Building 470, National Cancer Institute–Frederick, Fort Detrick
F-3-199
Frederick, Maryland
1952-53
Public

Capsule Summary

Building 470, the Pilot Plant, is located on the grounds of the National Cancer Institute–Frederick at Fort Detrick in Frederick, Maryland, and was designed by the Army Corps of Engineers and the H.K. Ferguson Company of Frederick, Maryland. It is a seven-story, brick tower that is devoid of architectural ornament. It was critical to the Cold War-era offensive biological warfare research effort of the United States, and is a rare building type, one of only four pilot plants constructed in the United States for offensive biological warfare research. Designed in 1952 to house unprecedented large-scale production and research facilities that focused almost exclusively on offensive use of *Bacillus anthracis*, the causative agent of anthrax, the building also served as the location where experiments relating to *Francisella tularensis* and *Brucella suis*, the causative agents of tularemia and brucellosis, respectively, were conducted.

Construction was completed in 1953 at a cost of $1.3 million, and agent production commenced in 1954. It was used for its original purpose until 1965, when production ceased. From 1965 to 1970, research related to infectious agents continued, but no pathogens were produced in the building. When the United States unilaterally renounced offensive biological warfare in 1969, the building was vacated the following year and has remained unused for more than 30 years. A complete decontamination was conducted in 1971. Building 470 retains a high degree of integrity, although in recent years the building has deteriorated greatly. Building 470 is eligible for listing in the National Register of Historic Places under Criteria A and C, as well as Criterion Consideration G. It exemplifies the nation's offensive biological warfare efforts during the Cold War and is a unique building type constructed for this distinct purpose.

Maryland Historical Trust
Maryland Inventory of
Historic Properties Form

Inventory No. F-3-199

1. Name of Property (indicate preferred name)

historic	Building 470, National Cancer Institute--Frederick, Fort Detrick
other	Pilot Plant

2. Location

street and number	National Cancer Institute--Frederick	__ not for publication
city, town	Frederick	__ vicinity
county	Frederick	

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

name	National Cancer Institute--Frederick, National Institutes of Health				
street and number	Building 427, Fort Detrick			telephone	301/846-5382
city, town	Frederick	state	MD	zip code	21702

4. Location of Legal Description

courthouse, registry of deeds, etc.	N/A			liber	folio
city, town		tax map	tax parcel		tax ID number

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	0	buildings
0	0	sites
0	0	structures
0	0	objects
1	0	Total

Number of Contributing Resources previously listed in the Inventory
0

7. Description

Inventory No. F-3-199

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.

Summary

Building 470, the Pilot Plant, is located on the grounds of the National Cancer Institute–Frederick (NCI–Frederick) at Fort Detrick in Frederick, Maryland, and was designed by the Army Corps of Engineers and the H.K. Ferguson Company of Frederick, Maryland. It is a seven-story, brick tower that is devoid of architectural ornament. It was critical to the Cold War-era offensive biological warfare research effort of the United States, and is a rare building type, one of only four pilot plants constructed in the United States for offensive biological warfare research. Designed in 1952 to house unprecedented large-scale pilot plant production and research facilities that focused almost exclusively on offensive use of *Bacillus anthracis*, the etiologic agent of anthrax, the building also served as the location where experiments relating to *Francisella tularensis* and *Brucella suis*, the causative agents of tularemia and brucellosis, respectively, were conducted. Construction was completed in 1953 at a cost of $1.3 million, and agent production commenced in 1954. It was used for its original purpose until 1965, when production ceased. From 1965 to 1970, research related to infectious agents continued, but no pathogens were produced in the building. When the United States adopted a defensive policy on biological warfare in 1969, the building was vacated the following year and has remained unused for more than 30 years. A complete decontamination was conducted in 1971. Building 470 retains a high degree of integrity, although in recent years, the building has deteriorated greatly.

Section 7–Architectural Description

Exterior Description

Building 470 is a utilitarian research laboratory tower that is devoid of architectural ornament. Faced with red brick, it is a seven-story, steel-frame, box-like tower with an essentially square footprint and includes a partial basement and penthouse. It is centrally located within NCI–Frederick with attached, occupied research buildings (Buildings 431 and 469) on two sides. Building 470 encloses 37,070 square feet, and 523,505 cubic feet.

Entrances to Building 470 are found on the south and west elevations. Large, metal double doors with glass panes lead to a mechanical room. Directly to the left are smaller doors with an identical configuration. A single metal door is on the west elevation.

Windows on Building 470 are exclusively glass block, which allows light into spaces. These opaque windows are the only exterior indicators of the top-secret nature of the biological research that was being conducted inside, as no other architectural elements indicate the use of the building. The glass-block windows, which are small and almost square, vary in size and are essentially placed in pairs with a smaller space between each coupling, and a larger space between each set. This fenestration is not centered on the building's facades because of the presence of the interior elevator shaft which is articulated on the exterior by a plain brick vertical surface at the southwest corner. Window openings on the sixth floor, which is the last complete story of the building, are taller, more rectangular forms than those on the levels below, but the horizontal spacing follows the lower levels. All windows have simple concrete sills.

The roof, which is flat, is covered with a roofing membrane. A brick penthouse containing a mechanical room comprises the seventh story of Building 470.

Interior Description[1]

The interior of Building 470 is similarly devoid of architectural ornament or detail. Interior walls are either masonry block, coated with sealants to prevent the lodging of air-borne agents, or fiberboard partitions. Interior spaces, which are organized around the two stairwells and an elevator (no longer functional), contain a series of large, multistory tanks used in agent production as well as laboratories and processing, piping, and support systems.

Not all interior floor spaces are decked; some spaces are open two or three floor heights to accommodate the tall production tanks, while others are decked in steel grating. Many original features related to the scientific work remain in Building 470. Tanks (as described below), used for fermentation or as centrifuges, remain, as do ultraviolet light fixtures (thought to kill anthrax spores, see below) and other laboratory equipment such as biological safety cabinets. A sophisticated ventilation and air filter room, known as the air-handling room, is also intact on the seventh floor.

The basement of Building 470 contains mechanisms for heat treatment and sterilization of cultures prior to disposal. The cultures were heated for six hours before being pumped across the campus to the sewage treatment facility where all samples were treated again, then released into the Monocacy River.

The ground floor contains vacuum pumps that were used to freeze-dry the biological samples into a powder form. A walk-in refrigerator, laboratory, and a change room with a shower area are also present.

Several large tanks, one used as a seed tank (in which cultures were fed and grew), and a settling tank (which used gravity to separate the agent from the growth medium) are located on the second floor. The centrifuge and another laboratory–this one equipped with an incubator–are also located on this level.

The third level houses two 3,000-gallon fermentors, each with a working capacity of 2,500 gallons (the additional 500-gallon space accommodated foam from the culture growth). Spargers, which sterilized air provided to the fermentors for aeration of the cultures, are located on the fermentation tanks. Also present on the third floor was the Central Assay Laboratory where various tests on anthrax were performed underneath microbiological safety hoods, and the Dry Laboratory where the powdered form of anthrax was tested. A walk-in refrigerator and a chemical and reagent storage room are also on the third floor.

Upper portions of the multistory fermentation tanks occupy much of the fourth floor. A room dedicated to refrigerators and freezers used for stability studies is also on this floor. Another room dedicated to the same purpose comprises the fifth floor. No permanent flooring exists between the fourth and sixth floors. Instead, floors are filled in with metal grating with spaces left open to accommodate the 30-foot-tall, stainless-steel fermentation tanks.

The tops of the large fermentation tanks are on the sixth floor, as are the housing for the charcoal filters used to purify the air. A laboratory with a hoodline and an employee relaxation room are also present.

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[1]Information in this section comes from the uncatalogued collective files of Building 470 located in Building 427 at Fort Detrick. Additional information was provided by SAIC Frederick and National Cancer Institute staff during tours of Building 470.

The seventh floor consists of the penthouse area, which contains mechanical devices relating to air handling. Copper wire precipitators, used to filter larger particles, were coupled with fiberglass filters installed in banks to filter building exhaust and fine particles. These mechanisms remain in place. The penthouse exits onto the flat roof.

Current Condition

Although Building 470 retains its original architectural configuration and some of the scientific equipment, it has been unoccupied for more than 30 years, and has not been actively maintained during this time. Consequently, leaks in the roof have resulted in pools of water on the ground level of the building and the elevator shaft. Interior walls are covered with cracked plaster and peeling paint. Exterior masonry walls are showing cracks and deteriorated mortar joints. Safety issues include spalling concrete floors and roof. As the rebar in the floor and roof slabs oxidizes, it expands and spalls, weakening the structure and creating a safety hazard of falling debris. Water penetrating the mortar joints freezes in cold weather, loosening the bricks and forcing them out of the walls, creating a hazard. This condition is especially critical and evident on the parapet wall surrounding the roof.[2]

[2]Gary R. Happel, "Structural Inspection Report: Building 470, Frederick Cancer Research and Development Center," March 6, 2000.

8. Significance

Inventory No. F-3-199

Period	Areas of Significance	Check and justify below		
__ 1600-1699	__ agriculture	__ economics	X health/medicine	__ performing arts
__ 1700-1799	__ archeology	__ education	__ industry	__ philosophy
__ 1800-1899	__ architecture	__ engineering	__ invention	X 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 1952-1970 **Architect/Builder** Army Corps of Engineers

Construction dates 1952-1953

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

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The History of American Biological Warfare Programs

The primary policy of the United States government regarding biological warfare agents between 1941 and 1969 was first to deter their use against the United States and its forces abroad, and secondly to retaliate if deterrence failed. Fundamental to the development of a deterrence strategy was the need for thorough study and analysis of U.S. vulnerability to attack, while at the same time examining retaliatory options. Recognition of the threat and lack of preparedness on the part of the United States prompted the start of the program during World War II. American scientists, medical consultants, industrial experts, and government officials were involved in elements of the U.S. biological warfare program from its inception. However, during the Cold War era, a brief yet critical effort to develop offensive weapons was mounted in the United States, with Building 470 at Fort Detrick playing a critical role in this research.[3]

In the fall of 1941, opinions varied on the reality of the threat of biological warfare. While some officials and experts believed that biological weapons posed no real threat to the United States, others felt that science and technology had progressed to a point where

[3] "U.S. Army Activity in the U.S. Biological Warfare Programs (Unclassified)," Volume I, February 1977, iii.

the threat was a serious one. To study the matter more closely, Secretary of War Henry L. Stimson requested that the National Academy of Sciences appoint a committee to make a detailed survey of the biological warfare threat. After careful study, the committee concluded that the threat was indeed real and that appropriate steps should be taken to reduce U.S. vulnerability to attack. Secretary Stimson recommended to President Franklin Delano Roosevelt that a civilian agency be established for this purpose. With approval from the President, the War Reserve Service (WRS) was established in August 1942. Attached to the Federal Security Agency, the WRS used the resources of existing government agencies and private institutions to carry out the biological warfare program. Experts from the National Academy of Sciences and the National Research Council provided the latest research and knowledge, and an exchange of information was inaugurated with Canada and Great Britain.[4]

The first task undertaken by the WRS was the development of defensive measures against a possible attack. It was quickly concluded that large-scale research and development operations were necessary to obtain accurate findings in regard to biological weapons. In November 1942, the WRS requested that the Chemical Warfare Service of the Army (renamed the Chemical Corps in 1946) take on the additional responsibility of the biological warfare program, with WRS maintaining a supervisory role. The Army agreed to this request and chose Detrick Field (renamed Camp Detrick in 1943, then Fort Detrick in 1956), a National Guard Airfield just northwest of the City of Frederick, Maryland, as the location for this critical research. The site was only 50 miles from Washington, D.C., and 80 miles from the Edgewood Arsenal in Edgewood, Maryland, which housed the Chemical Warfare Service research center, and the airplane hangar at Detrick Field provided a place for research to commence immediately while new construction was underway. The field comprised 90 acres, with ample surrounding farmland available for expansion.[5]

Prior to its purchase by the War Department, Detrick Field was used for flight training of student pilots in all branches of the Armed Forces and as the home of the 104th Observation Squadron of the 29th Division, Maryland National Guard. The field was named in honor of Dr. Frederick L. Detrick (Major Medical Corps, Maryland National Guard), a flight surgeon of the squadron until his death in 1931, who had served with distinction as an Army medical officer in France during World War I.[6]

Construction, consisting primarily of research space, to accommodate this new mission at Detrick Field began in April 1943. When the Office of Strategic Services alerted the Joint Chiefs of Staff in December 1943 that the Germans might be planning a biological warfare attack, work was accelerated. In June 1944, oversight of the program was again transferred, this time to the War Department, with the CWS maintaining responsibility for work on biological warfare agents, intelligence, and defense.[7]

At its peak, the CWS had 3,900 personnel with work being carried out at four installations: Camp Detrick was the main research center, field testing facilities were set up in Mississippi and Utah, and a production plant was established in Indiana.[8]
Throughout World War II, the United States biological and chemical warfare policies both stated that weapons could be used only in retaliation to an enemy attack. After the war was over, all biological warfare activities were reduced to research status, with most of the work concentrated at Camp Detrick. Activities were concentrated on agent research and defensive aspects, applied research on dissemination devices, the collation and absorption of the large-scale, research-and-development effort carried out during World War II, and the formation of sound research-and-development program frameworks. All of this work was conducted under stringent security measures, with all information strictly classified to the point that the American public was completely unaware of the

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[4]*U.S. Army Medical Research Institute of Infectious Diseases, 1969-1994*, (Fort Detrick, Maryland: USAMRIID, 1994), 14.
[5]Richard M. Clendenin, *Science and Technology at Fort Detrick, 1943-1968*, (Fort Detrick, Maryland: Published by the Technical Information Division, 1968), 3.
[6]Ibid.
[7]Ibid., xi-xii.
[8]"U.S. Army Activity in the U.S. Biological Warfare Programs," 1-3.

existence of the CWS until a government-approved press release briefly discussing the program was released in 1946.[9] The reason for this secrecy was twofold: to keep the enemy from gaining knowledge and to avoid unnecessarily frightening the American public and members of the Armed Forces over the possibility of a biological warfare attack.[10]

No actual production of biological warfare agents for the purpose of operational readiness was carried out from 1946 to1950, although plans were underway for the construction of the first facilities to be used for large-scale agent production. In 1950, after years of a retaliation-only policy, an Ad Hoc Committee on Chemical and Biological Warfare submitted a report to the Secretary of Defense and the President of the United States recommending changes in the policy that essentially allowed for expanded research, field tests on biological agents and munitions delivery systems, and the establishment of a large-scale production facility.[11]

Just as the Ad Hoc Committee's recommendations were being reviewed, the Korean War broke out, spurring efforts again to develop reliable retaliatory capability based on the grave threat of Cold War-era Soviet Union involvement. The Secretary of Defense formally approved all of the Committee's recommendations except for the provision that would change the retaliatory policy. Foremost among the measures taken was the construction of a biological agent production facility at Pine Bluff Arsenal near Pine Bluff, Arkansas. Design of the facility was accelerated and construction commenced in February 1951 with agent production beginning in December 1953.[12]

Major research facilities to support the newly expanded biological warfare research-and-development program were constructed at Camp Detrick, and in 1953, over $10 million worth of research facilities, including Building 470, were completed. In addition to the expanded retaliatory program, increases in research on defensive measures to be used in the event of an attack on the United States were also expanded. Despite the end of the Korean War, Federal officials were concerned with the possibility of a biological attack and continued to fund this critical research. Between August 1954 and July 1958, an additional $15.6 million was spent at Fort Detrick, primarily for the construction of new laboratories.[13]

Once again, the U.S. retaliation-only policy was reviewed, first by the Chief of Staff of the Army and then by high-level national security advisers. In light of the Cold War climate and based on Soviet military doctrine expressed in 1956, which stated that chemical and biological weapons would be used for mass destruction in future wars, the United States realigned its national policy. The new policy stated that the United States would be prepared to use chemical or biological weapons in a general war to enhance military effectiveness. The decision to use these weapons would be reserved for the President.[14]

From the mid 1950s through the mid 1960s, research focused on defensive measures as well as effective delivery systems for offensive or retaliatory measures. Safety issues–always important– were given an even higher priority. For the first time, the effects of such testing on ecological, biological, and environmental systems were monitored for impact.[15]

During the Vietnam War years, Department of Defense programs focused on supporting the war, and the biological warfare program was limited accordingly, with the majority of the work focusing on antipersonnel and anticrop agents. These anticrop agents were for the purpose of defoliating the jungle along key travel routes and killing the food crops of insurgents. Although these herbicides were

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[9] *U.S. Army Medical Research Institute of Infectious Diseases*, 1969-1994, 15.
[10] Clendenin, *Science and Technology,* 1.
[11] "U.S. Army Activity in the U.S. Biological Warfare Programs (Unclassified)," 3-1.
[12] Ibid.
[13] Ibid., 3-2.
[14] Ibid., 4-2.
[15] Ibid., 5-6.

not actually biological in nature, much of the work was carried on at Fort Detrick as part of the overall scientific program. Antipersonnel defensive work during this era emphasized rapid detection systems and improved vaccines and therapies.[16]

In January 1969, the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID) was established to develop medical defenses against biological warfare threats in both military and civilian settings.[17]

Later the same year, in November 1969, President Richard Nixon announced a major policy decision regarding the chemical and biological warfare programs. He renounced the first use of lethal and incapacitating chemicals and any use of biological weapons, with the recommendation that the Department of Defense dispose of all existing weapons, stating that U.S. efforts would focus on defensive measures such as immunization.[18]

On April 1, 1972, Fort Detrick was transferred from the U.S. Army Materiel Command to the Office of the Surgeon General, with some activities transferred to the Edgewood Arsenal. Building 470 is now under the control of the National Cancer Institute–Frederick of the National Institutes of Health. Building 470 has been unoccupied since it was decontaminated in 1971.

As a result of President Nixon's ban on biological weapons, the U.S. has ceased to develop them, but still maintains a defensive biological program which seeks to develop effective warning and detection devices as well as vaccines and treatments. Today, USAMRIID at Fort Detrick is the center of the Army's program on the medical aspects of biological defense.

Biological Warfare Research in Building 470, Fort Detrick[19]

The Pilot Plant, Building 470, was designed specifically for large-scale production of biological warfare agents, primarily anthrax spores, for testing. One of the key tasks of the scientists working in Building 470 was developing methods of growing large quantities of anthrax in as little time as possible. Seed tanks were used to initially grow the anthrax sample, which was transferred to larger fermentation tanks along with an organic growing media or nutrient broth, such as gelatin or beef broth. Spargers aerated the culture with sterile oxygen, and agitation assisted in the growth of the sample. Other variables such as ratio of bacteria to media and temperature were manipulated to determine the most hospitable climate for bacterial growth. Cultures, which were 2,500 gallons, were usually fermented for 96 hours, then put into a funnel-shaped tank to extract the sample after it settled by force of gravity. Later, after fears of possible leakage were allayed, centrifuges were used. Approximately six hours were needed to process a 2,500-gallon culture. After each sample was processed, all lines and valves were sterilized to avoid cross contamination of cultures.

Samples were then tested for quality. If the quality was good, the anthrax was used in other tests. If the culture was of a poor quality (i.e., with a low count of anthrax) or had been compromised or contaminated, the culture was pumped into a waste treatment tank where contents were steam sterilized before being released to the post sewage sterilization plant. This complicated process involved over 2,000 valves to various tanks and filters throughout the building, and workers estimated that it took approximately eight months to fully train an individual to complete all tasks associated with management of the plant.

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[16]Ibid., 6-1.
[17]Clendenin, *Science and Technology*, 9.
[18]"U.S. Army Activity in the U.S. Biological Warfare Programs (Unclassified)," 7-1.
[19]Information in this section comes from the uncatalogued collective files of Building 470 located in Building 427 at Fort Detrick. Additional information was provided by SAIC Frederick and National Cancer Institute staff during site visits and tours of Building 470 (see Bibliography).

Once the anthrax was separated from the media and tested for quality, it was transferred to laboratories within Building 470 for various types of research. Safety precautions were of the utmost importance and state-of-the-art methods were employed throughout the building. Glass-walled biological safety cabinets allowed workers to place their hands in holes containing thick rubber gloves so the researchers avoided direct contact with samples while handling them. These gloves were changed frequently to avoid microscopic tears in the rubber that would result in contamination. Fiberglass filters were found in each laboratory and in the penthouse air filtration system to remove possible contaminants from the building's air supply.

Other safety precautions were also in place. Each laboratory was entered and exited through an air-lock chamber which would isolate the lab if a spill occurred. Ultraviolet lights were installed throughout Building 470 because, at the time, it was generally accepted that UV light would kill any errant anthrax spores. Labs were washed weekly with bleach and/or formaldehyde, which led to peeling paint, which in turn was patched quickly to avoid the possibility that spores would lodge in cracks.

Several anthrax spills of varying degrees of severity occurred in Building 470 when it was actively used for agent production. In all cases, anthrax escaped from the 3,000-gallon fermentation tank. Only one major spill occurred at Building 470. In 1958, an anthrax culture was contained in the fermentation tank. When the tank valve was opened to drain the tank, the neoprene diaphragm did not loosen from the valve seat, and no drainage occurred. The plant operator attempted to rectify the situation by loosening the valve and inserting a screw driver into the valve. As a result, the contents of the tank spilled out on to the floor and entered a drain that was directly connected to the sewage sterilization plant, which usually received only cultures already treated to remove anthrax. (Tests were conducted later, and revealed that all treated sewage samples were sterile and posed no threat.)

The operator ran into the airlock room, removed his clothes, and went to the change room where he showered. A solution of hypochlorite was prepared and sprayed on the ceiling, walls, floor, and equipment. The solution was left in place for several hours, then rinsed with water. Personnel wore protective clothing, including rubber shoes, gloves, and an air-supplied hood. The valve on the tank was repaired and the fermenter was steam sterilized. Tests conducted the following day showed that the area was still contaminated, so the decontamination was repeated and subsequent tests showed no residual anthrax.

Decontamination Procedures

In 1965, all active production and process development studies in Building 470 ended. The holding and sterilization tanks were sterilized and the drain lines from the tanks were cut, filled with hypochloride, and capped. Some small-scale studies were continued in the glass-tight cabinet systems in the laboratory areas.

In 1969, when President Richard Nixon announced that offensive biological warfare studies and products would no longer be developed by the United States, personnel working in Building 470 were instructed to stop experiments, complete reports, and clean small equipment. The building was vacated on September 18, 1970, and decontamination began a month later on October 19. Building 470 was fully decontaminated on a large scale in 1970-71, when formalin and paraformaldehyde were used in gaseous form to kill any residual anthrax spores. After decontamination, numerous sample swabs were collected and none tested positive for any traces of anthrax bacteria. Comprehensive environmental culturing procedures on approximately 1,500 hard-to-reach areas yielded no anthrax bacteria.

Since 1970, the building has essentially remained vacant. It has been used for limited dry storage of historical records, some laboratory supplies and miscellaneous furniture, and small pieces of scientific equipment. The elevator is inoperable, and all primary utilities are in poor condition. No steam, chilled, or potable water is available. Electrical service is very limited and used cautiously.[20]

Several internal reports issued prior to September 11, 2001, cite the negative public perception of Building 470. NCI–Frederick employees expressed concern about possible hazards relating to the building–either in its deteriorated physical condition, or to its past as an anthrax production facility. Since September 11 and the subsequent anthrax attacks on the United States, Fort Detrick's history as a center of anthrax development has received copious amounts of national and local press coverage.

Significance Summary

The quality of **significance** in American history, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. that are associated with events that have made a significant contribution to the broad patterns of our history; or

B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that has yielded, or is likely to yield, information important in prehistory or history.

Building 470 is a rare example of a pilot plant used for large-scale biological warfare agent production. It is one of only four such pilot plants constructed to assist in the U.S. biological warfare campaign that resulted from international concerns originating from World War II and the Cold War. Building 470 was integral in the nationwide effort to employ biological weapons in retaliatory situations and exemplifies the importance of the research conducted during the short-lived period of offensive biological warfare research in America.

Building 470 is eligible for listing in the National Register of Historic Places under Criteria A and C. Under Criterion A, as an integral component of the United States biological warfare effort, work performed in the building has contributed to the nation's military history during the Cold War era. Although some specific data of the experiments conducted in Building 470 remains classified, general knowledge of the research and the military's infectious agent initiative is sufficient to determine that Building 470 is eligible for National Register listing under Criterion A.

Building 470 is also eligible for National Register listing under Criterion C. It is a rare building type–the pilot plant–constructed to house the unique and historically important experiments that were conducted in the building, and its design was such that it accommodated several large tanks integral to anthrax production. Original features include glass block windows to prevent views into the building, as well as interior components such as seed tanks and walk-in refrigerators directly related to infectious agent research.

[20]Memo to Peter Fischinger, Principal Investigator, SAIC Frederick, from Roy Waldt, Engineering Manager, January 23, 1997. Building 470 Files, Fort Detrick, Building 427.

Criterion Consideration G

The period of significance for Building 470 is 1952-1970, which includes both its design and construction for the important and function-driven purpose of biological warfare research and its use as an active research facility. Although the building itself is exactly 50 years old, the period of significance, which includes years when important research was being conducted, extends into the more recent past. Therefore, Building 470 must also be evaluated using National Register Criterion Consideration G, which allows for recent resources (those less than 50 years of age) to be listed if they are judged to be exceptionally important. Evaluations were based on information contained in *National Register Bulletin 22: Guidelines for Evaluating and Nominating Properties That Have Achieved Significance within the Last Fifty Years*, which contains the following guidance and parameters on evaluating resources of the recent past.

Historic Context

Building 470 was an integral part of the military work surrounding the offensive use of anthrax. Cultures were grown under various conditions to determine the fastest method to produce the greatest amount of the bacteria. These experiments were undertaken as a direct result of the Cold War and the perceived need for various forms of preparedness in the event of conflicts. After the anthrax was grown and processed it was shipped to a plant in Pine Bluffs, Arkansas, where delivery systems were developed. Although other buildings, such as laboratories, used for biological warfare research are more common, pilot plants with tower configurations similar to Building 470 appear to be rare.

Scholarly Evaluation

According to *National Register Bulletin 22*, historic resources that have been the subject of scholarly evaluation are more easily placed within historic and architectural context. Building 470 is a rare building type and little has been written about pilot plants. However, sufficient information about the experiments and the government programs prompting the research is known to place the building within a national context of biological weapons development during the Cold War era.

Time

Because the 50-year period is an arbitrary span of time, it is important to evaluate resources within greater periods or movements in history. According to *National Register Bulletin 22*, the 50-year rule:

> *was not designed to be mechanically applied on a year-by-year basis. Generally, our understanding of history does not advance a year at a time, but rather in blocks of time which can logically be examined together.*

As such, Building 470 can be evaluated as an important resource of the Cold War era specifically related to infectious agent research.

Comparative Evaluation of the Significance of a Property

Building 470 fits into the history of infectious agent research on a national level. Its role in development of mass amounts of pathogens was key to initial development in biological warfare, along with the work of other plants (such as Pine Bluffs in Arkansas) focusing on delivery systems originating from research conducted at Fort Detrick. It was critical to the Cold War offensive efforts of this country.

Because the period of significance extends into a time of less than 50 years ago, Building 470 is also eligible for the National Register under Criterion Consideration G. Substantial historic context exists to evaluate Building 470 as a Cold War resource. As a key

component in the nationwide effort to develop biological weapons for use by the United States, Building 470 displays exceptional significance.

Integrity

Building 470 retains a high degree of integrity of location, design, materials, setting, workmanship, feeling, and association. It is largely intact to its period of use as a premier biological research facility. In addition to its architectural integrity, key pieces of research equipment are still present, conveying the large-scale production operations that occurred in Building 470.

9. Major Bibliographical References

Inventory No. F-3-199

Building 470 Files, Archives, and Drawings. Located in Building 427, National Cancer Institute, Fort Detrick, Frederick, Maryland.

Clendenin, Richard M. *Science and Technology at Fort Detrick, 1943-1968*, Fort Detrick, Maryland: Published by the Technical Information Division, 1968.

Covert, Norman M. *Cutting Edge: A History of Fort Detrick, Maryland* (Third Edition), 1997.

Happel, Gary R. "Structural Inspection Report: Building 470, Frederick Cancer Research and Development Center," March 6, 2000.

Interview with Gary R. Happel, National Cancer Institute--Frederick, August 2000.

Interview and Building 470 Tour with Tim Rowe, SAIC Frederick, August 2000.

"U.S. Army Activity in the U.S. Biological Warfare Programs (Unclassified)," Volume I, February 1977.

U.S. Army Medical Research Institute of Infectious Diseases, 1969-1994, Fort Detrick, Maryland: USAMRIID, 1994.

10. Geographical Data

Acreage of surveyed property	approximately 1 acre		
Acreage of historical setting	N/A		
Quadrangle name	Frederick	Quadrangle scale:	1:24,000

Verbal boundary description and justification

Building 470 is located on Chandler Road at the National Cancer Institute—Frederick at Fort Detrick in Frederick, Maryland (see USGS map, Frederick Quadrangle). Building 470 is the only building at Fort Detrick currently being evaluated. No surrounding grounds or landscape are associated with Building 470 or its significant body of research.

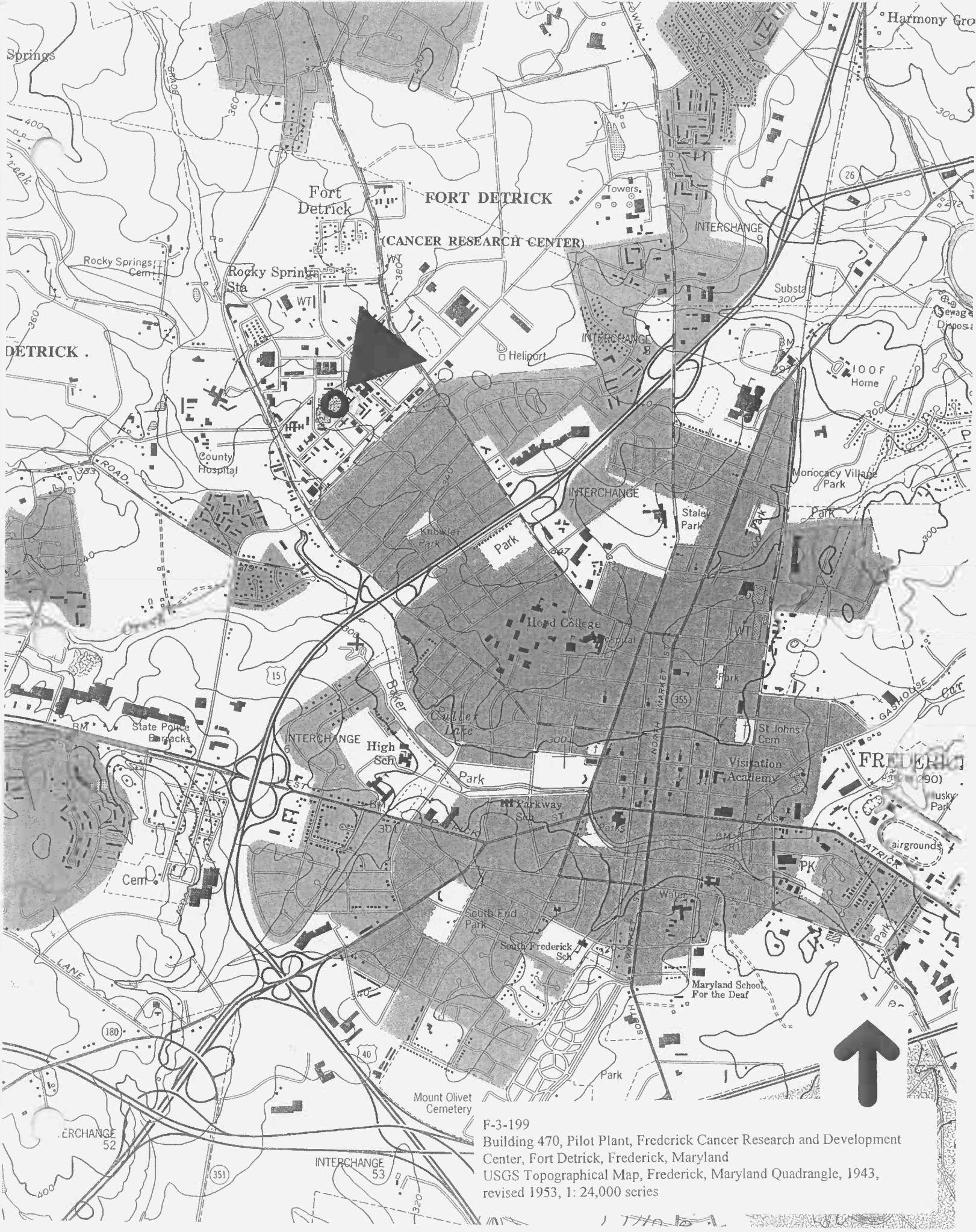
11. Form Prepared by

name/title	Judith Robinson and Stephanie Foell, Architectural Historians		
organization	Robinson & Associates, Inc.	date	July 25, 2002
street & number	1909 Q Street, NW	telephone	202/234.2333
city or town	Washington	state	DC

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



F-3-199
Building 470, Pilot Plant, Frederick Cancer Research and Development Center, Fort Detrick, Frederick, Maryland
USGS Topographical Map, Frederick, Maryland Quadrangle, 1943, revised 1953, 1: 24,000 series

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
East and North Elevations
1 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
South Elevation
2 of 13

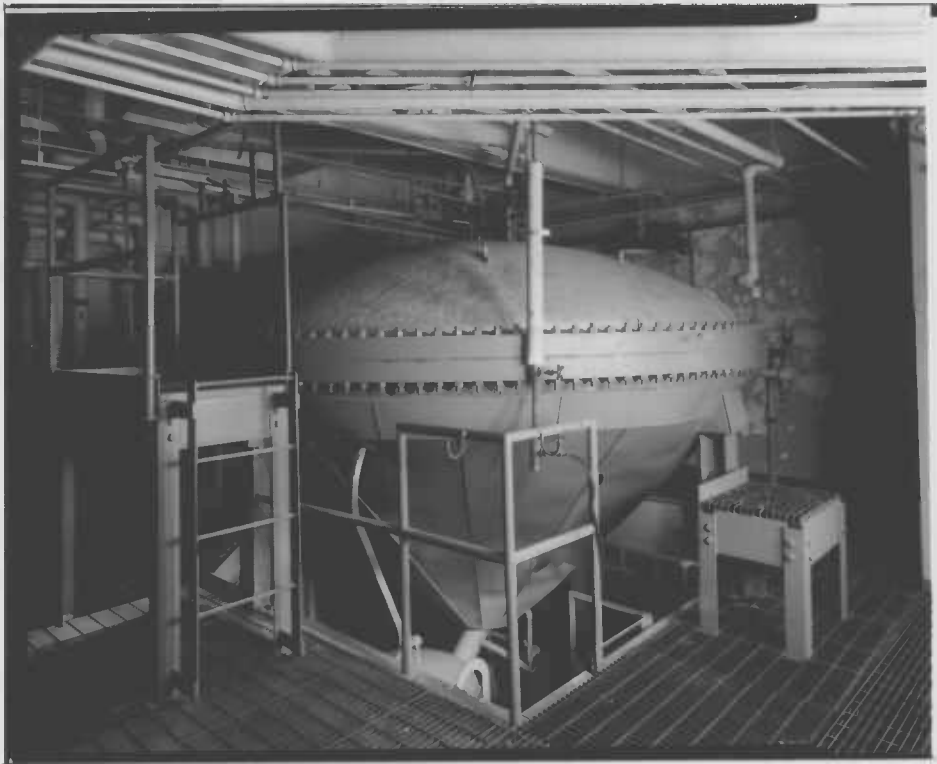
MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
North and West Elevations
Showing NCI-Frederick
Campus

3 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
North and West Elevations
4 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
Ground level vacuum pumps;
South elevation
5 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
Seed tank and centrifuge,
second floor
6 of 13



MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
Settling tank,
second floor

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5

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD.
Walter Smalling, Jr.
March 2002
MD SHPO

Bottom of fermentor;
third floor

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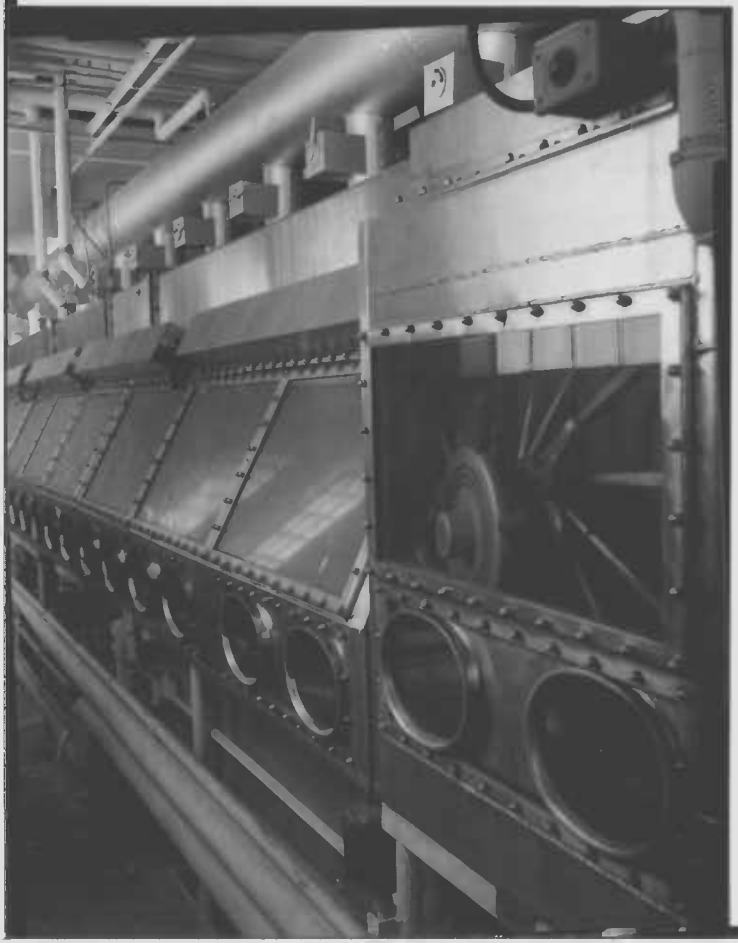
STRETCHER
BLANKET

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO

Gauges, pipes, and valves;
Fourth floor

9 of 13



MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr
March 2002
MD SHPO
Hood line / Biomedical
Cabinet; sixth floor
11 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO

Top of fermentation tank; fourth floor

10 of 13

MIHP Inventory NO. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO
Top of fermentation tank;
Sixth floor
12 of 13

MIHP Inventory No. F-3-199
Building 470, Fort Detrick
Frederick County, MD
Walter Smalling, Jr.
March 2002
MD SHPO

13

Air filtration room, seventh floor

13 of 13