

USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

Enhanced Preliminary Assessment Report:

Portland Army Housing Units
Portland, Connecticut

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Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Portland, CT. The objectives of this assessment include identifying and characterizing all environmentally significant operations, identifying areas of environmental contamination that may require immediate remedial actions, identifying other actions which may be necessary to resolve all identified environmental problems, and identifying other environmental concerns that may present impediments to the expeditious sale of this property.			
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SUMMARY

The Portland housing area in Portland, Conn., represents no imminent or substantial threat to human health or the environment. No immediate remedial actions are warranted for the site. Nevertheless, environmental impacts from this property have been identified, and some further investigations are warranted.

Although these housing units were originally developed in support of a Nike missile battery, all available documentation and circumstantial evidence suggest that the housing property remained wholly independent of the battery's operational activities. No wastes associated with the operation and maintenance of the missile and tracking systems were ever delivered to or managed at this housing area. There is no evidence to suggest that Nike-related hazardous or toxic constituents were ever released from the area. Furthermore, since this area existed independently of the missile launch area and fire control portions of the battery with respect to utilities, there is no possibility of missile-related contaminants migrating to this property along buried utility lines.

Despite its independence from Nike missile battery operations, this property has affected the environment. Concerns center on the septic system installed 30 years ago during original property development. The Portland housing area has had multiple problems with two individual septic tanks located behind units #6 and 13. Raw sewage is reported as having backed up into the septic tanks and the housing units, thus creating a health hazard.

The Portland housing area has had problems with termites. One unit (#12) was razed because it had been infected with termites. The area facility engineers reported that another unit (#3) was accidentally contaminated with chlordane by a termite exterminator. That contamination has reportedly been cleaned up. However, no documentation exists detailing the nature or extent of cleanup actions. No analytical results are available to guarantee successful mitigation of the chlordane contamination. Further investigations are necessary to confirm the absence of chlordane contamination.

Approximately two years ago, the New York District of the Army Corps of Engineers replaced the original underground fuel storage tanks located behind each unit with 275-gallon above-ground tanks. The underground storage tanks remain buried at the rear of the houses and are said to be filled with sand and capped. No document suggests integrity or leak tests were ever taken for these tanks. However, there is no known or suspected contamination from those tanks.

Finally, it was found during the site visit that a common practice of housing occupants has been to leave the spigots to the cement containment troughs around the above-ground tanks in the open position. The practice is intended to allow drainage of accumulated rainwater from the troughs. If a spill were to occur, this practice would compromise the effectiveness of the spill-containment trough. These above-ground tanks were also given only a primer paint covering at the time of installation. Primer does not provide adequate protection against adverse weather conditions over an extended period of time.

Electrical transformers are maintained by Portland's power company, and there is no evidence that PCB contamination is a problem.

The following actions are recommended prior to release of this property:

- Coat the existing above-ground tanks with a protective paint to insure extended-wear integrity of these tanks.
- Develop and implement a solution to the possibility of containment-box drainage taps being consciously or inadvertently left in the open position.
- Develop and implement a permanent solution to the sewage-treatment problems.
- Sample the area around housing unit #3 to confirm the absence of chlordane contamination.

These recommendations assume that this property will most likely continue to be used for residential housing.

1 INTRODUCTION

In October 1988, Congress passed the Defense Authorization Amendments and Base Closure and Realignment Act, Public Law 100-526. This legislation provided the framework for making decisions about military base closures and realignments. The overall objective of the legislation is to close and realign bases so as to maximize savings without impairing the Army's overall military mission. In December 1988, the Defense Secretary's ad hoc Commission on Base Realignment and Closure issued its final report nominating candidate installations. The Commission's recommendations, subsequently approved by Congress, affect 111 Army installations, of which 81 are to be closed. Among the affected installations are 53 military housing areas, including the Portland housing area addressed in this preliminary assessment.¹

Legislative directives require that all base closures and realignments be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA). As a result, NEPA documentation is being prepared for all properties scheduled to be closed or realigned. The newly formed Base Closure Division of the U.S. Army Toxic and Hazardous Materials Agency is responsible for supervising the preliminary assessment effort for all affected properties. These USATHAMA assessments will subsequently be incorporated into the NEPA documentation being prepared for the properties.

This document is a report of the enhanced preliminary assessment (PA) conducted by Argonne National Laboratory (ANL) at the Army stand-alone housing area in Portland, Conn.

1.1 AUTHORITY FOR THE PA

The USATHAMA has engaged ANL to support the Base Closure Program by assessing the environmental quality of the installations proposed for closure or realignment. Preliminary assessments are being conducted under the authority of the Defense Department's Installation Restoration Program (IRP); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 91-510, also known as Superfund; the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499; and the Defense Authorization Amendments and Base Closure and Realignment Act of 1988, Public Law 100-526.

In conducting preliminary assessments, ANL has followed the methodologies and procedures outlined in Phase I of the IRP. Consequently, this PA addresses all documented or suspected incidents of actual or potential release of hazardous or toxic constituents to the environment.

In addition, this PA is "enhanced" to cover topics not normally addressed in a Phase I preliminary assessment. Specifically, this assessment considers and evaluates the following topical areas and issues:

- Status with respect to regulatory compliance,
- Asbestos,
- Polychlorinated biphenyls (PCBs),
- Radon hazards (to be assessed and reported on independently),
- Underground storage tanks,
- Current or potential restraints on facility utilization,
- Environmental issues requiring resolution,
- Health-risk perspectives associated with residential land use, and
- Other environmental concerns that might present impediments to the expeditious "excessing," or transfer and/or release, of federally owned property.

1.2 OBJECTIVES

This enhanced PA is based on existing information from Army housing records of initial property acquisition, initial construction, and major renovations and remodeling performed by local contractors or by the Army Corps of Engineers. The PA effort does not include the generation of new data. The objectives of the PA include:

- Identifying and characterizing all environmentally significant operations (ESOs),
- Identifying property areas or ESOs that may require a site investigation,
- Identifying ESOs or areas of environmental contamination that may require immediate remedial action,
- Identifying other actions that may be necessary to address and resolve all identified environmental problems, and
- Identifying other environmental concerns that may present impediments to the expeditious transfer of this property.

1.3 PROCEDURES

The PA began with a review of Army housing records located at Fort Devens, Mass., during the week of May 15-19, 1989. Additional information was obtained from conversations with personnel from the Connecticut Housing Office in New Haven, Conn., on July 17. A site visit was conducted at Portland, Conn., on July 19, 1989, at which time additional information was obtained through personal observations of ANL investigators. Photographs were taken of the housing units and surrounding properties as a means of documenting the condition of the housing units and immediate land uses. Site photographs are appended.

All available information was evaluated with respect to actual or potential releases to air, soil, and surface and ground waters.

Access to individual housing units was not possible during the site visit. However, ANL investigators revisited the property on September 11, 1989, at which time the interiors of all but two of the houses (units #14 and 15, Thompson Drive) were inspected.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The Portland housing units are located in central Connecticut, in the town of Portland, Middlesex County. The entire property is 6.03 acres with surrounding woodland on its borders.² Figures 1 and 2 show the general location of the facility.

The housing units were developed in 1958. Hearsay information indicates that during the 1970s, unit #12 became ridden with termites and had to be razed. The area of unit #12 is currently used as a playground.

2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the housing property.

Housing Units

The Portland housing area now contains 15 "Capehart"-style houses, each having three bedrooms. Three units (#1, #2, and #3) have a carport and storage room. Capehart is the model name assigned to these houses by the builder, National Homes. The houses are built on concrete slabs, with no structures underground.² Water lines are embedded in the foundation slab. Heating ducts were also originally embedded in the foundation slabs. Heating ducts were moved to the ceiling approximately two years ago, when the Army Corps renovated the heat system. The original heating ducts were abandoned in place.

Utilities

Since development of the property, the housing units have been supplied with city water; no drinking water wells exist on the property. The property is provided with city power, and all telephone poles and electrical transformers on site are the responsibility of Portland's power company. Solid wastes (garbage) are collected and removed from the property by a private contractor.

Sewage

Each housing unit has a septic tank in its backyard. These septic tanks are connected to individual leaching fields, located behind each unit. Individual septic tanks for units #6, 13, and 15 are reported to have backed up. Two tanks in particular, those associated with units #6 and 13, have been pumped out numerous times.³

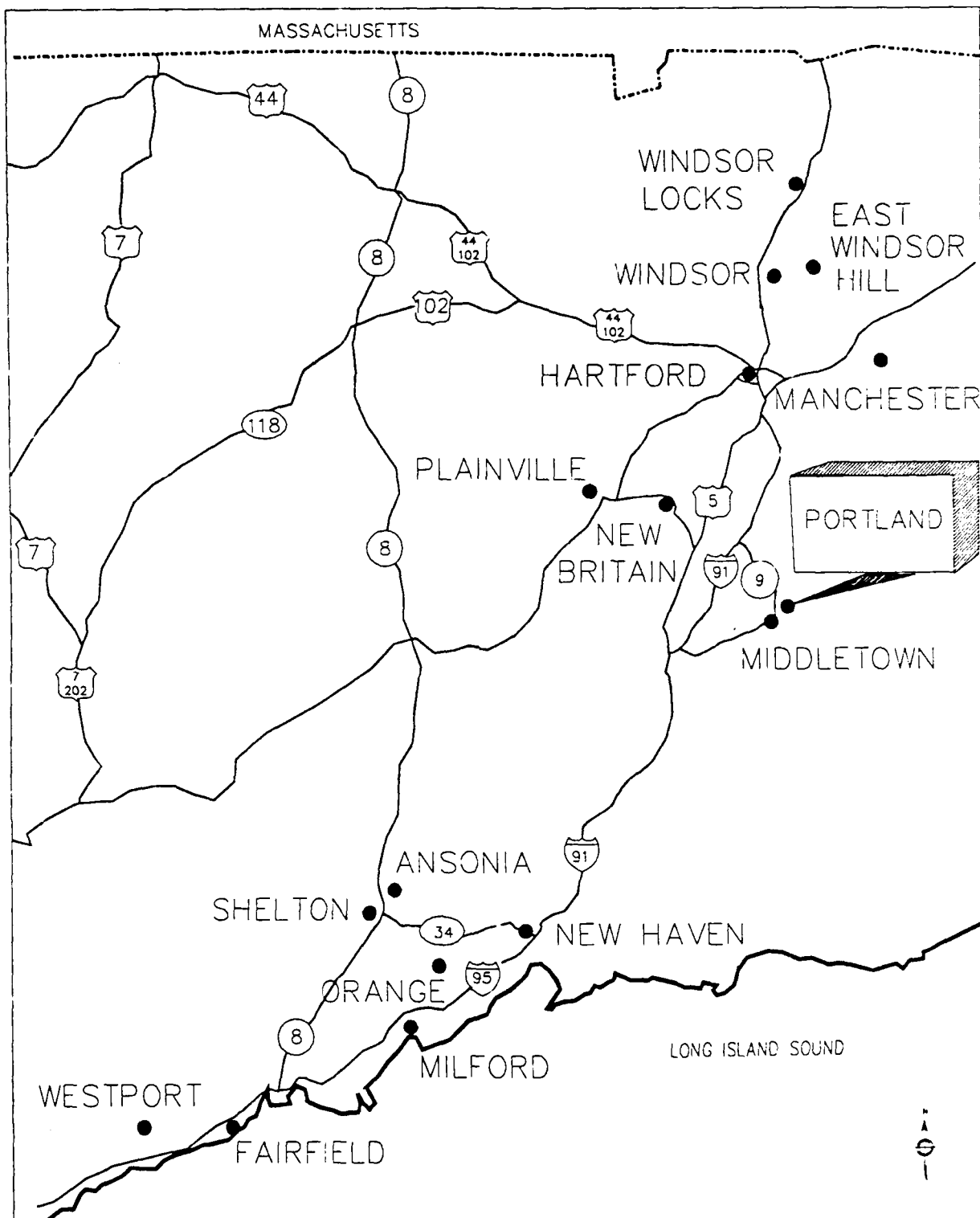


FIGURE 1 Location Map of Connecticut Army Housing Facilities

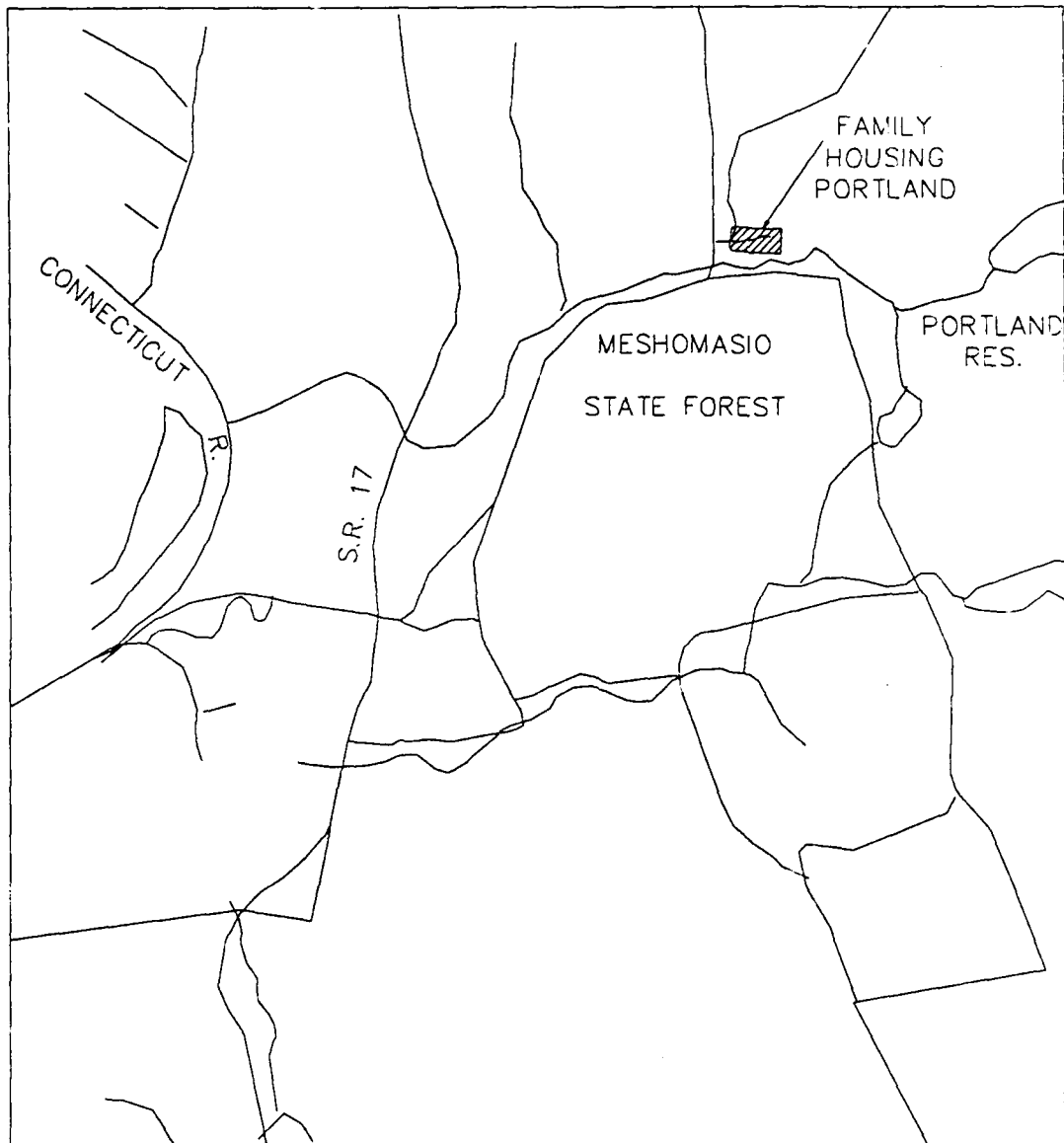


FIGURE 2 Vicinity Map of Portland Army Housing Units

Fuel Storage

The original 275-gallon underground fuel storage tanks installed in 1958 were replaced approximately two years ago with 275-gallon above-ground tanks. The New York District Army Corps of Engineers conducted the tank changeover, filled the underground storage tanks with sand, and left the old tanks buried in the ground. The underground tanks are located at the rear of each housing unit. The above-ground tanks were installed above them. There is no documentation of spills or leaks from the underground tanks. Their replacement was the result of good engineering practice, dictated by the advancing ages of the tanks.

Storm Drainage Systems

2.3 PROPERTY HISTORY

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers⁴ and the other by the U.S. Army Toxic and Hazardous Materials Agency.⁵ In both studies, independent contractors relied on information contained in unclassified documents related to the Nike surface-to-air missile program, including engineering drawings and specifications (for the facilities and the missiles themselves), interviews with Army personnel participating in the Nike program, and operations manuals and directives relating to the operations and maintenance of Nike facilities. Taken together, these two reports represent the most complete assemblage of generic information on the Nike

missile program from an environmental perspective. Salient points from both reports are condensed below.

At its zenith in the early 1960s, the Nike program included 291 batteries located throughout the continental United States. The program was completely phased out by 1976, with many of the properties sold to private concerns or exceded to state or local governments for nominal fees.

Nike Ajax missiles were first deployed in 1954 at installations throughout the continental United States, replacing, or in some cases augmenting, conventional artillery batteries and providing protection from aerial attack for strategic resources and population centers. Typically, Nike batteries were located in rural areas encircling the protected area. The Ajax was a two-stage missile using a solid-fuel booster rocket and a liquid-fuel sustainer motor to deliver a warhead to airborne targets.

The Ajax missile was gradually replaced by the Nike Hercules missile, introduced in 1958. Like the Ajax, the Hercules was a two-stage missile, but it differed from the Ajax in that its second stage was a solid-fuel rather than liquid-fuel power source and its payload often was a nuclear rather than conventional warhead. Ajax-to-Hercules conversions occurred between 1958 and 1961 and required little change in existing Nike battery facilities. A third-generation missile, the Zeus, was phased out during development and consequently was never deployed.

A typical Nike missile battery consisted of two distinct and separate operating units, the launch operations and the integrated fire control (IFC) operations. The two operating areas were separated by distances of less than two miles, with lines of sight between them for communications purposes. A third separate area was also sometimes part of the battery. This area was typically equidistant from the two battery operating sites and contained housing for married personnel assigned to the battery. Occasionally, these housing areas also contained battalion headquarters, which were responsible for a number of Nike batteries.

Depending on area characteristics and convenience, the housing areas were often reliant on the launch or IFC sites for utilities such as potable water, electrical power, and sewage treatment. In those instances, buried utility lines connected the housing area to one or both of the other battery properties. It is also possible, however, that housing areas were completely independent of the missile launcher and tracking operations. In those instances, the necessary utilities were either maintained on the housing site or purchased from the local community. In many localities, as the character of the land area around the housing units changed from rural to suburban or urban, communities extended utility services to the housing unit locations, in which case conversions from independent systems to community systems were made.

A large variety of wastes was associated with the operation and maintenance of Nike missile batteries. Normally encountered wastes included benzene, carbon tetrachloride, chromium and lead (contained in paints and protective coatings), petroleum hydrocarbons, perchloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Because of the rural locations of these batteries, and also because very few regulatory controls existed at that time, most of

these wastes were managed "on-site." (Unused rocket propellants and explosives, however, would always have been returned to central supply depots and not disposed of on-site.) It is further conceivable that wastes generated at one of the Nike properties may have been transferred to its companion property for management or disposal.

Wastes related to missile operation and maintenance would not have been purposely transferred from a battery operating area to a housing area with no facilities for waste management or disposal. In some instances, however, the sewage treatment facilities for all Nike battery properties were located at the housing area; that possibility cannot be automatically ignored. Finally, where housing areas received various utilities from either of the operating areas, it is also possible that wastes disposed of on those other properties may have migrated to the housing area via the buried utility lines. And since decommissioning of the Nike batteries did not normally involve removal of buried utility or communication lines, any such contaminant migration is likely to have gone unnoticed.

2.3.2 Portland Housing Units

The Portland housing area was developed in 1958 as a stand-alone housing facility for military personnel assigned to the Portland Nike battery. Sixteen single-family houses were erected on the property. Other property improvements included the installation of 16 individual septic tanks. The site has been used to house military personnel and their dependents since the decommissioning of the Nike battery in the early 1970s.

Since the initial property development in 1958, no other permanent structures have been added. One of the original structures has been razed because it was infested with termites. Renovations of unit kitchens and heating systems were completed in 1988 by the Army Corps of Engineers.³

2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The surrounding land is a heavily wooded area, with private houses bordering the property. Portland lies approximately two miles from the Connecticut River. The area is relatively flat with many fieldstones located in the yards of the housing units. Poisonous snakes also reside in this area. The town of Portland has a 1984 population estimate of 8,000.⁶

2.5 GEOLOGIC AND HYDROLOGIC SETTINGS

Portland is located in the Upper Connecticut River Basin of the New England Upland Section of the New England Physiographic Province. The 508 square miles of the upper Connecticut River Basin in north-central Connecticut include the basins of four major tributaries: the Scantic, Park, and Hockanum rivers, and the Farmington River downstream from Tariffville. Precipitation over this area averaged 44 inches per year during 1931-1960. In this period, an additional 3,800 billion gallons of water per year

entered the basin in the main stem of the Connecticut River at the Massachusetts state line, about 230 billion gallons per year in the Farmington River at Tariffville, and about 10 billion gallons per year in the Scantic River at the Massachusetts state line. Some water was also imported from outside the basin by water-supply systems. About half of the precipitation, 22.2 inches, is lost from the basin by evapotranspiration; the remainder flowed out of the area in the Connecticut River at Portland. There are 30 principal lakes, ponds, and reservoirs, in the Upper Connecticut River basin. Two of them have usable storage capacities of more than 1 billion gallons. Floods have occurred within each month of the year. The greatest known flood on the Connecticut River was in March 1936; it had a peak flow of 130,000 cubic feet per second at Hartford. Since then, major floods have been reduced by flood-control measures.⁷

The major aquifers underlying the basin are composed of unconsolidated materials (stratified drift and till) and bedrock. Stratified drift overlies till and bedrock in valleys and lowlands in the eastern and western parts and in most of the broad central valley. The stratified drift generally ranges in thickness from 10 feet in small valleys to more than 200 feet in the Connecticut River Valley. Bedrock underlies the entire basin and is composed of (1) interbedded sedimentary and igneous rocks and (2) crystalline rocks.

Groundwater sources yield between several million gallons per day from large well fields to 1 gallon per minute (gal/min) from single wells. Yields of 100 gal/min or more are most commonly obtained from screened wells tapping stratified-drift aquifers. Small to moderate water supplies can generally be obtained from any of the aquifers. Wells in bedrock yield at least a few gallons per minute at most sites. The probability of obtaining an adequate yield for domestic supply is greater in sedimentary than in crystalline bedrock and is also greater in stratified-drift overburden than in till.

Where unaffected by man's activities, the water, classed as calcium-magnesium-bicarbonate, has low to moderate concentrations of dissolved-solids and ranges from soft to hard. In general, stream flow is less mineralized than groundwater, particularly when it consists largely of direct runoff. However, streams become more highly mineralized during low-flow conditions, when most flow consists of more highly mineralized water discharged from aquifers. The median dissolved-solids concentration in water from 25 stream sites was 113 milligrams per liter (mg/L) during high-flow conditions and 148 mg/L during low-flow conditions. Iron and manganese occur naturally in objectionable concentrations in some streams that drain swamps and in some waters that drain from sedimentary bedrock containing iron- and manganese-bearing minerals.

Man's activities have affected the water quality of streams in much of the area, particularly in the basins of the Hockanum and Park rivers. The degradation of quality in these streams is shown by wide and erratic changes in dissolved-solids concentration, excessive amounts of trace elements, a low dissolved-oxygen content, and abnormally high temperatures. Groundwater within this area is degraded principally by induced infiltration of surface water that contains chemical wastes, by leachate from wastes stored or disposed of on the ground, and by effluents discharged from septic tanks.⁷

The quantity and quality of water are satisfactory for a wide variety of uses, and, with suitable treatment, the water may be used for most purposes. The total

amount of water used in 1968 was more than 100 billion gallons. About 80% of this was used for industrial purposes, and 90% of the industrial water was obtained from surface-water sources. About 85% of the regional population was supplied with water for domestic use by 15 major public and municipal systems and 25 private associations. Analyses of water from the 13 largest systems show generally good quality.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 SEPTIC SYSTEM PROBLEMS

Reportedly, the Portland housing area has had some problems with septic tanks backing up into units #6, 13, and 15. Septic tanks for units #6 and 13 have been pumped out on many occasions in recent years. The backing up of septic systems is a potential health hazard. High water tables in the area may contribute to this problem. A new leach field was installed at unit #6 when the system failed in 1987. However, the problems of sewage backup still persist.

3.2 FORMER UNDERGROUND FUEL-STORAGE TANKS

Each unit has a 275-gallon underground fuel tank still buried in back of the house, but the tanks are no longer in use. The New York District of the Army Corps of Engineers drained and filled them with inert material and had them capped-off in 1987. An above-ground tank currently serves each house (see Sec. 3.3). No documentation was found to indicate failures or suspected leaks in any of the underground tanks. Their replacement was the result of good engineering practice dictated by the advancing ages of the old tanks.

3.3 ABOVE-GROUND FUEL-STORAGE TANKS

The 275-gallon above-ground tanks currently in use have only a primer paint to cover them, and a make-shift shelter attached to the house a few feet above the tanks. This does not offer adequate protection to the tanks against adverse weather conditions. Areas of rust and corrosion were observed on some of the tanks.

It is common practice for the residents of the housing area to leave the spigots open which drain the cement around the above-ground tanks. This is to allow the rainwater which collects in these tanks to drain away. Residents store garbage cans, lawn chairs, and miscellaneous supplies in this trough area. If these spigots are left open routinely, the effectiveness of the cement troughs as spill-containment devices would be compromised. No such incident has occurred, however.

3.4 CHLORDANE CONTAMINATION

Termites have been a reported problem at this site. Exterminators have been brought in to control the problem. Chlordane pesticide is reported to have been used. A reported accidental contamination of housing unit #3 by the exterminator is said to have been remediated. No documentation was found concerning the details of this accidental contamination, or the resolution of this incident; therefore, chlordane contamination cannot be ruled out and further investigation is warranted.

4 KNOWN AND SUSPECTED RELEASES

Releases of contaminants to groundwater are suspected from the failed septic systems at the Portland housing area. The area is known to have a high groundwater table, and it is suspected that the individual leaching fields were constructed very close to the groundwater table. There has been no documentation of groundwater contamination, however. No sampling is known to have taken place in the area.

No documented releases of soil contamination were found during the site visit; however, chlordane is suspected to have been released to the soil around unit #3. No sampling or tests have been reported in the suspected contaminated area. This is of concern since the site is near a playground.

The original underground storage tanks remain buried behind each house and are believed to have been installed with no cathodic protection or other protective coatings. However, no documentation of any tank failures or petroleum contamination could be located.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery, all available documentation and circumstantial evidence indicate the fully independent operation of this housing property from other Nike battery activities. No Nike-related wastes were delivered to this property for management or disposal. Furthermore, since this property was independent of the Nike missile operations with respect to all necessary utilities, there is no possibility of migration of Nike-related wastes along buried utility lines.

Floor tiles which may contain asbestos were used in the original construction of these units. The tiles were found to be in good condition, however.

No records indicate a problem with PCB-related contamination at this site. The local power company maintains the electrical transformers, and no evidence of leaks or spills from the transformers was found during the site visit.

The original underground heating oil tanks installed at each unit are no longer in service but have not been removed. No records were found indicating that any soil tests around these tanks had been made. None of these tanks has cathodic protection or other protective coatings. The topography of the property frequently results in saturated soil conditions which may promote the deterioration of these tanks. However, no documentation of petroleum contaminant releases from these tanks was found, and the method of tank abandonment is generally considered to be acceptable.

Although the above-ground tanks were installed with a cement containment trough around them, the effectiveness of containing a possible oil-spill is compromised with the common practice of leaving the spigots to the troughs left in the open position. These tanks were installed with only a primer paint coating, and this does not allow adequate protection from adverse weather conditions over an extended period of time. Some corrosion was observed.

The possibility of chlordane contamination exists and should be investigated further. Termites have been a problem at this site and it is reported that accidental chlordane contamination by an exterminator occurred in the past and was reportedly remediated, although no documentation or confirmatory sampling results could be located. This chlordane contamination accident needs to be further investigated.

Septic problems have been reported, and the possibility of groundwater contamination exists. This would not pose a long-term environmental threat but potential health hazards. Additional investigations to determine the nature and extent of contamination are warranted.

6 RECOMMENDATIONS

Based on currently available information, the Portland housing facility represents no imminent or substantial threat to human health or the environment. There is no evidence to suggest that Nike-related hazardous or toxic constituents have ever been released from this property. No immediate remedial actions are warranted for this site. Nevertheless, environmental impacts from this property have been identified and some eventual additional investigations are warranted.

The malfunctioning septic systems at two of the units represent a continuing potential for environmental impact and an impediment to the expeditious excessing of this property. Development and implementation of a permanent solution to the sewage treatment problems deserve immediate action. The septic tank failures at housing units #6 and 13 are an ongoing inconvenience and a potential health hazard.

It is recommended that the above-ground tanks be painted with a coating that will offer adequate protection against adverse weather conditions. In connection with the cement troughs surrounding these behind the houses, a way should be found to prevent the trough taps from being left in the open position.

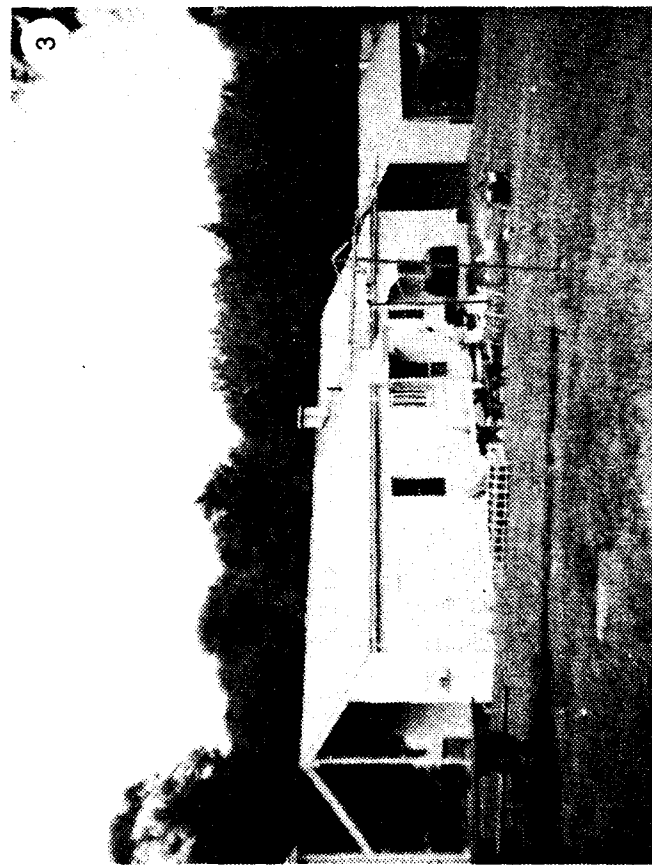
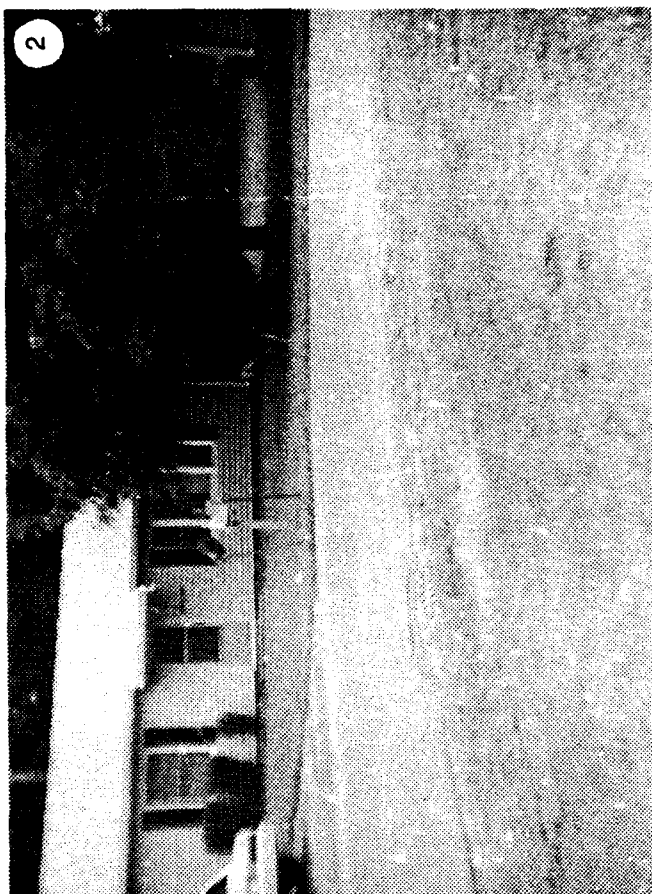
The possibility of chlordane contamination around housing unit #3 must be further investigated. Samples of the soil should be analyzed for chlordane to determine the extent of chlordane contamination.

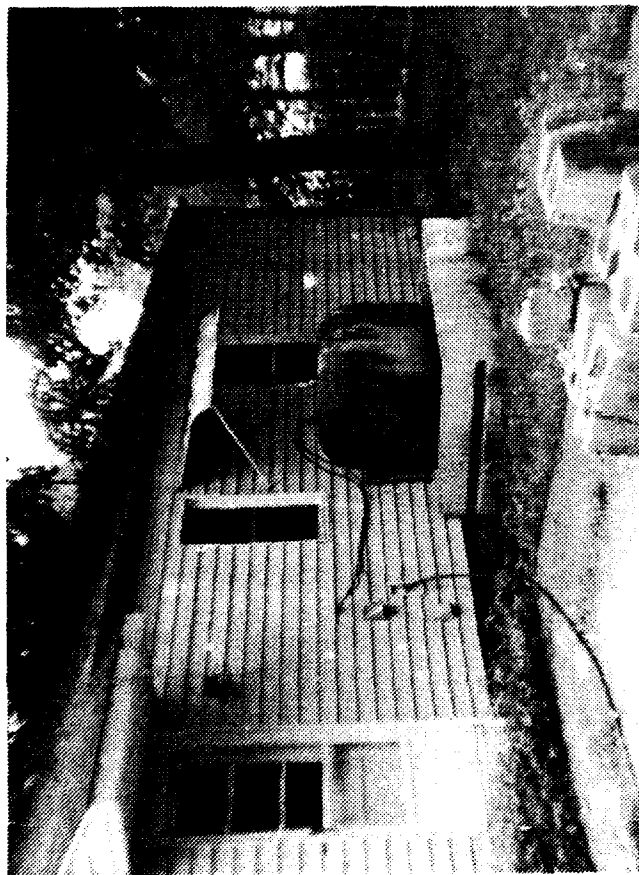
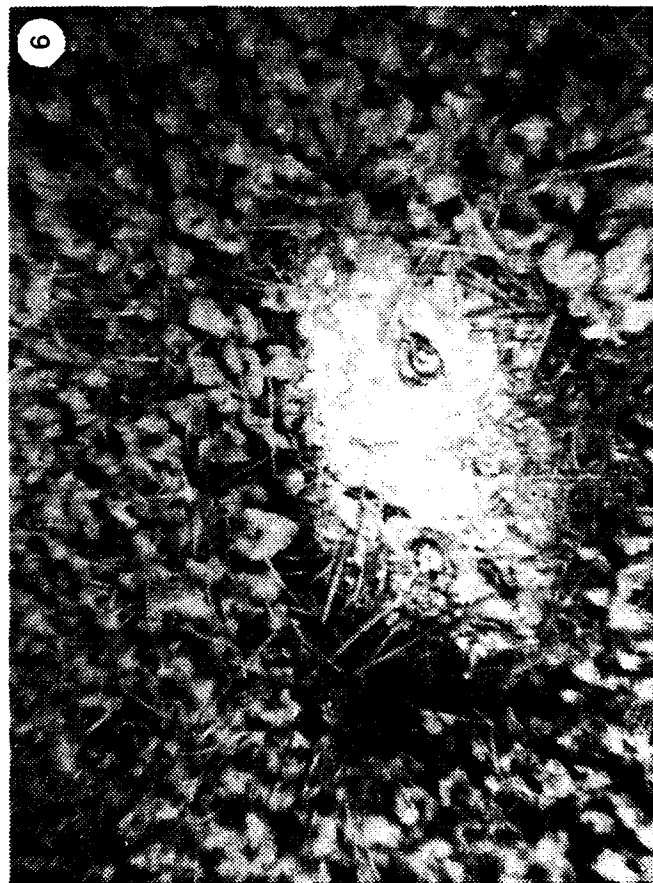
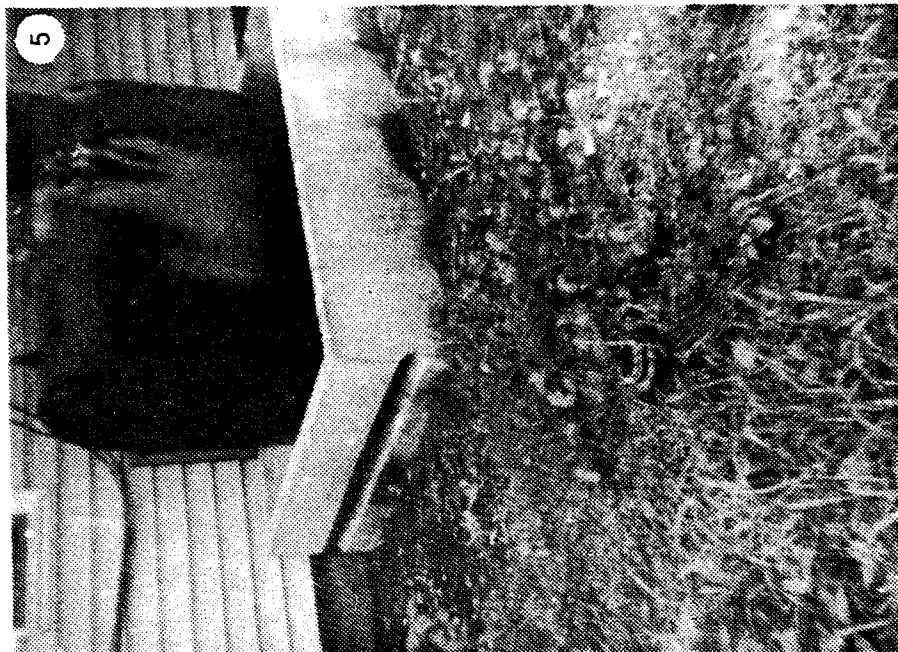
These recommendations assume that this property will most likely continue to be used for residential housing.

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APPENDIX:
PHOTOGRAPHS OF PORTLAND HOUSING FACILITY
AND SURROUNDING LAND





IDENTIFICATIONS OF PHOTOGRAPHS

1. The road leading to the housing area at the site entrance.
2. Front view of a Capehart housing unit. In the foreground, on the street, is a grated lid of the storm sewer system.
3. Rear view of a Capehart housing unit; attached carport at left.
4. Above-ground fuel-oil storage tank, concrete containment box, and overhead canopy to protect the tank, at the rear of a housing unit.
5. A close-up view of the above-ground fuel-oil storage tank and the concrete containment box; in lower center of view is the sealed-off inlet pipe to an underground fuel-oil storage tank; at this housing area, the original underground tanks are no longer in use but remain buried in place.
6. Lids of a septic tank; at this site, sanitary sewage service is provided by means of a septic tank system and individual leaching fields; sewage backup problems occurred at some units in the past.