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# USATHAMA

U.S. Army Toxic and Hazardous Materials Agency

## Enhanced Preliminary Assessment Report:

### Elrama Army Housing Units Elrama, Pennsylvania



October 1989

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prepared for

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<p>Argonne National Laboratory has conducted an enhanced preliminary assessment of the Army housing property located in Elrama, PA. 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.</p>			
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## SUMMARY

The Elrama Army housing area located in Elrama, Pa., represents no imminent or substantial threat to human health or the environment. It was developed in 1959 as part of the Nike missile anti-aircraft defense program. Although the facility was affiliated with and is adjacent to former Nike operations, it has always been used strictly for housing military personnel, with no industrial-type activities ever performed on-site.

No problems associated with the collection and disposal of solid wastes (garbage) for the facility have been reported. No sewage problems were found to be documented for the housing area, which includes an on-site sewage-treatment plant that has been used by the housing units. However, because of past malfunctions and because of the current modified operation of the treatment plant, some investigations for adverse environmental impacts are appropriate.

Prior to release of this property, the following action is recommended:

- Sample and analyze soils in the area of the sewage-treatment plant to identify possible contamination.

This recommendation is based on the assumption 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 Elrama housing area addressed in this preliminary assessment.<sup>1</sup>

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 Elrama, Pa.

### 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 the Charles E. Kelly Support Facility, Directorate of Engineering and Housing (DEH) Office, Building S-630052, Oakdale, Pa. A site visit was conducted at Elrama, Pa., on July 18, 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 obtained through the senior occupant at the facility. In addition, ANL investigators revisited the property on September 12, 1989, at which time the interiors of all of the units were inspected.

## 2 PROPERTY CHARACTERIZATION

### 2.1 GENERAL PROPERTY INFORMATION

The Elrama housing area is located in the easterly part of the village of Elrama, Washington County, Pa., about 25 miles south of Pittsburgh. The area consists of 16 houses (five with one set of dimensions and 11 with another set), and it occupies 14.18 acres in fee plus 0.25 acre in easements. It is situated on the side of a steep slope. No water wells exist on the property; each house is supplied with city water (Western Pennsylvania Water Co.). The sanitary disposal is served by an on-site sewer network, which connects each house through a main line to an on-site sewage treatment plant located at the northern side of the property. The sewage treatment plant is designed as a trickle-down type.

The housing area is located on a cul-de-sac road connected with Coal Bluff and Gilmore roads. The village of Elrama had an estimated population of 800 in 1986.<sup>2</sup> The village lies between Bethel and Monessen and is served by Routes 51 and 88, and Dravosburg Road.<sup>2</sup>

The 16 houses of the facility line both sides of the cul-de-sac road. They were built in 1959,<sup>3,4</sup> and no additional major construction has taken place since that time. The DEH at the Charles E. Kelly Support Facility is responsible for routine maintenance and major renovations or upgrading the facility. Some renovations inside and outside of the houses took place in 1973 and 1984 (see Sec. 2.3.2).

Figures 1 and 2 show the general location of the facility.

### 2.2 DESCRIPTION OF THE FACILITY

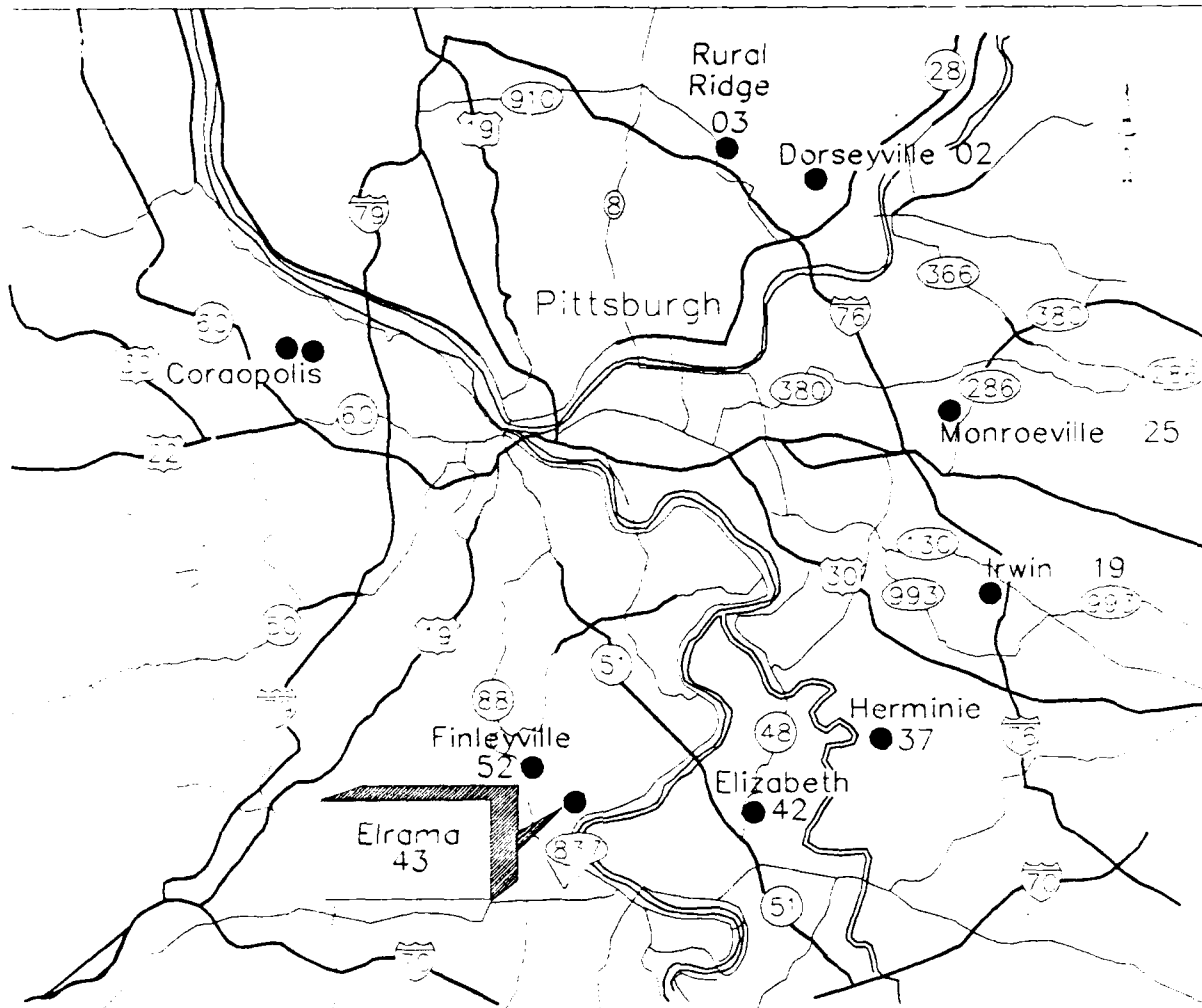
Figure 3 presents the site plan of the housing property.

#### Housing Units

Each of the 16 houses of the facility (see appended photographs) is a "Capehart"-style single-family unit consisting of three bedrooms, a family area, and an exterior storage room. Five of the houses (units #85-89) are of one type (1286.66 ft<sup>2</sup>), and the other 11 of another type (1171.27 ft<sup>2</sup>).<sup>4</sup> The houses are built on concrete slabs, with no structures underground, and their floors are covered with tile that may contain asbestos. Inside walls are covered with plywood over sheetrock panels; outside walls are covered with shake shingles over Celotex. The roofs of the houses are made of asphalt shingles on wood sheathing. A driveway and a pathway connect each house with the road.

#### Utilities

No water wells exist on the property; each house is supplied with city water (Western Pennsylvania Water Co., Pittsburgh Suburban District). Other utility

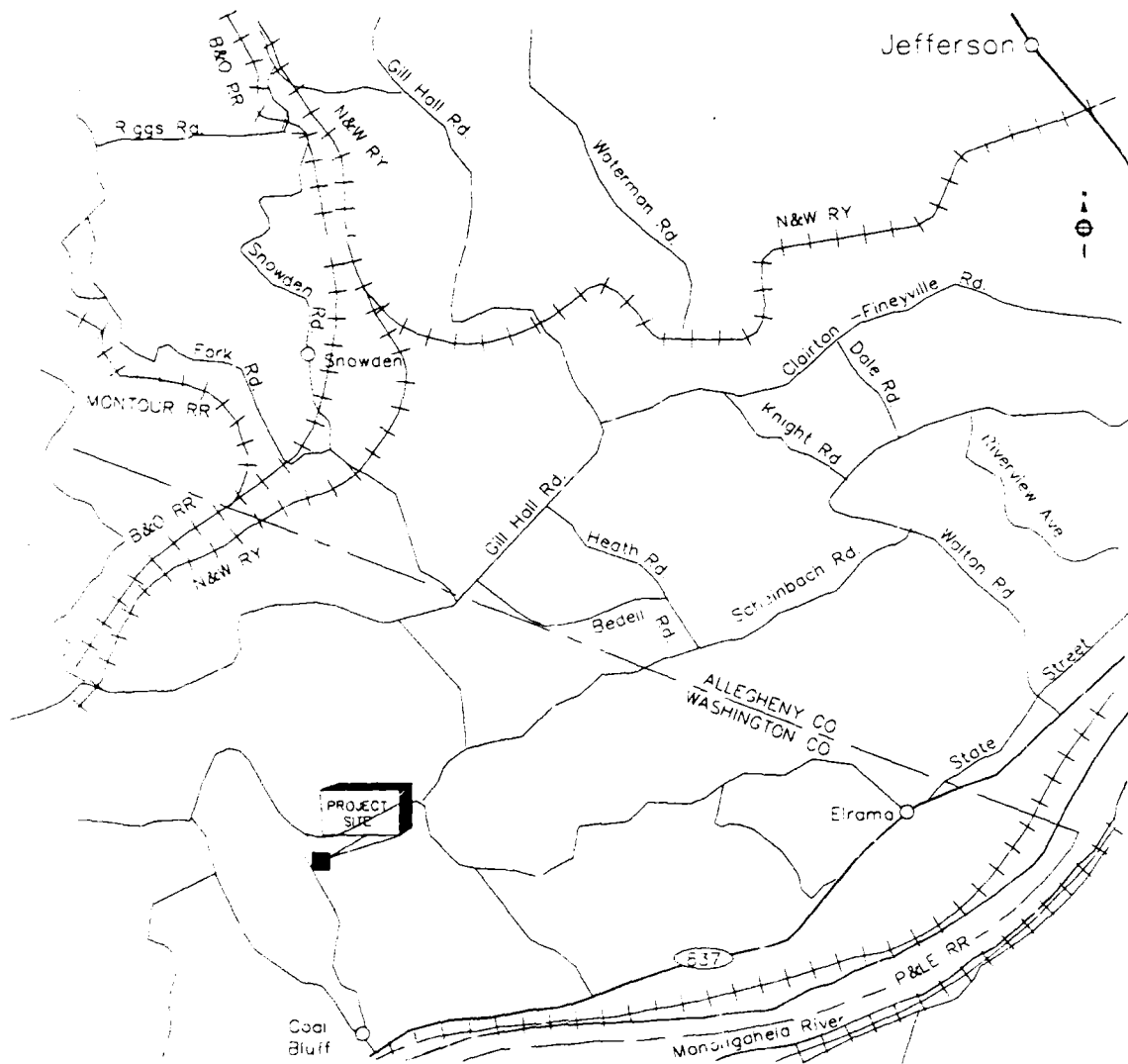


**FIGURE 1 Location Map of Pennsylvania Army Housing Facilities**

connections are electric power (West Pennsylvania Power Co.), gas service (Equitable Gas Co., Finleyville, Pa.), and telephone lines. All electric power, gas, and telephone installations outside the houses are the responsibility of the companies providing the services. There are seven street lights and two hydrants in the property. The hydrants are located at the front of housing units #88 and 94. The water, gas, and sewer lines are located under the front yards of the houses; the electric power and telephone lines run overhead in front of the houses. A gas line (Equitable Gas Co.) runs along the southwest, south, and southeast borders outside of the property.

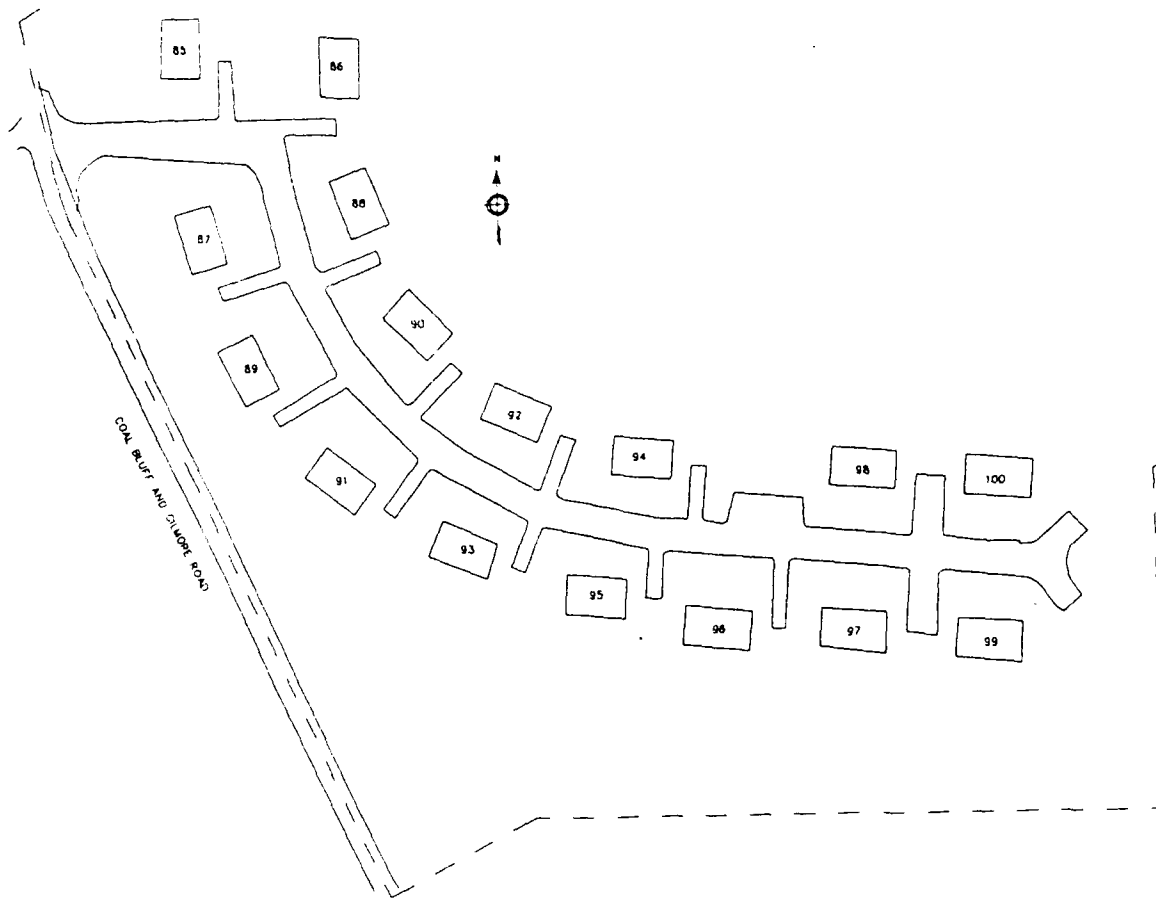
#### **Sewage**

The sanitary disposal is provided by an on-site sewer network that connects each house through a main line to the on-site sewage treatment plant located at the northern



**FIGURE 2 Vicinity Map of Elrama Army Housing Units**

side of the property. The main sewer line starts from a clean-out hole (located in the front yard of unit #100). The line runs straight west to the first manhole (located at the front yard between housing units #91 and 93), then to a second manhole (located at the east side of unit #85), and finally northeastward to the treatment plant.<sup>5</sup> The sewage treatment plant is of the trickle-down type, located down a slope at the northern part of the area. This sewage treatment facility has always served only the housing area. No wastes from the operating areas of the Nike battery were ever delivered to this plant for treatment. Up until recently, about 5,000 gallons per day of wastewater were released from the plant into the neighboring Peter's Creek after being treated in a trickling-filter system equipped with an Imhoff tank. At present, the trickling-filter apparatus is not functional. However, wastes are still being discharged to Peter's Creek after passage through the filter media and after chlorination. A sewage odor is present. This



**FIGURE 3 Site Plan Map of Elrama Army Housing Units**

system will be discontinued by late 1989, when the sewer network of the housing area will be connected to the Finleyville city system (Peter's Creek Sanitary Authority).<sup>6</sup>

Municipal solid waste (garbage) for the facility is picked up by a local contractor (Edmond's Trucking Co.) and disposed of off-site. No problems associated with the collection and disposal of solid wastes have ever been recorded.

### **Heating System**

The houses are heated by forced hot-air furnaces. For both heating and cooking purposes, the houses are provided with natural gas from Equitable Gas Co. A gas meter enclosure is located at the left side of the entrance to the cul-de-sac road.

### **Storm Drainage System**

The area is drained by open ditches, surface run-off, and a storm sewer system. The storm system is divided into three subsystems; one serves units #94-100. A second serves units #88-93. A third serves units #85-87. All three subsystems use a 12-inch pipe.<sup>5</sup>

### **Other Permanent Structures or Property Improvements**

Since the development of the property and the construction of the houses, no other permanent structures were built in the area.

## **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 Engineers<sup>7</sup> and the other by the U.S. Army Toxic and Hazardous Materials Agency.<sup>8</sup> 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 Elrama Housing Units**

The Elrama housing units were built in 1959 to provide stand-alone housing for military personnel stationed at the Elrama Nike battery. The battery was phased out in the early 1970s, and the facility has been used since then for housing active-duty military personnel and their families in the Greater Pittsburgh Area. During the original

construction of the houses, other property improvements included the construction of the road, driveways, sidewalks, storm and sanitary sewers.

Despite its affiliation with the Elrama Nike missile battery, this housing area has always been independent of the Nike battery with respect to electrical, water, and sewer utilities. Furthermore, no Nike missile-related wastes have ever been delivered to this housing area for management or disposal.

Since the initial property development in 1959, no other structures have been built. The roofs of each house were replaced in 1973, and the sidings were painted in 1984. At the east side of the property is a playground (120 ft x 90 ft), which is well maintained and contains standard play equipment.

#### **2.4 ENVIRONMENTAL SETTING AND SURROUNDING LAND USE**

The Elrama housing area is situated about two miles from the Monongahela River, in hilly land drained through groundwater and tributary streams into Peter's Creek, which neighbors the housing area. The surrounding land is wooded, with much underbrush coverage. In the southern part of the area is a hill-like elevation of 1,186 feet mean sea level, with smooth slopes. The property is in a rural setting, with many existing farms, scattered farm houses, and a slowly growing number of nonfarm residences.

#### **2.5 GEOLOGIC AND HYDROLOGIC SETTINGS**

The Elrama housing area lies within the Appalachian Plateaus Physiographic Province.<sup>9</sup> Rock types are primarily sandstones and shales that contain thin beds of coal. The rocks are divided into ten stratigraphic units. From youngest to oldest, these units are the Dunkard Group of Permian and Pennsylvanian age; the Monongahela, Conemaugh, and Allegheny groups, and the Kanawha Formation of Pennsylvanian age; the Greenbrier Limestone and Pocono Group of Mississippian age; and the Hampshire, Chemung, and Brallier Formations of Devonian age. Coal beds are numerous in the Pennsylvanian system. The Allegheny and the Monongahela groups have 12 feet and 3 feet, respectively, of workable coal. The Conemaugh Group has only thin beds of coal, which are generally not workable. The Pennsylvanian system accounts for approximately 75% of the rock units present in the Elrama geographic area.

Soils in the Monongahela River Basin are grouped into 35 associations composed of combinations of 31 major soils. Soils in the Elrama area are composed mainly of the Guernesey-Culleoka association and are formed in unconsolidated water-sorted alluvial materials. Soil pH values range from highly acidic to neutral. Terrain slopes range from 3 to 35%. Distances to bedrock on the surrounding hillsides are expected to be slightly greater (4-5 feet average). (It is important to note that these conclusions are extrapolated from general area soil characteristics and not the result of site-specific studies or information.)

Quaternary deposits consist of alluvium overlying bedrocks in most places along stream valleys. The alluvium is generally permeable and, when saturated, yields moderate to large supplies of water. Groundwater in bedrock occurs largely in secondary openings such as joint planes or solution openings. The Conemaugh Group crops out in the extreme northern part of the county and along some stream valleys and is the source of moderate supplies of groundwater.

The Monongahela River and its tributaries cut valleys below the water table of the interstream areas. Under this condition, the aquifers discharge on the slopes of the valleys in the form of hillside springs and seeps. Conversely, during high stream-flow conditions, surface streams will recharge aquifers. Surface water flow characteristics within the Monongahela Basin largely depend on topography. Average annual runoff in Subbasin 19 ranges from 14 to 28 inches and is primarily influenced by precipitation distribution; however, land use, land cover, and geologic factors also exert some influence.<sup>10</sup> Flows in most valley streams are seasonably variable. Most streams are found in the valley floors, although, under certain hydrologic conditions, groundwater will discharge to the surface by means of hillside streams and seeps.

### 3 ENVIRONMENTALLY SIGNIFICANT OPERATIONS

The sewage treatment plant located on the northeast side of the property consists of a bar screen, an Imhoff tank, a trickling filter, a secondary settling tank, a sludge drying bed, and a chlorine-contact tank. As an average, it has treated 5,000 gallons of sanitary waste per day. The chlorine-treated wastewater is released into Peter's Creek. Currently, the plant is not operated at its full technical capacity, but the wastes are still being chlorinated. It is expected that by the end of 1989, the sewage treatment plant will be abandoned and the houses will be connected to the city system of Finleyville (Peter's Creek Sanitary Authority).

No sewage problems were found to be documented for the housing facility. During the visit of the property by ANL investigators, an odor was noted coming from the sewage treatment plant.

Inspections of the interiors of the units revealed that there was no insulation whatsoever on water pipes.

#### 4 KNOWN AND SUSPECTED RELEASES

Besides the chlorine-treated waste water released into Peter's Creek, no other releases are known to have occurred at the facility and its surrounding area. No hazardous materials or wastes have been recorded on-site, and no evidence of contamination from housing activities has been documented.

## 5 PRELIMINARY ASSESSMENT CONCLUSIONS

Although this housing area was originally developed as part of a Nike missile battery, all available documentation and circumstantial evidence support the conclusion that it was fully independent from Nike operational areas. 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.

The sewage treatment plant has not been operating correctly. Temporary modifications to operating procedures have been made to allow its continued interim operation. However, decisions have been made to abandon the treatment plant by late 1989 and connect the housing units to the municipal sewer system. In light of this planned abandonment, no modifications or upgrades to the plant are necessary at this time.

The floor tiles of the housing units may contain asbestos. However, all floor tiles inspected were in good condition. No other asbestos-containing materials could be found.

## 6 RECOMMENDATIONS

The Elrama housing facility does not represent any imminent or substantial threat to human health or the environment. There is no evidence that hazardous or toxic contaminants have ever been released from this property. No immediate remedial actions are warranted for this facility. Nevertheless, environmental impacts from this property are suspected, and some actions are warranted.

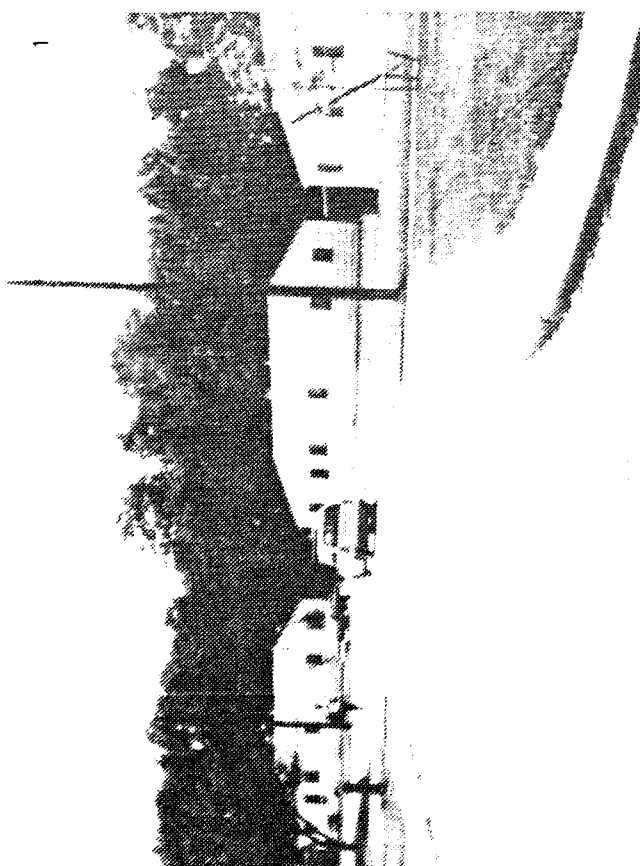
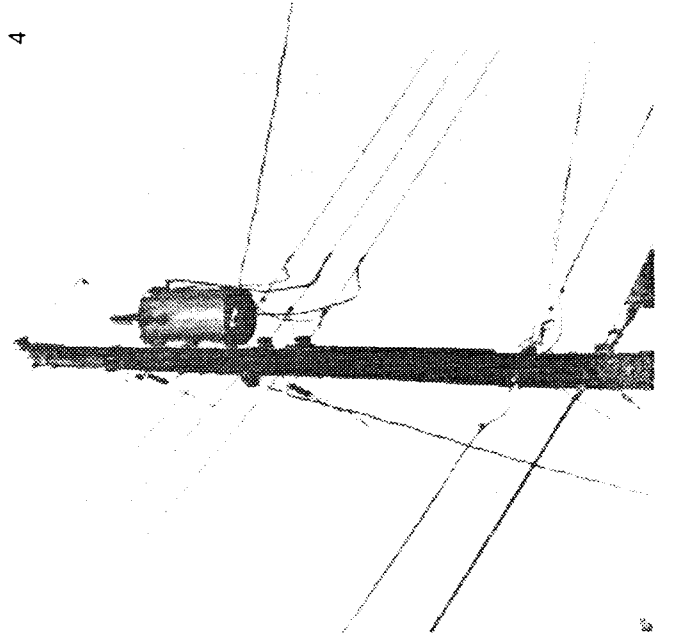
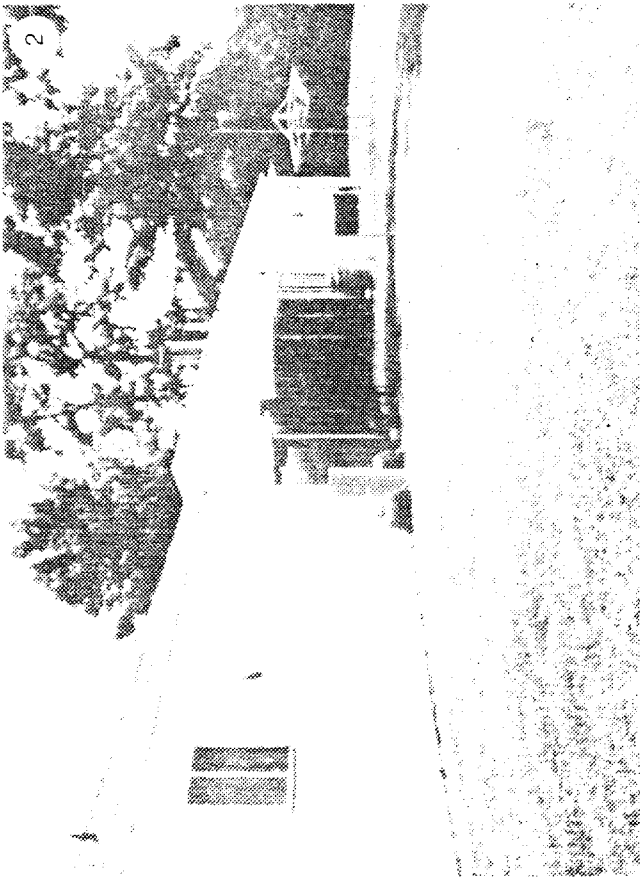
There is no analytical documentation of adverse environmental impacts from the on-site sewage-treatment plant. However, because the plant has malfunctioned in the past, and because the plant is not now being operated at its full design capability, sampling of soils and filtering media is recommended to confirm the absence of adverse impacts.

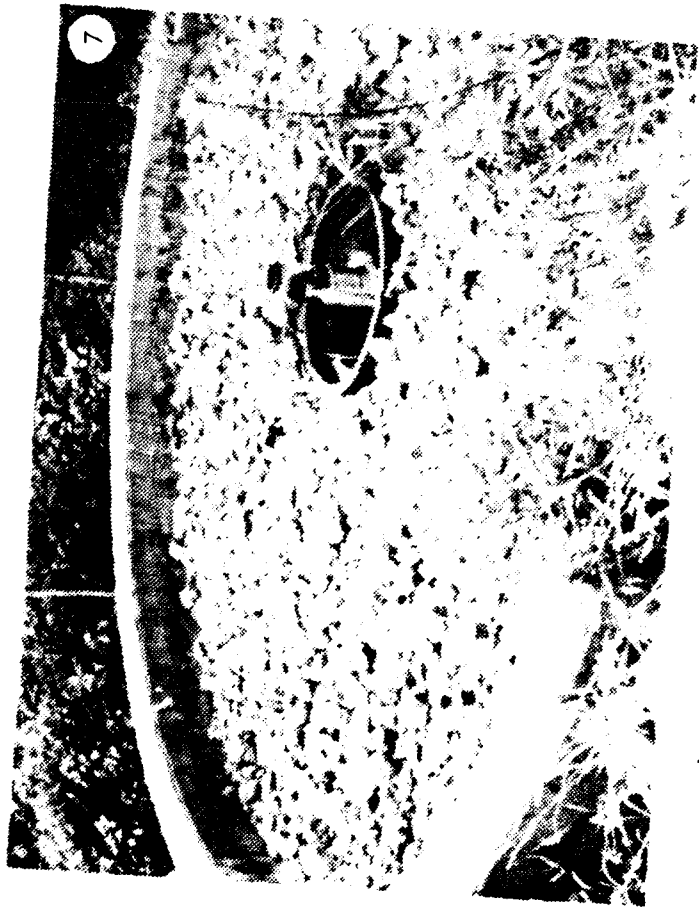
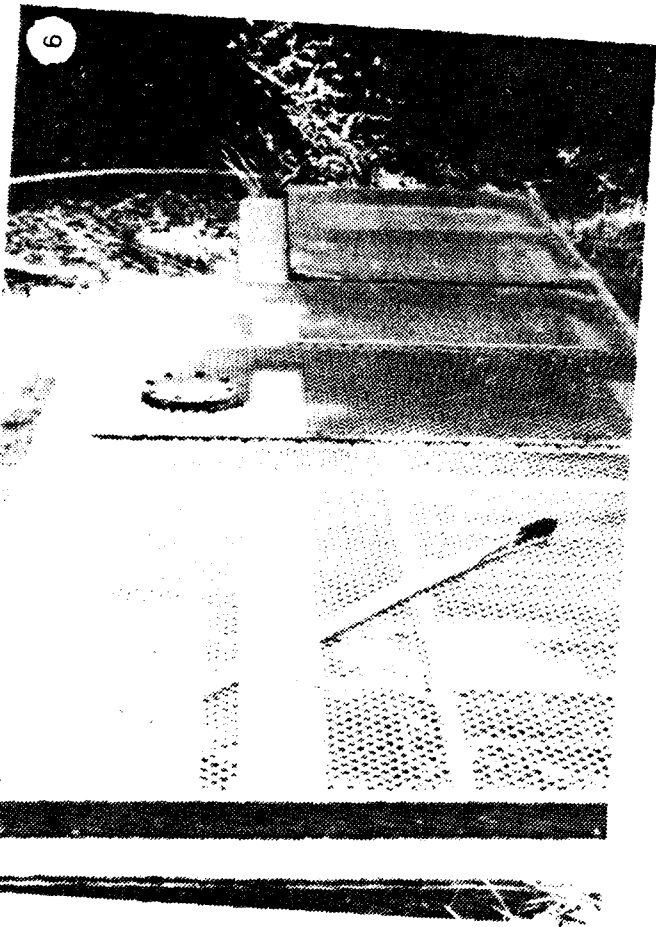
This recommendation assumes that this property will most likely continue to be used for residential housing.

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10. *State Water Plan, Subbasin 19 Monongahela River*, Office of Resources Management, Bureau of Resources Programming (DCN 42530RM154) (July 1982).

**APPENDIX:**  
**PHOTOGRAPHS OF ELRAMA HOUSING FACILITY**  
**AND SURROUNDING LAND**





**IDENTIFICATIONS OF PHOTOGRAPHS**

1. A front view of the housing units (southeast direction).
2. Rear area of two housing units.
3. Playground at the housing area.
4. Electrical transformer at top of a utility pole; transformers are the responsibility of the Western Pennsylvania Power Company.
5. Sanitary-sewage treatment building, containing the chlorination unit for wastewater treatment; future plan calls for replacing on-site treatment with services of the township sewage system.
6. The sewage separation system.
7. Rock bed of the trickle filter system for treating sewage.