, Zone of the Interior, Building #73, 31 December 1941 to 12 December 1942*, Edgewood Arsenal, ETF613.356-5, 1945, quoted in Gary Nemeth, *RCRA Facility Assessment, Edgewood Area, Aberdeen Proving Ground, MD*, United States Army Environmental Hygiene Agency, No. 39-26-0490-90, 1989, 58.

11. *Historical Record Property Division*, Edgewood Arsenal, 1946, 3.

12. Smart, 19,21.

13. *History of Quartermaster Corps Post War Period*, Quartermaster Corps/ Chemical Warfare Center, 1946, 1-2.

14. *History of Industrial Property Division, Army Chemical Center, MD*, Edgewood Arsenal, 1950, 2.




Inventory No. HA-1991
Zone of the Interior Impregnating Plant / Bldg. #73 (preferred) E5238
Edgewood Area, Aberdeen Proving Ground
Harford County, Maryland
U.S. Geological Survey Map, 1984
Edgewood, MD

~~1~~ HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT/ BLDG. #73

(PREFERRED C5238)

HARFORD COUNTY, MARYLAND

T. DUNNE

6.21.00

MD SHPO

NORTHEAST CORRIDOR

1 OF 9

HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73

(PREFERRED E5238)

HARFORD COUNTY, MARYLAND

T. BUNNE

6.21.00

MD SHPO

NORTH ELEVATION

2 OF 9

3 HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73
(PREFERRED E5228)
HARFORD COUNTY, MARYLAND

T. DUNNE

6·21·00

N.D. SHPO

NORTHWEST ELEVATION
3 OF 9

1 HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73
(PREFERRED ES238)

HARFORD COUNTY, MARYLAND

T. DUNNE

8-21-00

MD SHPO

WEST ELEVATION

4 OF 9

~~5 of 9~~ HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73

(PREFERRED E5238)

WASHOE COUNTY NEVADA

T. DUNNE

6-21-00

MD SHPO

SOUTHWEST ELEVATION

5 OF 9

HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT/ BLDG # 73

(PREFERRED E5238)

HARFORD COUNTY, MARYLAND

T DUNNE

10.21.00

MD SHPO

SOUTH ELEVATION

1 OF 9

HA - 1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73

(PREFERRED 05738)

HARFORD COUNTY, MARYLAND

T. DUNNE

6.21.00

MD SHPO

SOUTHEAST ELEVATION

7 OF 9

HA-1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG. #73

(PREFERRED 65238)

HARFORD COUNTY, MARYLAND

T DUNNE

6-21-00

MD SHPO

EAST ELEVATION

8 OF 9

[illegible] HA. 1991

ZONE OF THE INTERIOR IMPREGNATING PLANT / BLDG # 73

(PREFERRED E 5238)

HARFORD COUNTY MARYLAND

T. DUNNE

6.21.00

MD SHPO

NORTHEAST ELEVATION

9 OF 9