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U.S. Army Toxic and Hazardous Materials Agency



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Enhanced Preliminary Assessment Report:

Middletown Army Housing Units
Middletown, Connecticut

October 1989

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prepared for

Commander
U.S. Army Toxic and Hazardous Materials Agency
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Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Middletown, 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 Middletown housing area does not present an imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions are warranted for the site. Nevertheless, environmental impacts from this property have been identified, and some remedial actions 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 was 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 property. Furthermore, this housing property existed independently of the missile-launch area and fire-control portions of the battery with respect to utilities, so there is no possibility of missile-related contaminants migrating to this property along buried utility lines.

Approximately two years ago, the New York District of the Army Corps of Engineers replaced the original underground fuel-storage tanks 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 documentation was located indicating that integrity or leak tests were ever performed for these tanks.

Asbestos-containing floor tiles and siding were used in the construction of these housing units. However, these materials are in good condition, and there is no evidence that asbestos is a problem.

Electrical transformers located on the property are maintained by Middletown's power company; there is no evidence that polychlorinated biphenyl (PCB) contamination is a problem.

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

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.

These recommendations assume that the 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 Middletown 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 Middletown, 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 Middletown, 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.

ANL investigators revisited the property on September 11, 1989, at which time the interiors of all but two of the housing units (units #42 and #89, Military Road) were inspected.

2 PROPERTY CHARACTERIZATION

2.1 GENERAL PROPERTY INFORMATION

The Middletown housing units are located in Middletown, Conn., Middlesex County. The entire property is 7.5 acres, with surrounding woodland on its borders.² The Directorate of Engineering and Housing (DEH), located at Fort Devens, Mass., is responsible for general maintenance of these units. The New York District of the Army Corps of Engineers is responsible for all major renovations. Figures 1 and 2 show the general location of the facility. The housing units were developed in 1958.

2.2 DESCRIPTION OF FACILITY

Figure 3 presents the site plan of the housing property.

Housing Units

The Middletown housing area consists of 16 "Capehart"-style houses, each having three bedrooms. 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. Water lines are embedded into the foundation slab, as were the original air conditioning ducts. Heating lines and air conditioning 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 the property's development, the housing units have been supplied with city water; no drinking water wells exist on the property. The property is supplied city power, and all telephone poles and electrical transformers on-site are the responsibility of Middletown's power company. Solid waste (garbage) is collected and removed from the site by a private contractor.

Sewage

The housing units have been connected to city sewers since their construction.

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 renovations and abandoned the underground storage tanks in place, filling them with sand. These tanks are located at the rear of each housing unit. No problems were observed with the above-ground tanks.

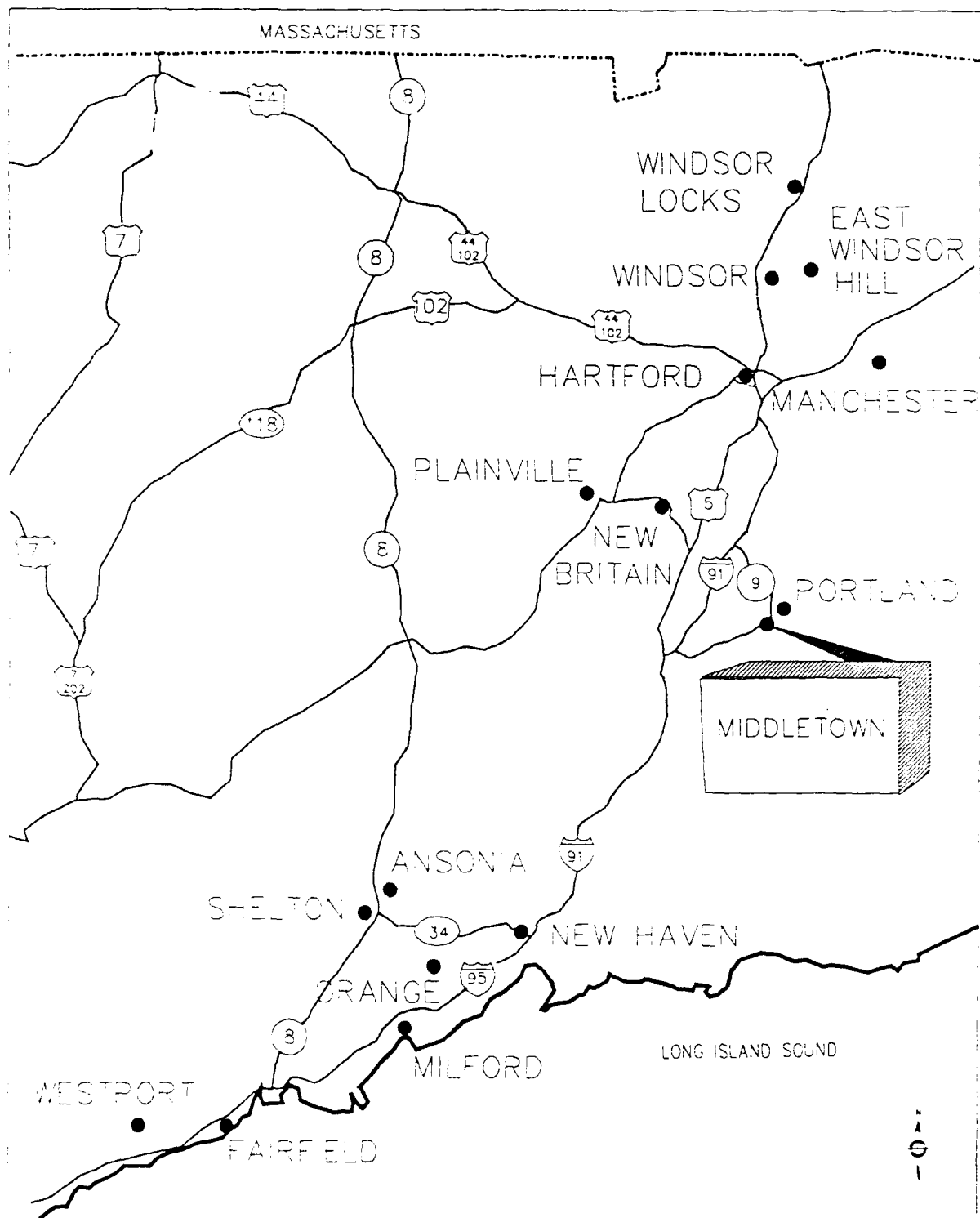


FIGURE 1 Location Map of Connecticut Army Housing Facilities

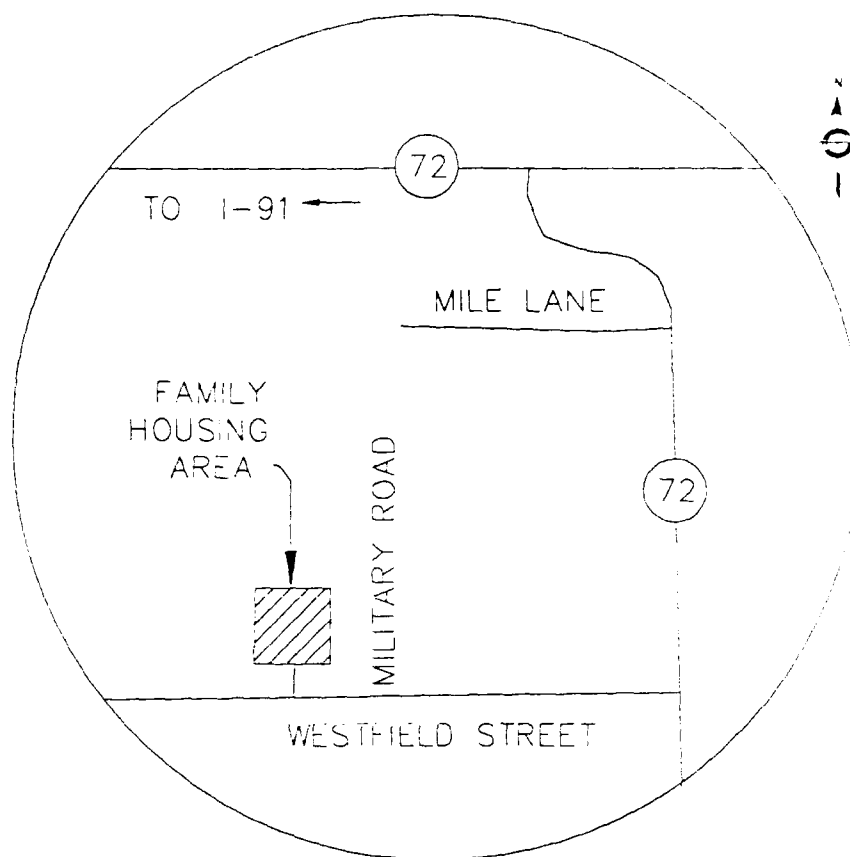


FIGURE 2 Vicinity Map of Middletown Army Housing Units

Storm Drainage Systems

The housing units are connected to city storm drainage.

Other Permanent Structures or Property Improvements

No such structures or improvements exist.

2.3 PROPERTY HISTORY

2.3.1 Nike Defense Program and Typical Battery-Level Practices

Generic information on the national Nike antiaircraft defense program has been compiled in two studies, one commissioned by the Army Corps of Engineers³ and the other by the U.S. Army Toxic and Hazardous Materials Agency.⁴ 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

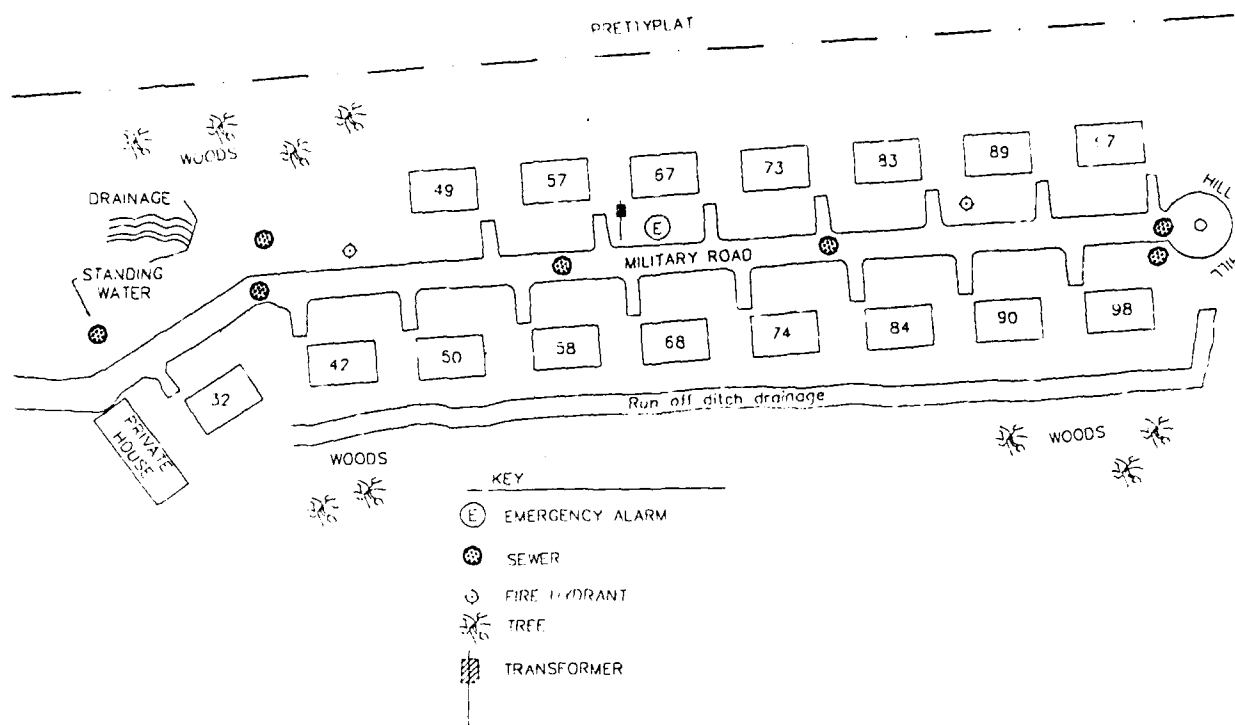


FIGURE 3 Site Plan Map of Middletown Army Housing Units

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 excessed 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 Middletown Housing Units

The Middletown housing area was developed in 1958 as a stand-alone housing facility for military personnel assigned to the Middletown Nike battery. Sixteen single-family houses were erected on the property. Since the decommissioning of the Nike battery in the early 1970s, these units have been used to house other active-duty military personnel.

Since the initial property development in 1958, no other permanent structures have been added. Renovations have taken place; these include construction of sewer lines⁵ and storm-drainage system modifications.⁶

2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE

The Middletown housing area is located within a residential area. It is segregated from the rest of the area by a narrow wooded area. A drainage ditch feeds into a low area where standing water was observed. The town of Middletown has a 1984 population estimate of 39,000.⁷

2.5 GEOLOGIC AND HYDROLOGIC SETTINGS

Middletown is located in the lower Connecticut River Basin of the New England Upland Section of the New England Physiographic Province. The lower Connecticut River Basin area in south-central Connecticut includes 639 square miles and is drained principally by the Connecticut River and seven smaller streams; the seven flow directly to Long Island Sound between the West River on the west and the Connecticut River on the east.

Precipitation averages 47 inches per year and provides an abundant supply of water. About 20 inches of precipitation return annually to the atmosphere as evapotranspiration, and the remainder either flows directly to streams or percolates to the water table. Small quantities of water are exported from the basin by the New Haven and Meriden Water Departments, and small quantities are imported by the New Britain Water Department and Metropolitan District Commission. Precipitation during the period 1931 to 1960 resulted in an average annual runoff of 302 billion gallons. If inflow from the Connecticut River is added to the average annual runoff, then 4,370 billion gallons of water per year is potentially available for use.⁸

The total amount of fresh water used during 1970 was estimated to be 256,000 million gallons, of which 247,000 million gallons were used for cooling water at steam electric-generating plants. Total water used for domestic, commercial, industrial, and agricultural purposes was 9,000 million gallons, which in the region translates to approximately 120 gallons per day per person. Public water systems provide 70% of these requirements. All the systems supplying water have met the drinking water standards of the Connecticut General Assembly.

Stratified drift is the major aquifer capable of large sustained yields of water to individual wells. Yields from 53 inventoried screened wells tapping stratified drift range from 2 to 1,570 gallons per minute (gal/min); median yield is 397 gal/min.

Till is widespread and generally provides only small amounts of water. Wells in till normally yield only a few hundred gallons of water daily and may be inadequate during dry periods. The thickness of till ranges from 9 to 159 feet.

Bedrock aquifers underlie the entire area and include sedimentary and crystalline (igneous and metamorphic) rock types. These aquifers supply small and usually reliable quantities of water to wells and are the chief source of water for many rural homes and farms. About 90% of the wells tapping bedrock yield at least 2 gal/min. The median yields from wells tapping aquifers in sedimentary, igneous, and metamorphic rocks are 112, 8, and 6.5 gal/min, respectively.

The quantity of water potentially available from stratified drift was estimated on the basis of hydraulic characteristics of the aquifers, mathematical modeling of the aquifer system, and evaluation of natural and induced recharge. Long-term yields estimated for 10 areas underlain by significant thicknesses of stratified drift range from 0.4 to 4.4 million gallons per day.⁸

The chemical and physical quality (turbidity, color, taste, and sediment load) of the water is good. The water is generally low in dissolved solids and is classified as soft to hard. Surface water is less mineralized than groundwater, especially during high-flow conditions, when it is primarily derived from surface runoff rather than groundwater runoff. A median dissolved-solids concentration of 42 milligrams per liter (mg/L) and a median hardness of 18 mg/L were determined from water samples collected from 26 streams during the high-flow period. During the low-flow period, a median dissolved-solids concentration of 61 mg/L and a median hardness of 26 mg/L were determined from samples from the same streams.

The quality of water in stratified-drift and crystalline-rock aquifers is generally better than that in the sedimentary-rock aquifers. Water from 32 wells tapping stratified drift and 37 tapping crystalline rock had a median dissolved-solids concentration of 1,126 mg/L; 33 wells tapping stratified drift and 42 tapping crystalline rock had median hardness ratings of 73 mg/L and 68 mg/L, respectively. Water from 32 wells tapping sedimentary rock had a median dissolved-solids concentration and a hardness of 231 and 156 mg/L, respectively. Sedimentary rock generally yields the hardest water.

Iron and manganese occur in objectionable concentrations in certain areas, particularly in water from streams that drain swamps and in water from aquifers that are rich in iron and manganese-bearing minerals or from aquifers where the reducing environment for solution of these minerals is favorable.

Most of the high iron and manganese concentrations in regional streams and aquifers are found east of the Connecticut River.

3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

3.1 FORMER UNDERGROUND FUEL-STORAGE TANKS

Each unit was originally equipped with a 275-gallon underground fuel tank located in back of the house. These tanks are no longer in use. The New York District of the Army Corps of Engineers drained and filled them with inert material (sand) and had them capped-off in 1987. (Above-ground fuel-storage tanks are currently in use.) No documentation was found to indicate failures or suspected leaks at any of the 30-year-old tanks. The changeover to above-ground tanks was apparently a matter of good engineering practice.

3.2 ABOVE-GROUND FUEL-STORAGE TANKS

The above-ground tanks recently installed behind each house have only a primer paint to cover them; a make-shift shelter is attached to each house a few feet above each tank. These measures do not adequately protect 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 that drain the cement troughs around the above-ground tanks. The practice is intended to allow rainwater, which collects in these tanks, to drain away. Residents also store garbage cans, lawn chairs, and miscellaneous supplies in this trough area. Leaving the spigots open routinely compromises the effectiveness of the cement troughs as spill-containment devices. No actual spillover of fuel from containment troughs has occurred, however.

3.3 SEWER LINES

Sanitary sewer lines were replaced in 1988. No documentation of problems with the original sewer lines could be located, however. The renovations were apparently the result of general municipal sewer system upgrading.

3.4 ASBESTOS CONSTRUCTION MATERIALS

Asbestos-containing floor tiles and exterior siding are believed to have been used in the original construction. However, these materials were all found to be in good condition, showing only expected wear and no significant deterioration.

4 KNOWN AND SUSPECTED RELEASES

No major releases to or impacts on the environment have been identified for the Middletown housing area. No hazardous wastes or hazardous materials are stored on-site. The area has been residential in character since original construction of the houses, and no industrial activities are known to have occurred on this property.

Since the original underground storage tanks remain buried behind each house, and were installed with no cathodic protection or other protective coatings, it is possible that oil leakage might have contaminated some soil at this property, although no such releases have been documented.

5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although these housing units were originally developed in support of a Nike missile battery, all available documentation and circumstantial evidence suggest the fully independent operation of this housing property from other Nike battery activities. No Nike-related wastes were delivered to the area 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 missile-related wastes migrating to the area along buried utility lines.

No problems were found involving asbestos-containing materials. Floor tiles, which may contain asbestos, were in good condition.

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

The original underground heating oil tanks installed at each unit are no longer in service, but they have not been removed. No records were found indicating that any leak tests or soil tests have been conducted around these tanks. None of these tanks is believed to have had cathodic protection or other protective coatings. Furthermore, the topography of the property frequently results in saturated soil conditions, which may have promoted corrosion of the tanks. No leaks or releases were found or suspected, however, and the method used to abandon the tanks 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 by the common practice of leaving the spigots to the troughs in the open position. The tanks were installed with only a primer paint coating, and primer does not adequately protect them against adverse weather conditions over an extended period of time. Some corrosion was observed.

6 RECOMMENDATIONS

The Middletown housing facility does not represent an imminent or substantial threat to human health or the environment. There is no evidence to suggest that hazardous or toxic constituents have ever been released from this property. No immediate remedial actions are warranted for this site.

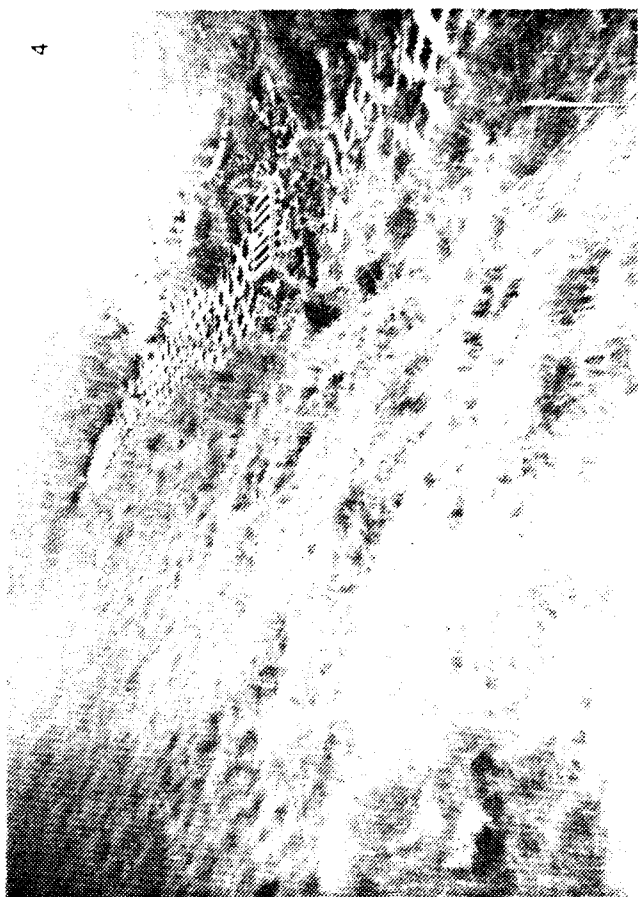
One potential environmental impact derives from the continued use of the inadequately protected above-ground fuel-oil storage tanks and their associated concrete containment boxes. The integrity of these relatively new storage tanks should be confirmed, and, following treatment for existing rust, protective coatings should be applied to the exteriors of the tanks. With respect to containment-box drainage taps, a method should be devised to ensure that they do not remain in the open position for extended periods of time.

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

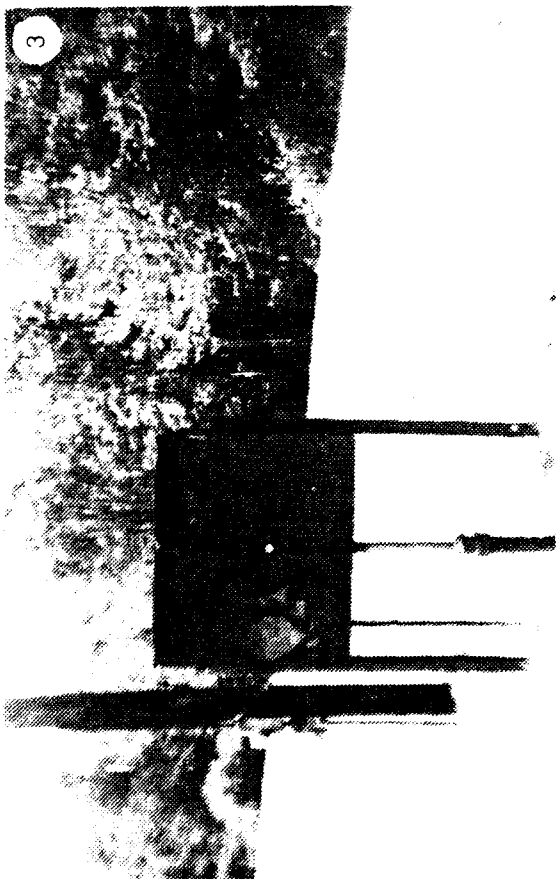
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APPENDIX:
PHOTOGRAPHS OF MIDDLETOWN HOUSING FACILITY
AND SURROUNDING LAND



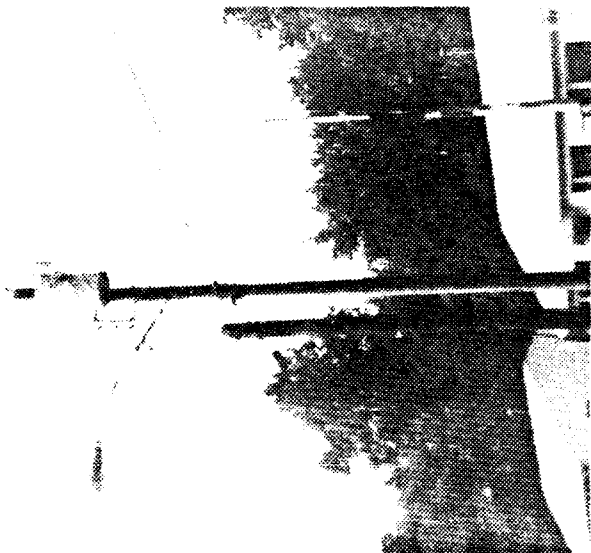
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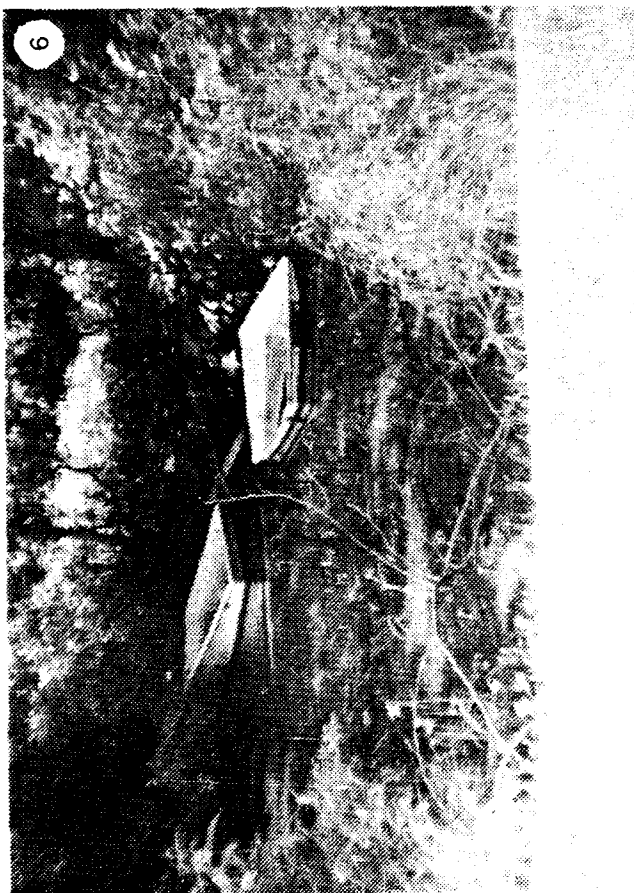
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IDENTIFICATIONS OF PHOTOGRAPHS

1. The road leading to the housing area, at the site entrance.
2. Electrical transformer mounted at the top of a utility pole; transformers at this site are maintained by the Middletown Power Company.
3. Control box for the old pumping station.
4. Drainage ditch for surface water runoff.
5. Stagnant water in a drainage ditch.
6. Both refuse and stagnant water can be seen in this drainage ditch.
7. A puddle of water near the entrance to the housing area.