

MARYLAND HISTORICAL TRUST  
DETERMINATION OF ELIGIBILITY FORM

NR Eligible: yes   
no

Property Name: Test Chamber Building E3370 Inventory Number: HA-2202  
Address: North of Beach Point, Edgewood Area Road Historic district:  yes  no  
City: Aberdeen Proving Ground Zip Code: 21010 County: Harford  
USGS Quadrangle(s): Edgewood  
Property Owner: U.S. Army Garrison, APG Tax Account ID Number: N/A  
Tax Map Parcel Number(s): N/A Tax Map Number: N/A  
Project: \_\_\_\_\_ Agency: U.S. Army Garrison, APG  
Agency Prepared By: R. Christopher Goodwin & Associates, Inc  
Preparer's Name: Roger Ciuffo Date Prepared: 1/12/2010  
Documentation is presented in: Building E3370, formerly Building 339, is located about 400 feet north of Beach Point Road in a wooded area  
Preparer's Eligibility Recommendation:  Eligibility recommended  Eligibility not recommended  
Criteria:  A  B  C  D Considerations:  A  B  C  D  E  F  G  
*Complete if the property is a contributing or non-contributing resource to a NR district/property:*  
Name of the District/Property: \_\_\_\_\_  
Inventory Number: \_\_\_\_\_ Eligible:  yes  no Listed:  yes  no  
Site visit by MHT Staff  yes  no Name: \_\_\_\_\_ Date: \_\_\_\_\_

Description of Property and Justification: *(Please attach map and photo)*

Building E3370, formerly Building 339, is located about 400 feet north of Beach Point Road in a wooded area. The building was constructed for use as a Detonation and Dispersion Laboratory for the Chemical Research Division, Technical Command, at the Chemical Warfare Center in 1943. By 1949, the structure was referred to as a test chamber for aerosols; it is currently listed as a Laboratory - General Purpose.

Building E3370 was constructed in 1943 at a cost of \$28,600 dollars. The original square footage of the building was 1,211 square feet. As originally designed, the building contained a test chamber, an observation room, and a blower house. The U.S. Army Corps of Engineers prepared the original drawings (APG, DPW drawings files). The building's largest room is the main rectangular test chamber with the interior dimensions of 20' x 30' x 10'. The chamber rests on a concrete foundation, and the chamber walls are comprised of thick concrete. The walls are wider at the base and taper at the top. The interior of the chamber has steel applied on the walls. The roof is topped with rolled steel roofing. A single oval steel door provides access to the chamber from the building's exterior.

Connected to the south end of the test chamber is the observation room. The original observation room measured 21' x 17'6" and

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4/26/2010  
Date

N/A  
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was constructed of 12" structural clay tile. Wood-panel doors are located on either side of the room. Two, six-over-six-light windows were located in the south elevation. The observation room had two port holes where a high speed camera could be affixed to observe and to document testing in the chamber. A wood-frame blower house was located along the east side of the chamber.

Since its original construction, Building E3370 has received many additions. By 1968, the total square footage was 2,100; the current square footage is 2,154 square feet (APG DPW, real property records). These additions surround the original chamber and the observation room, currently identified as the laboratory. Attached to the southeast of the laboratory is a 16' x 16', wood-frame addition with a front gable roof, which was used as an office. On the west side of the chamber is a wood-frame control room that measures approximately 9' x 31' 2". The control room housed shock wave instrumentation and sensors to measure the strength of the explosion waves bouncing off the walls (force and speed studies).

Attached to the north end of the building are two rooms, the 15' x 21' electronics lab on the northwest corner and the 15' x 10' 3" photo lab on the northeast corner. Sited on the east elevation directly to the south of the photo lab are the 9' x 10' 3" compressor room and the 9' x 10' 3" blower house. In 1989, a 3' x 11' restroom was added to the wall north of the office area. The restroom structure was 54 square feet, had a concrete foundation and floor and concrete block walls, and was topped with an asphalt shingle roof (EAI Corporation, Building E3370).

Other alterations to the building include removal of testing equipment and continual upgrades and modifications to the air filtering system and cooling system.

**Building History**

Building E3370 was constructed in 1943 as a detonation chamber for the Technical Command. By 1962, Building E3370 was referred to as a dispersion laboratory. The test chamber was used for assessing the clouds of aerosol and vapor produced by munitions for dispersing toxic agents. All research on this structure indicates that agent simulants, rather than agents themselves, were used for the studies conducted in this structure. The laboratory associated with this structure was used for the calibration and operation of the equipment located inside of the test chamber (EA Corporation, Building E3370; RDECOM vertical files; APG, DPW real property files).

Arthur Stuempfle, retired, Army Chemical Research and Development Center, Aberdeen Proving Ground, MD wrote the following in his paper *Aerosol Wars: Facts and Fiction; Defense and Offense, A Short History of Some Military Applications, Advances and Challenges*:

*"The generation of particulate and liquid aerosols is an inevitable result of military operations both in peacetime and war. Matter can become airborne through the inadvertent creation of particulates by re-aerosolizing dust and dirt particles in helicopter downwash or from the residue of propellant smokes or explosive burst from military munitions. More ominous is the deliberate or unintentional dispersion in aerosol form of liquid or chemical compounds, biological agents, nuclear or radioactive material. Military aerosols of all types are integral elements in all aspects of chemical warfare defense and can pose a serious threat to soldiers and civilians during military operations"* (Stuempfle 2006).

From 1960s to the 1970s, the breakup of the chemical agent simulants was accomplished by placing the liquid simulant in a small device and subjecting it to an explosion from a burster. The study of the resulting droplets yielded basic data on aerosol size characteristics from explosion types. The droplet characteristics were studied by collecting them on any one of the variety of devices such as "Print Flex" sampling cards or high speed photography. A camera capable of shutter speeds of up to 1 million

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frames per second, though generally operated at 250,000 to 300,000 frames per second, was used to document both droplet breakup and travel characteristics (EAI Corporation, Building E3370).

In 1966, the Permanent Installation Board wanted to dispose of Building E3370 and consolidate operations of the chamber with those carried out in Building E3726, in order to permit construction of an Air Filtration Defense System Development Facility (EAI Corporation, Building E3370). At that time, Building E3370 was described by the Research Laboratories, Edgewood Arsenal, as the principal research laboratory of the Dissemination Research Department. It was the only facility of its size for explosive dissemination research, and it was the only facility at Edgewood Arsenal equipped for detailed explosive dissemination studies using flash x-ray, the Beckman-Whitley Camera (for ultra high-speed photography), and the Hologram Camera. The explosive, non-toxic research chamber, at that time, was in continuous use involving approximately 400 tests/year, or an average of two tests per day. The technological advances and applications promoted by military aerosol science research include the role of holography in munitions development, optical theory applied to the development of infrared screening smoke, aerosol filtration and the development of High Efficiency Particulate Air (HEPA) filters (Stuempfle 2006).

During the 1980s, 40mm cartridge "rockets" containing about 25ml of simulants for explosive aerosol dissemination, and a helium gun containing about 5cc of simulant for spray dissemination had been used to disperse various simulants. Droplet studies were conducted using Miran Infrared Analyzers which measure vapor concentration, and M9 detector paper which turns red on simulant contact and aids visualization of aerosol droplet size and spray patterns. In 1984, the real estate category code for this building was changed to Lab and Test Building, General Purpose, meaning that the building was used for research, development and testing of "miscellaneous" materials and equipment. In the early 1990s, approximately 20 tests per year were conducted in this building, and no personnel were working in the building on a permanent basis (EAI Corporation, Building E3370). Currently the building is in a dilapidated state, except for the actual dispersal chamber, which is planned for continued use in the future.

**General History**

Edgewood Arsenal was founded 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. 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 chemical warfare installation in the U.S. until World War II, when three other chemical warfare production plants were established. Edgewood Arsenal continued as the headquarters of the expanded chemical warfare program and the center for specialized and experimental tasks (Cannan et al. 1995).

Edgewood Arsenal was originally named the U.S. Filling Plant, Gunpowder Reservation. The central core of the installation was designed as an integrated production line to accommodate the multi-step process of chemical weapons manufacturing. The installation included an area to receive shipments of and to produce raw materials, an area to produce chemicals, an area to pack chemicals into shells, and an area to load, store, and ship chemical ordnance.

After World War I, Edgewood Arsenal remained a permanent installation, but at a much reduced level of activity. The National Defense Act of 1920 established the Chemical Warfare Service as a separate entity, distinct from the Ordnance Department. However, a general abhorrence for chemical warfare as practiced during World War I limited the role of this new service. In 1924, the Chemical Warfare Service was confined to studying defensive measures and equipment and to preparing a modest deterrent or retaliatory capability; the United States would not develop chemicals as an offensive measure (Brophy 1959a:21 23).

Within this framework, Edgewood Arsenal served as the center of Chemical Warfare Service activity. Workers at Edgewood tested methods for dispersing chemical agents from aircraft or from chemical mortars. They also developed improved gas masks

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and means of impregnating clothing for protection against toxic gases. Stocks of chemical agents that remained from World War I were stored at Edgewood, but the production facilities were mothballed and, in some cases, dismantled. The Chemical Warfare School, which trained both Army and Navy personnel, also operated at Edgewood (Brophy 1959a:28 31).

As the possibility of war increased between 1939 and 1941, facilities at Edgewood were placed on standby status. Old production plants were repaired and manufacturing equipment was updated. Experimental chemical plants were constructed. Additional laboratory and office space was required to consolidate research activities expanded during the war. The area east of the airfield along Ricketts Point Road was selected as the location of the new research and testing buildings. This location had enough space to build new up-to-date laboratories and support buildings to accommodate all staff in a few buildings.

As the buildings and facilities at Edgewood Arsenal were expanding, the administrative structure of the Chemical Warfare Service was reorganized in 1940 into the following divisions: Executive, Information, Fiscal, Operations, Training and War Plans, Personnel, Procurement, Supply, and Technical. The Technical Division originally administered all research and development work undertaken in the chemical warfare field, including all offensive and defensive phases, as well as medical and biological phases (U.S. Army Service Forces 1946:3). In 1941, the Technical Division was organized in the following divisions: Research, Development, Engineering, Special Assignments, and Information. As the war progressed and the research requirements expanded, the Technical Division's staff grew from 300 to 2,400 persons supported by \$8 million budget. In spring 1943, the medical and biological research and development functions were removed from the Technical Division and a new Medical Division and Special Projects Division were organized (U.S. Army Service Forces 1946:3).

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 defensively with chemical weapons. This deterrent capability had its desired effect; the Axis powers never resorted to the use of toxic gases on military targets (Grandine et al. 1982; Smart 1994).

Edgewood Arsenal, however, was prepared, although the nature of the industrial mission at the installation changed as the post no longer functioned as an integrated chemical production line. The bulk of chemical warfare production was shifted to other installations, including Huntsville/Redstone Arsenal (1941), Alabama; Rocky Mountain Arsenal (1942), Colorado; and Pine Bluff Arsenal (1943), Arkansas. Edgewood Arsenal became the center for specialized and experimental tasks, such as the establishment of pilot plants to test new chemicals and new production processes.

The shift in mission resulted in a smaller number of self-contained production plants constructed at Edgewood Arsenal. 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 industrial plant, each manufacturing process functioned independently. Older production facilities were dismantled or demolished while new plants were constructed wherever space was available.

Edgewood Arsenal also served as the location for proof tests for preliminary and final engineering and field tests for chemical weapons, munitions, agents, protective equipment and other chemical warfare materiel. Personnel initiated test programs, and developed field techniques and field operating procedures. The purpose of the testing program was to undertake comparative evaluation and analysis and to publish test results (Brophy and Ross 1953). Indoor testing facilities were located in the main laboratory area east of the airfield. These facilities included test chambers for aerosols (Building E3370), as well as environmental chambers, and a vertical wind tunnel, which was added to Building E3360 in 1964 (EAI Corporation, Building E3370).

The Cold War era generally is defined as the time period from 1946, following Soviet activities to retain territory liberated from

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Nazi Germany during World War II, to the fall of the Berlin Wall in 1989. This period was marked by a tense, hostile relationship between the Warsaw Pact countries led by the U.S.S.R. and the North Atlantic Treaty Organization (NATO) Allies led by the U.S.A. The primary role of the U.S. Army during this time was to support U.S. policies of peace through strength by maintaining ground force readiness as an alternative to strategic nuclear weapons for deterring communist expansion (USAEC 1997).

The Cold War era was marked by major organizational changes in the armed forces and accompanied by competition for limited military appropriations among the services. Under the 1947 National Security Act, the Army assumed responsibility for conducting land warfare, providing troops for occupation duty in Central Europe, and for providing air defense units within the continental U.S.

The Cold War era also was marked by significant changes in U.S. Army operations. Instead of relying on a small standing army and mobilizing troops as needed, Army personnel were now ready to enter combat on short notice. This meant that a large, trained standing army was maintained in constant readiness. Troops were stationed for the first time in friendly foreign nations under an allied command structure. Within the U.S., the Army maintained an active force prepared to deploy quickly into combat zones (USAEC 1997).

In 1951, Edgewood Arsenal (Army Chemical Center) became the Research & Engineering Center for the Chemical Corps. In 1962, the Army's technical services were disbanded, and the Army Materiel Command (AMC) was established. This new command consolidated logistical functions to ensure integrated materiel management, including new product development, management of materiel stockpiles, testing, and technical and maintenance support (USAEC 1997). The Ordnance Department and the Chemical Corps activities at APG were transferred to AMC. 1962 brought about the demise of the Chemical Corps as it was abolished and the laboratories and production facilities were placed under the Chemical – Biological – Radiological Agency (CBR Agency). In 1983 the name changed to Chemical, Research and Development Center (CRDC) and in 1986 the name was changed once again to the Chemical Research, Development and Engineering Center (CRDEC). 1992 brought about another change as the Edgewood Research, Development and Engineering Center was placed under the U.S. Army Chemical and Biological Defense Command (CBDCOM). In 1998, CBDCOM became absorbed by the Soldier and Biological Chemical Command (SBCCOM) (Smart 1997). The most recent reorganization and name change took place in 2002, when the U.S. Army Research, Development and Engineering Command (RDECOM) was created.

The chemical laboratories located at Edgewood conducted both basic research and materiel development. The laboratories focused on the development of chemicals as tactical weapons and on defensive measures to counter chemical weapons attack. Basic research included the discovery and development of new chemical agents, incendiaries, and screening and signaling smokes. Materiel development focused on improved weapons delivery and dispersal systems, including flame throwers, chemical mortars, and smoke generators. By 1953, the 4.2-inch chemical mortar developed by the Chemical Corps became a standard infantry weapon. In addition, the laboratories conducted research into the development of insecticides, rodenticides, and fungicides, as well as tear gas, non-lethal riot control agents, nerve agents, and defoliants (Brophy and Ross 1953; Smart 1994).

#### Evaluation

Building E3370 is located in the Edgewood Area, about 400 feet north of Beach Point Road and was constructed in 1943 as a detonation chamber. All work conducted in the building was centered on studies of dissemination of a variety of chemical agent simulants. Building E3370 was evaluated applying National Register of Historic Places (NRHP) Criteria for Evaluation to assess if it retained those qualities of significance and integrity necessary for listing in the NRHP. Surviving records do not document important events (Criterion A) or individuals (Criterion B) associated with this building. Although the tests that were carried out in Building E3370 involved sophisticated testing materials (i.e., various agent simulants and substances) and were necessary for

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Eligibility not recommended \_\_\_\_\_

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national security and war efforts, the building no longer contains the original testing equipment (other than the test chamber) which would have given this building the integrity or engineering significance for listing on the National Register under Criterion A. The building does not possess any significance for its design applying National Register Criterion C due to subsequent exterior and interior alterations that compromise integrity of materials and design.

References

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Eligibility recommended _____	Eligibility not recommended _____
Criteria: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D	Considerations: <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G
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U.S. Army Research Development and Engineering Command (RDECOM)  
Various Dates  Vertical Building Files.

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Eligibility recommended \_\_\_\_\_ Eligibility not recommended \_\_\_\_\_

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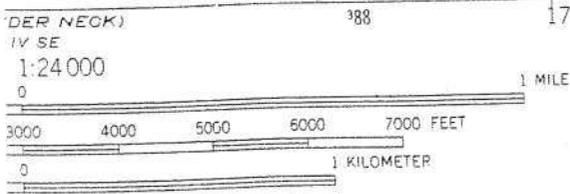
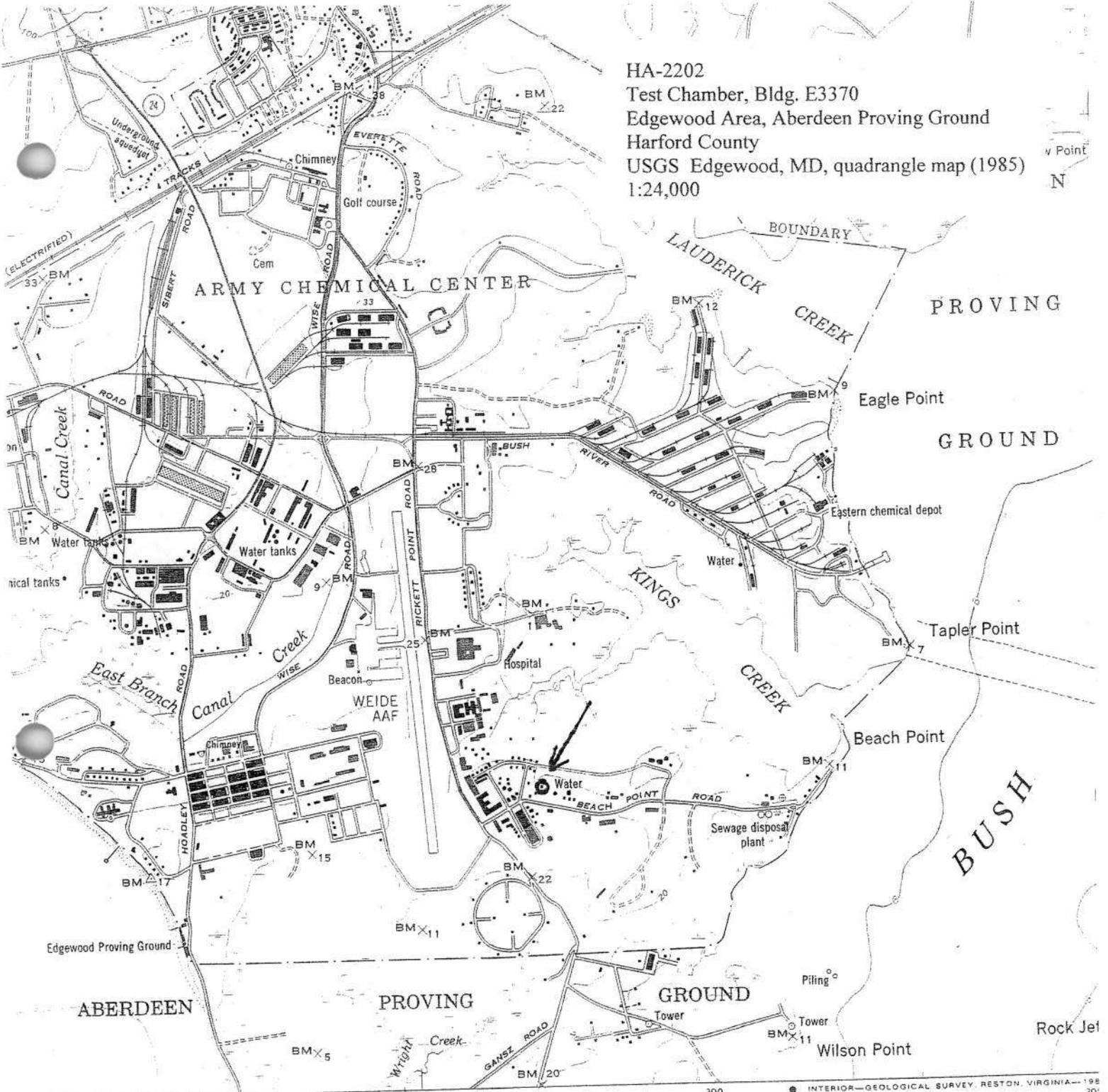
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HA-2202  
 Test Chamber, Bldg. E3370  
 Edgewood Area, Aberdeen Proving Ground  
 Harford County  
 USGS Edgewood, MD, quadrangle map (1985)  
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Point  
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VERTICAL DATUM OF 1929  
 IS MEAN LOW WATER  
 TWO DATUMS IS VARIABLE  
 APPROXIMATE LINE OF MEAN HIGH WATER  
 IS APPROXIMATELY 1.5 FEET

SURVEY, DENVER, COLORADO 80225  
 VIRGINIA 22092  
 S AND SYMBOLS IS AVAILABLE ON REQUEST



QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface	Light-duty road improved surface
Secondary highway, hard surface	Unimproved road
○ Interstate Route	□ U. S. Route

EDGEWOOD  
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 PHOTOREPRODUCTION  
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