

PICATINNY ARSENAL, BUILDING 154  
North of Kibler Road  
Morris County  
New Jersey

HAER No. NJ-0036-

PHOTOGRAPHS  
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD  
National Park Service  
Philadelphia, Pennsylvania



## HISTORIC AMERICAN ENGINEERING RECORD

### PICATINNY ARSENAL, BUILDING 154

HAER No. NJ-0036-XX

**Location:** North of Kibler Road in the Administrative and Research 100 Area  
Picatinny Arsenal, near Dover, Morris County, New Jersey

Universal Transverse Mercator (UTM) coordinates:  
NAD 27 Zone 18.537219.4531731  
USGS Dover, New Jersey, 7.5 minute quadrangle map

**Significance:** Building 154 was constructed in 1943 as a film storage magazine to support the research and development activities that occurred at Picatinny Arsenal. The building was located in an area north of the row of chemical laboratories that front onto Kibler Road. This area contained small-scale magazines and test buildings that supported experimental testing programs. The small-scale buildings were dispersed throughout the area to ensure safety in case of accidental explosion.

Building 154 was surveyed in 1982-1983 during a study of Picatinny Arsenal conducted by a summer team funded through the Historic American Buildings Survey/Historic American Engineering Record (HABS/HAER). At that time, the building was assessed as insignificant (Category 4) (Thurber and Norman 1985). Between 1993 and 1996, WCH Industries, Inc. (1996) completed a study to re-evaluate buildings and structures constructed at Picatinny Arsenal before 1946 and to re-assess the results of the earlier HABS/HAER study. The 1996 report identified 500 buildings, including Building 154, as contributing to a single historic district comprising the entire installation.

In 1999, Panamerican Consultants, Inc., reviewed the National Register evaluations of 500 previously-identified buildings located on the installation. As a result of this investigation, three historic districts and two individual buildings were identified as possessing the qualities of significance for listing in the National Register of Historic Places. One historic district identified in 1999 was the Administration and Research District (NJ HPO ID #2244) comprising 24 buildings in the 100 area. This district included officer housing, the post headquarters building, administration buildings, chemical laboratories, and additional support buildings and structures. Building 154 was identified as contributing to the district (Nolte et al. 1999:35-36). The New Jersey Historic Preservation Office concurred that the Administration and Research District (100 area) possessed the qualities of significance for listing in the National Register of Historic Places under Criteria A and C.

**Description:** Building 154 is one story and occupies a square footprint measuring 16'-0" x 16'-0". The building rests on a concrete foundation. The exterior walls are

constructed of -8" red structural clay tiles. Red bricks infill the front and rear upper gable ends and along the eaves. The gable roof is oriented southeast to northwest and is sheathed with corrugated asbestos roofing. A roof ridge extends the length of the building. A large curved metal vent projects from the south corner of the roof. The southeast (front) wall contains two metal-frame, nine-light industrial sash windows; most glass lights are replaced by opaque plastic panels. The northwest (rear) wall contains two metal-frame, 12-light industrial sash windows with reinforced wire glass. The window openings have concrete sills and metal lintels. A small metal vent projects from the upper northwest wall. The vent has a conical metal cap and is supported on a wood box structure. The northeast and southwest walls contain centrally-located doorways set in concrete surrounds with metal lintels and frames. Each door is a metal-panel door with four lights and external metal hinges; the glass lights were replaced with opaque plastic panels. A square concrete slab is positioned outside each doorway.

The interior of Building 154 is divided into two rooms by a central partition constructed of structural clay tile that rises from the floor to the roof ridge. Steel panels were applied over each side of the interior wall. The outer walls of the room are painted structural clay tile. The floor is asphalt tile applied over concrete. The ceiling is transite. Each room has a working counter or bench installed along the inner and end walls. The counter is constructed of dense stone. The southwest room has a stone sink, a large metal hood on the inner wall, and a large metal oven installed along the southeast wall that is vented through the large curved metal vent projecting from the roof. The northeast room has stone counters, a porcelain sink, and a small hood, but no oven. Both rooms were equipped with safety showers. Signage in the southwest room detailed the following safety information for use of the room:

“Operators 3  
Transient 1  
1lb explosives CL9  
100 grams of INIT  
No initiator material during glycerol test nitration.”

**History:** Building 154 was constructed in 1943 as a film storage magazine. Prior to 1943, the number 154 was assigned to a different building. The 1922-1941 real property records described Building 154 (Old Building #257) as a black powder supply vault. The vault was constructed of wood-frame and stucco on a concrete foundation and had a corrugated iron roof. The handwritten record clearly stated that this structure was destroyed in May 1939. No photograph was attached to the 1922-1941 real property record (“Historical Record of Ordnance Buildings at Picatinny Arsenal” 1922-1941).

An original drawing located in the drawing files of the Directorate of Public Works (DPW) identified Building 154 as a film storage magazine (USAG Picatinny, Building 154 file, drawing #DP47748, Plan #6538-21?). Unfortunately, the date and the final digits of the plan number were torn off the bottom corner of the drawing. Real property records indicate that the original construction date of the current building was 1943 (USAG Picatinny real property records). The drawing was prepared by the Philadelphia Office of the U.S. Army Corps of Engineers (USAG Picatinny, Building 154 file, drawing #DP47748, Plan #6538-21?).

The original drawing depicted the building with two wood doors in the southeast (front) wall. Each door accessed a single room. Natural light was provided through the four lights in each door and the industrial sash windows in the rear wall. The side walls of the building were blind. The interior partition wall stretched from the floor to the gable peak; no ceilings were installed in the rooms. The drawings indicated salvaged materials were used on the roof and for the industrial windows. The industrial windows had wood sills (USAG Picatinny, Building 154 file, drawing #DP47748, Plan #6538-21?). The ca. 1948 value of the building was recorded as \$3,229.00 (USAG Picatinny real property record card 1956).

In 1951, the building was substantially renovated to become an Explosives Sample Preparation and Hazardous Material Testing Laboratory. New door openings were cut in the side walls. New metal-clad doors with four-lights available from the arsenal's salvage yard were installed. The original door openings were infilled with steel-sash window units and structural tile procured from the salvage yard. New concrete sills were installed under all windows. The interior partition wall was covered with steel panels. The tansite ceiling and the exhaust system in the northwest (rear) wall were installed. Laboratory counters and sinks also were installed (USAG Picatinny, Building 154 file, drawings DP53795, DP53855, SK50481, CP53913, 1951-1952). The 1951 alterations to the building raised the value to \$7,229.00 (USAG Picatinny real property record card 1956).

In 1974, a safety shower was replaced and the radiator heating system was upgraded (USAG Picatinny, Building 154 drawing file). The installation of a large oven in the southwest room and the large curved ventilator on the roof also was a later alteration. No drawing documented when the large roof ventilator was installed.

In 1969, the use of the building was recorded as a chemistry laboratory. In 1971, the building was recorded with the original use as “NG” testing, and the then current use was as a chemistry laboratory (Picatinny Arsenal Facilities Directory 1969; Building Information Schedule 1971).

Building 154 was constructed as a support building north of the row of chemical laboratories along Kibler Road. Originally built as a film storage magazine, the building supported the ballistics testing and research programs conducted at the Picatinny Arsenal proving ground. Picatinny Arsenal initially was established in 1880 as a powder depot. The arsenal’s primary function between 1880 and 1907 was to store powder in above-ground magazines. In 1907, the role of the powder depot changed dramatically when the Army constructed a powder manufacturing plant on the installation. By January 1908, the factory was operational and had the capacity to produce 3,000 pounds of cannon powder daily (Rogers 1931:55-56).

During the early twentieth century, Picatinny Arsenal also became a center for Army research and development pertaining to the chemistry and properties of explosives and propellants. In 1911, the Army established a school to instruct personnel in chemistry, explosives, and interior ballistics. Scientific research in the chemical properties of explosives greatly expanded during World War I. A large number of chemists were employed at Picatinny Arsenal to study propellant powders and high explosives that were used in grenades, artillery shells, bombs, and mortars (Hale 1926:14).

In 1926, a massive explosion devastated the adjoining Naval Ammunition Depot, Lake Denmark, and damaged many buildings at Picatinny Arsenal. Efforts to rebuild Picatinny Arsenal began almost immediately after the explosion. The Army appointed a board of Ordnance officers to review the damage and make recommendations for rebuilding the Arsenal. The board recommended changes in the overall layout of the arsenal by concentrating activities into areas that were geographically separated from each other. Under the new plan, administration, chemical laboratories, and engineering functions were concentrated south of the explosives manufacturing and ammunition storage areas. The main chemical laboratory was completed by 1930 and was occupied during 1931 (Rogers 1931:93-94). As described in Rogers (1931), the laboratory complex comprised:

...a main chemical laboratory with auxiliary buildings to remove operations embracing fire hazards to a safe distance. This group of buildings will afford our chemists proper facilities for carrying out the work so important to every group in the arsenal. The demands made upon the chemists and chemical engineers of the Nation by

ordnance ammunition activities are many, and in time of war will be tremendous. Picatinny Arsenal is the chemical center for ammunition, and every effort is being made to properly equip the arsenal laboratory to fill its mission (Rogers 1931:94).

Chemical laboratories completed after the 1926 explosion included the Physics/Chemistry Lab (Building 162 constructed in 1930), High Explosives Research Lab (Building 163 constructed in 1930), Chemistry/Stability Lab (Building 164 constructed in 1930), Test Conditioning Chambers (Buildings 166 and 197 constructed in 1930), and High Explosives Preparation and Test Lab (Building 167 constructed in 1930). The laboratories were designed in the Colonial Revival Style, the same architectural style used in the post headquarters building (Nolte et al. 1999:31-78; "Plant Design" ca. 1942:16). "It was realized that when plans for the new Picatinny were underway that research work would gradually become the main activity of the Arsenal and that the Area should be as complete as available funds would permit" ("Plant Design" ca. 1942:16-17). The laboratories were designed for flexibility to accommodate general studies, as well as specialized ones ("Plant Design" ca. 1942:17). The main laboratories were supported by a group of small-scale magazines, such as Building 168 constructed in 1930 and Building 154 constructed in 1943.

One aspect of the testing program was the Testing Station, a small proving ground that operated at Picatinny Arsenal. In 1928, the Testing Station was removed from the built-up areas of the arsenal to the plateau on the ridge along the west side of the installation in the 600 area. All activities involving the ignition or detonation of explosives and firing of ballistics were conducted at the Testing Station. In ca. 1942, the new Testing Station or Proving Ground was described as follows:

...well suited for practically all activities and tests which are usually assigned to a small proving ground. The principal installation is the firing range. It consists of gun emplacements, velocity screens, and a recovery butt or tunnel into which all shell are fired and recovered for examination. This range permits the testing of pilot lots of smokeless powder for velocity and pressure as well as other experiments that would otherwise have to be conducted at Aberdeen Proving Ground. Another range, which is located within a building, provides facilities for the similar testing of small arms ammunition. Other installations provide for the safe exploding of high explosive shell in order to determine the efficiency of bursting charges. A tower for conducting drop tests

and a friction pendulum for sensitivity investigations were constructed (“Plant Design” ca. 1942:15-16).

One important technology adapted to the study of ballistics was high-speed photography. Beginning in the mid-nineteenth century, high-speed photography was used in observing ballistics tests and recording test results. First developed in Europe, the new technology was introduced into the United States in 1892. The Fastax camera contained a revolving disc shutter that was capable of taking 1,000 frames per second (Fuller 2005:251-256). The technology of high-speed photography continued to advance during the 1930s and throughout World War II. Late in the war, a camera capable of 200,000 frames per second was developed to record explosive reactions (Fuller 2005:256). High-speed photography offered a safe means to observe and measure the effects of explosions and the launches, flights, and impacts of projectiles. Film captured more than the human eye could observe and recorded the test results for later review.

Before the invention of non-flammable safety film in 1950, cellulose nitrate film used in high-speed cameras was highly flammable and tended to be chemically unstable for long-term storage. Cool and dry storage conditions were required to maintain the film over a long period of time (Library of Congress 1994). Building 154 was designed to meet the requirements for film storage. Films of ballistics tests conducted at the Testing Station were transferred to the laboratory and research buildings for in-depth review and study, and then were stored in Building 154. The building isolated potentially flammable film from the nearby laboratory buildings. The adoption of cellulose acetate plastic film in the early 1950s eliminated the potential fire hazard from film. When Building 154 no longer was needed as a film storage magazine, it was renovated into a chemistry laboratory.

- Sources:** Building Information Schedule  
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U.S. Army Garrison, Picatinny

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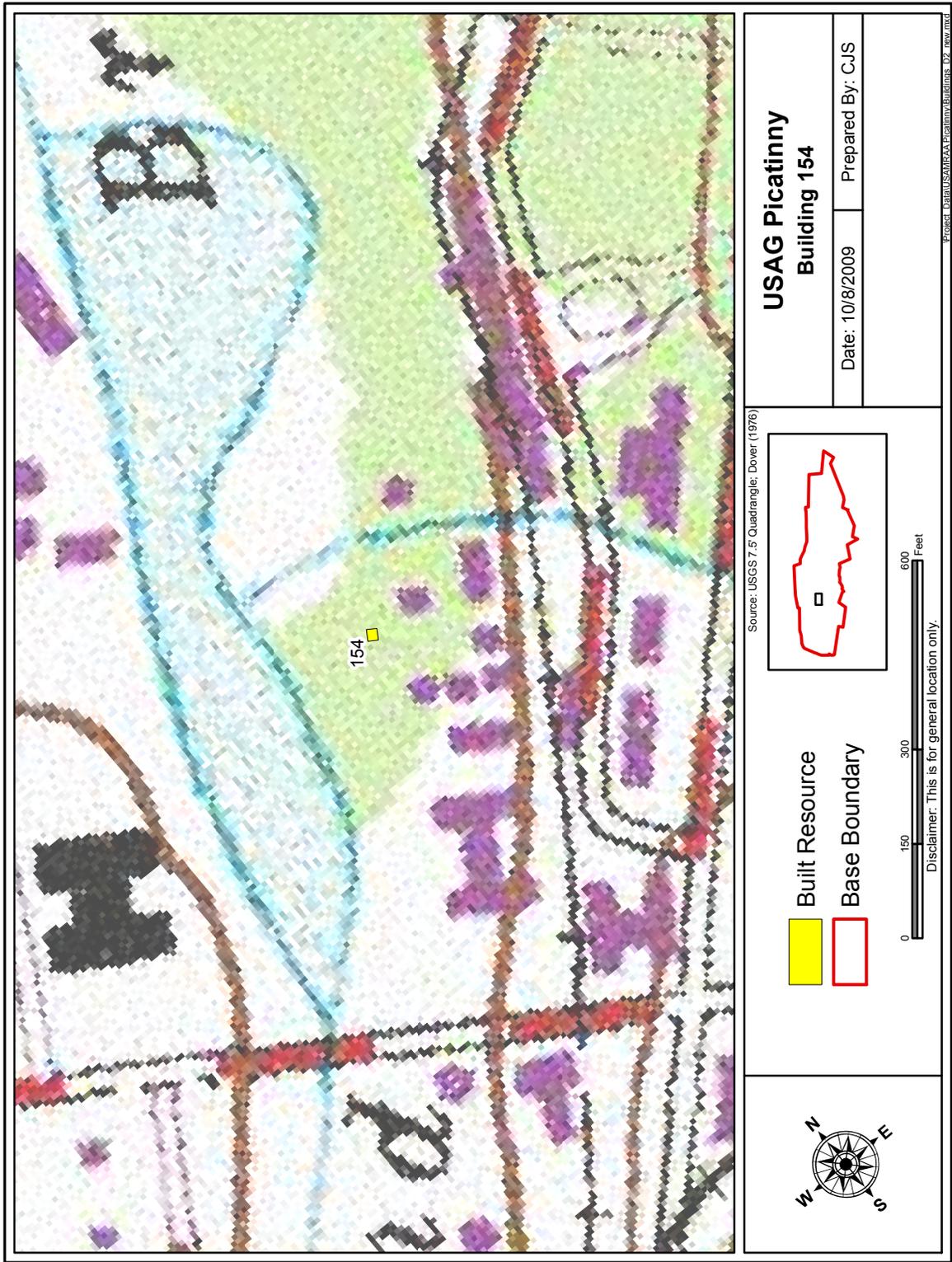
Var. Drawing files maintained by Directorate of Public Works.

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1996 *Evaluation of Structures Built Prior to 1946 at Picatinny Arsenal, New Jersey*. Final Report prepared for New York District, U.S. Army Corps of Engineers under contract number DACW51-92-D-0003 Work Order #8. On file in CRC office, USAG Picatinny, New Jersey.

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R. Christopher Goodwin & Associates, Inc., December 2009

**Project**

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Excerpt of USGS Dover 7.5-minute quadrangle map showing location of Building 154.







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