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REPORT

Phase I Environmental Site Assessment

Herron Farm Site
178, 180, 183 Zeitler Road
Elkton, Cecil County, Maryland 21922

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ERM Project No.: 0025137

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1.0 INTRODUCTION

1.1 PURPOSE

Environmental Resources Management, Inc. (ERM) has completed a Phase I Environmental Site Assessment (ESA) of the subject property identified as parcels 21 and 23 on Cecil County Tax Map No. 26 located on the north and south sides of Zeitler Road, west of Blue Ball Road (the "subject property" or "site"). The subject property does not include the 400 feet by approximately 3,000 feet buffer set back from the original parcel's circular boundary to the south.

The site visit for this Phase I ESA report was conducted on 8 February 2005 by Mr. Thomas Weissinger, Mr. Leonard Rafalko and Ms. Robin Guynn of ERM's Annapolis, Maryland office. ERM was accompanied during the site visit by Mr. Matthew Morgan of Herron 393, LLC (Herron 393) and Mr. Alex M. Cox of the Maryland Department of the Environment (MDE). The Phase I assessment was conducted to assess whether any *recognized environmental conditions*[1] exist at the subject property.

This report presents the results of a Phase I ESA for the subject property. It was conducted in accordance with the American Society for Testing and Materials (ASTM) Standard E 1527-00 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The project was conducted on behalf of Herron 393 to identify possible environmental liabilities or other related concerns associated with the subject property. The purpose of the Phase I ESA is as follows:

- To identify obvious areas or potential sources of environmental concern that might exist at the site;
- To assess to what extent these concerns are likely to impact the site; and
- To present a report of findings that will assist Herron 393 in assessing the need for further investigations or analytical work that may be

[1] The term recognized environmental conditions is defined in ASTM E1527-00 as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

required to more definitively determine the presence and extent of any detected or suspected concerns.

1.2 *SCOPE OF WORK*

The Phase I ESA was conducted in conformance with the scope and limitations of ASTM Standard E 1527-00 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. The scope of services included the following tasks:

- An on-site reconnaissance of the property to identify *recognized environmental conditions*;
- Observation, to the extent possible, from the subject property and adjacent properties, of land use and apparent *recognized environmental conditions*;
- A review of readily available environmental agency databases provided by Environmental Data Resources, Inc. (EDR);
- A review of readily available files and aerial photographs from MDE associated with the history of the property as a formerly used defense site (FUDS); and
- Interviews with persons knowledgeable about the property history and facility operations.

1.3 *METHODOLOGIES AND LIMITING CONDITIONS*

The site investigation was conducted on 8 February 2005 by Mr. Thomas Weissinger, Mr. Leonard Rafalko and Ms. Robin Guynn of ERM's Annapolis, Maryland office. The weather at the time of the site visit was mostly cloudy with an approximate temperature of 40°F. Although not considered to substantively affect the report conclusions, conditions encountered during this Phase I ESA that affected the site review include:

- heavy vegetation and overgrowth at certain locations of the property;
- deteriorated/razed state of structures;
- walking restrictions in the vicinity of Fischer Lane (i.e. walking in areas off the road were prohibited);
- snow cover of approximately one to eight inches on portions of the site; and

- lack of availability of historical aerial photograph coverage for western portions of the site (1947, 1957, 1969, and 1990) and northern portions of the site (1952 and 1969). MDE, who provided the aerial photographs, indicated that the photographs covering the additional portions of the subject site could not be readily accessed.

Mr. Matthew Morgan of Herron 393, LLC and Mr. Alex Cox of MDE provided a tour of the accessible areas of the subject property. The restrictions mentioned above refer to the fact that there are alleged to be unexploded ordinance (UXO) at the ground surface to the east and west of Fischer Lane in the vicinity of what is referred to as Unit 2 and 3. For health and safety reasons, ERM did not walk across these areas.

2.0 SITE DESCRIPTION

2.1 LOCATION

The subject property is approximately 393 acres in size and is located on the north and south sides of Zeitler Road to the west of Blue Ball Road in Cecil County, Maryland. The only public access to the site may be achieved by Zeitler Road, as it transects virtually the entire property.

A site location map is presented as Figure 1. A site layout identifying various features of the subject property is included as Figure 2. A large-scale, site-specific topographic map showing the subject property is included as Appendix A. Photographs of the subject property are presented in Appendix B.

2.2 CURRENT USE OF THE PROPERTY

The subject property is currently owned by Marva Limited Partnership of Orlando, Florida. The subject property is presently a farm with tillable fields currently rented to a local farmer. The property includes three buildings rented to tenants (the main residence, the secondary residence, and the former milk house) and various unused farm structures that are deteriorated to a state of disrepair. The residences and farm structures are all identified on Figure 2.

Portions of the property have been identified as FUDS, and although still farmed, they are under active environmental investigation by MDE and EPA. This investigation has identified four "units" of potential concern, all identified on Figure 2. The unit descriptions, referenced as such through this Phase I, are provided below:

- Unit 1 – Former waste storage area in farming structures.. This unit was closed by EPA during a removal action in the early 1990s;
- Unit 2 – Former "firehole" for waste burning;
- Unit 3 – Former Thiokol Motor Recovery Area (TMRA) where rocket motors were cleaned and combusted; and
- Unit 4 – Area upgradient of the former GE Railcar Site.

2.3 SITE AND VICINITY CHARACTERISTICS

2.3.1 Physical Setting

The subject site is comprised of a 393-acre parcel situated just north of the Triumph Industrial Park in a rural portion of Cecil County, Maryland. Blue Ball Road abuts the property on the east. On the north, south, and west the property is abutted by a mix of fields, woods, and residences.

For ease of reference, ERM has segregated the subject property into different geographical areas as follows. Zeitler Road transects the subject property from east to west creating a northern portion and a southern portion. Laurel Run and Little Elk Creek transect the property from north to south dividing the subject property into thirds: a western, central, and eastern portion. Accordingly, these six portions are labeled on Figure 2 as north-western, north-central, north-eastern, south-western, south-central, and south-eastern.

The north-eastern portion of the property is predominantly woodlands with Gravelly Run flowing from east to west, along Zeitler Road, and into Little Elk Creek. The woodlands in this area are flat, and low-lying. A private residence borders the northern boundary of the this area of the site.

The south-eastern portion of the property is a large farm field, and comprised FUDs Unit 4. The southeastern corner of the field is a hill, which is also farmed. There is a terrace approximately one third up the hill for drainage control. The southern property boundary of this portion follows a ravine in the woods, which has a seasonal stream.

The north-central portion of the property, between Little Elk Creek and Laurel Run, north of Zeitler Road, is predominantly a farm field. A driveway passes through this portion, providing access to some of the residences and farming structures of the property, along with access to some off-site residences to the north.

The south-central portion of the property consists of all farm fields with the secondary residence and some farming structures along Zeitler Road. FUDs Unit 2 and Unit 3 are located on the western side of the south-central portion of the property. Fischer Lane, a gravel road, heads south from Zeitler Road providing access first to Unit 2, and then to Unit 3 at the southern end of the road. Although the farm fields encompass almost the entire area between Zeitler Road and the confluence of Laurel Run with Little Elk Creek to the south, the southern boundary of the subject property in this portion will now run approximately east-west just south of the abandoned Unit 3 site

(providing additional buffer distance radially from the nearest ATK-Thiokol rocket testing location).

The north-western portion of the property consists of a farm field and a wooded section. Zeitler Road also turns north and then east in this section, providing access to an off-site residential property to the north.

The south-western portion of the property consists entirely of woodlands. The land increases in elevation to the west up a hillside that parallels Laurel Run.

The elevation of the site varies. The central portions between Laurel Run and Little Elk Creek and the north-eastern portion are relatively flat with an elevation of 50 – 60 feet above mean sea level. The portions west of Laurel Run increase in elevation from 50 feet at Laurel Run to 125 feet at the western property boundary. The south-eastern portion increases in elevation from 50 feet at the Little Elk Creek to 125 feet at the eastern property boundary.

The adjacent properties to the north, east and west are generally higher in elevation than the subject property. The adjacent properties to the south are generally situated at lower elevations than the subject property.

2.3.2 *Hydrologic and Geologic Information*

2.3.2.1 *Surface Water*

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Three streams are present on-site. Gravelly Run is located on the north-eastern portion of the property and runs west until it joins Little Elk Creek. From there, Little Elk Creek flows southwest to its confluence with Laurel Run. Laurel Run flows from north to south on the western portion of the property. Gravelly Run and Laurel Run both discharge to Little Elk Creek, which flows south into Big Elk Creek and eventually to the Chesapeake Bay.

Laurel Run and Little Elk Creek are perennial freshwater streams and Laurel Run is classified as a fishery. The confluence of Laurel Run and Little Elk Creek (south of the subject property) is classified as a Palustrine Aquatic Bed wetland.

As detailed in the map in the EDR report (see Appendix C), portions of the subject property are located in a Federal Emergency Management Agency (FEMA) flood zone. The flood zones are predominantly adjacent to Laurel Run, Gravelly Run, and Little Elk Creek. However, the zone extends across a large portion of the south-central portion of the property, between Laurel Run and Little Elk Creek, as well as much of the north-eastern portion between Gravelly Run and Little Elk Creek.

The EDR report also indicates that the subject property contains wetlands registered in the National Wetlands Inventory. These wetlands are located in the north-eastern and north-central portions of the subject property, on both sides of Little Elk Creek in the flood plain.

2.3.2.2 *Geology and Hydrogeology*

The Elkton Farm is situated within the Coastal Plain physiographic province, near the Fall Line. The unconsolidated sediments of the Coastal Plain extend eastward from the Fall Line, dipping eastward and becoming progressively thicker with distance, eventually reaching over 8,000 feet in thickness at Ocean City, MD.

The quaternary strata which underlie the site are classified as Uplands Deposits. The Uplands Deposits are a floodplain deposited formation consisting of lenses of micaceous sand and gravel interbedded with thin layers of silt and fine sand. The coarse-grained sands and gravels at the base of the formation can be as large as boulders 8-feet in diameter. Bedrock consists of gneiss, which is encountered 5 to 30 feet below ground surface.

The soil series at Elkton Farm consists of the Elsinboro, Mattapex, and Othello silt loams, all having slopes of less than 5 percent. Eisenboro series soils are deep, well drained soils found on terraces above the flood plains of major streams. Eisenboro soils are formed in old alluvium and contain considerable amounts of fine mica flakes. Mattapex soils consist of deep, moderately well drained loamy soils that formed in silty material laid down on older, coarser sediment. Othello series soils are poorly drained loamy soils on upland flats. These soils were formed in silty material underlain by coarser sediment. Most of the hardwood vegetation native to these three soil series is noted to have been cleared for use as cropland.

Shallow ground water is present within the unconsolidated materials at depths ranging from 5 to 20 feet below ground surface. Previous investigations by MDE have indicated that the water table drops to depths greater than 20 feet during periods of prolonged drought. Where present,

shallow ground water is expected to flow generally from north to south toward the onsite streams.

According to the EDR report, there are four water supply wells listed with the United States Geologic Survey (USGS) within a one-mile radius of the subject site. This listing contains descriptive information on sites where the USGS collects, or has collected, data on surface water and/or groundwater. There are no public water supply systems listed with the Federal Reporting Data System (FRDS) or with the MDE within a one-mile radius of the subject site. Public water is not supplied to the subject property or to the other surrounding properties; therefore, there are numerous individual residential wells in the surrounding area.

2.4 *DESCRIPTION OF STRUCTURES, ROADS AND OTHER SITE IMPROVEMENTS*

The subject property is a farm used to raise crops and includes a cluster of residences and farming structures. Zeitler Road, the only ingress/egress for the site, transects the property from east to west with a bridge across Little Elk Creek and a paved roadway through Laurel Run (an abandoned bridge remains adjacent to this roadway). A driveway turns north off Zeitler Road in the north-central portion of the property to provide access to the off-site residences to the north. Fischer Lane is a gravel road that turns off Zeitler Road in the south-central portion of the property that provides access to Unit 3. These features are evident in Figure 2 and the map in Appendix A.

The farm fields are currently being leased to a farmer that is cultivating them in seasonally rotated crops (e.g. corn, soybeans, and wheat). The three residences are being leased to tenants and the farming structures are not being used. As such, the farming structures, with the exception of the main barn and three silos have all deteriorated to a state of disrepair.

Nine structures or portions thereof, were observed on the subject property during the site visit and include the following:

- Bldg. 1 – main residence, (183 Zeitler Road);
- Bldg. 2 – secondary residence, (180 Zeitler Road);
- Bldg. 3 – former milk house/rental unit (178 Zeitler Road);
- Bldg. 4 – main barn with three silos and attached structures/lean-tos, south of Zeitler Road;
- Bldg. 5 – demolished dairy barn, north of the main residence;

- Bldg. 6 – corn crib, north of the dairy barn;
- Bldg. 7 – small shed, northeast of the dairy barn;
- Bldg. 8 – long tractor shed, east of the dairy barn; and,
- Bldg. 9 – chicken coops, east of the tractor shed.

The building numbers have been assigned by ERM for the purposes of clarification for this Phase I ESA report. The Site Layout, Figure 2, depicts the approximate building locations and configuration on the subject property using the numbers above.

In general, these buildings were constructed of concrete block/masonry with interior wood framing for flooring and rafters. Evidence of both metal and shingled roofing was observed during the site visit.

In addition to the nine structures above, there are still the remains of the Unit 3 structure in the south-central portion of the property. At the intersection of Fischer Lane and Zeitler Road there is an old fence post, where Fischer Lane may have been gated off.

Electrical service lines and pole-mounted transformers were observed on the subject property from Blue Ball Road to the cluster of residences. Two pole-mounted transformers are located on Blue Ball Road, servicing houses east of the road, one is at the intersection of Blue Ball and Zeitler Roads, servicing the property on the northwestern corner (not part of the subject property), and one is located at the on-site cluster of residences. The transmission lines do not proceed down past the on-site residences on Zeitler Road, as the houses at the very end of the road receive power from west of the property. There is also a high-voltage overhead line that crosses the southern end of the south-central portion, and turns north, up the field.

Supplied natural gas service was not observed on the subject property. One aboveground storage tank (AST) and one underground storage tank (UST) were observed outside the primary residence, which may currently store or have historically stored heating oil. No tanks were observed outside any other structures and according to Mr. Pat Ulrich, the property manager, the secondary residence and the milk house rental unit are heated by electric heat. Only one water-supply well was observed on the property and it was located northwest of the main residence. According to Mr. Ulrich, this well supplies the two residences and the rental unit with potable water.

One septic system was observed in an open field east of the primary residence (evidenced by a concrete clean-out). No signs of septic systems

near the secondary residence were observed during the site reconnaissance, nor was Mr. Ulrich aware of additional systems.

2.5 *CURRENT USE OF SURROUNDING PROPERTIES*

The area surrounding the subject property is developed and used for residential, commercial, and industrial purposes. The following is a summary of the adjacent property uses:

North: Residential and agricultural;

East: Blue Ball Road, with residential and church properties beyond;

South: Residential (at the southeast corner, along Blue Ball Road) and industrial (ATK-Thiokol); and

West: Wooded areas, with residential and agricultural properties beyond.

2.6 *INFORMATION REPORTED BY USER REGARDING ENVIRONMENTAL LIENS OR SPECIALIZED KNOWLEDGE OF ENVIRONMENTAL ISSUES*

The subject property is currently owned by Marva Limited Partnership, in Orlando, Florida. The partnership was formed among the Herron family prior to the father (Mr. Martin Herron) passing away in the late 1990s. ERM interviewed Mr. David Herron, one of Mr. Martin Herron's sons, and he was not aware of any liens on the property. However, environmental issues associated with the site being a FUDS have already been raised, and MDE is investigating these issues. The current status of these investigations is provided in Section 3.2.5.1.

3.0 *RECORDS REVIEW*

3.1 *ENVIRONMENTAL DATABASE REVIEW*

ERM utilized the services of Environmental Data Resources, Inc. (EDR) to conduct a search of readily available federal and state databases concerning environmental issues at the subject property and surrounding properties. The EDR Report, included as Appendix C was produced on 15 December 2004. The databases and search radii reviewed in the EDR report meet those specified by ASTM Standard E 1527-00.

3.1.1 *Subject Property*

The subject property is listed in four databases as identified in the EDR Report:

- Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS);
- Facility Index System (FINDS);
- State Hazardous Waste Sites (SHWS); and
- Emergency Response Notification System (ERNS).

The CERCLIS list contains sites, which are either proposed to be on or are already on the National Priority List (NPL), and sites, which are in the screening and assessment phase for possible inclusion on the NPL. The finding indicated that 1) there was a discovery, assessment, and on-site removal action in 1991 and 1992. The removal action pertains to Unit 1; and 2) there continues to be an ongoing preliminary assessment/site inspection (PA/SI). The investigations pertain to FUDs Units 2, 3, and 4. The finding also indicates that EPA began a reassessment of the site in August 2001.

The removal action indicated in CERCLIS is consistent with what MDE has reported as the removal of drums and soils at Unit 1 in the early 1990s (details provided in Section 3.2.5.2). The PA/SI is consistent with the fact that MDE is actively working with EPA to investigate Units 2, 3, and 4. The FINDS, ERNS, and SHWS database "hits" do not provide any additional information beyond what the CERCLIS "hit" indicated.

The EDR report also identified a property called NRCS Herron Lane Project on Herron Lane, in Elkton, MD as being on the Oil Control Program (OCP)

Case list. The Facility Status is reported as "closed", with "NO" Release. MDE indicated that this case involved an oil tank found in Little Elk Creek upstream of the site and was unrelated to the site.

3.1.2 *Surrounding Properties*

Surrounding sites that were identified in the 15 December 2004 EDR Report as being on federal or state environmental records databases are shown on Table 1. This table provides a list and summary description of ASTM-required databases searched, the radii of the searches, and the number of sites ("hits") that were identified for each database. There are more "hits" listed below than reported in the EDR report because EDR reported radii from a single point in the center of the property. Because the property is so large, ERM determined "hits" by measuring the appropriate distances from the property boundary. As a result, there are six sites considered "hits" and identified on Table 1 (one site, Central Chemical, was identified on two databases). The complete EDR Report is provided in Appendix C.

The potential for an identified property to have an impact on the subject property is based on one or more of the following:

- Readily available information from regulatory files or from the site contacts;
- The presence of a documented release of hazardous substances or wastes in the regulatory files reviewed by ERM or as identified in the database report; and
- The level of contamination, the relative distance and directional location from the site, and known or anticipated ground water flow direction.

The following discussion addresses each of these factors for each of the six surrounding properties identified as "hits" in Table 1. ERM has also included a discussion on the ATK-Thiokol property because it was identified on the FUDS database (an ASTM-supplemental database), and it is adjacent to the subject property. Based on the location of the subject property and its proximity to these other sites discussed below, there do not appear to be any sites listed in the EDR report that could significantly impact the subject property.

Table 1 *Federal and State Database Summary*

Database	Radius Searched	Sites Found
FEDERAL ASTM STANDARD DATABASES		
National Priorities List (NPL) The NPL is EPA's list of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program. A site must meet or surpass a predetermined hazard ranking score, be chosen as a state's top priority site, or meet three specific criteria set jointly by the U.S. Department of Health and Human Services and the U.S. EPA in order to become an NPL site.	1.0 mile	0
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) The CERCLIS list contains sites, which are either proposed to or on the NPL, and sites, which are in the screening and assessment phase for possible inclusion on the NPL. The information on each site includes a history of all pre-remedial, remedial, removal and community relation's activities or events at the site, financial funding information for the events, and unrestricted enforcement activities.	0.5 mile	0
Corrective Action Report (CORRACTS) Treatment, storage, and disposal facilities subject to corrective action under RCRA.	1.0 mile	0
Resource Conservation and Recovery Act Information System – Treatment, Storage, or Disposal Facilities (RCRA - TSD) The EPA's RCRA Program identifies and tracks hazardous waste from the point of generation to the point of disposal. The RCRA facilities database is a compilation by the EPA of facilities, which report generation, storage, transportation, treatment, or disposal of hazardous waste. RCRA TSDs are facilities, which treat, store and/or dispose of hazardous waste.	0.5 mile	0
Resource Conservation and Recovery Act Information System (RCRA Generator) RCRA small quantity generators (SQG) are facilities that generate less than 1,000 kg/month of nonacutely hazardous waste. RCRA large quantity generators (LQG) are facilities, which generate at least 1,000 kg/month of nonacutely hazardous waste (or 1 kg/month of acutely hazardous waste).	0.25 mile	0
Emergency Response Notification System (ERNS) The ERNS database is a national database containing records from October 1986 to December 1998 and is used to collect information for reported releases of oil and hazardous substances. The database contains information from spill reports made to federal authorities including the EPA, the US Coast Guard, the National Response Center, and the Department of Transportation.	Subject Site	0
CERCLIS-No Further Remedial Action Planned (NFRAP) NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.	0.25 mile	1

Table 1 *Federal and State Database Summary (cont.)*

Database	Radius Searched	Sites Found
STATE ASTM STANDARD DATABASES		
State Hazardous Waste Site (SHWS) The SHWS is Maryland's equivalent to the CERCLIS, and includes priority sites planned for cleanup.	1.0 mile	3
State Landfill (SWF/LF) This is a list prepared by the MDE that provides an inventory of solid waste disposal facilities or landfills.	0.5 mile	0
Registered Underground Storage Tanks (USTs) This is a database of USTs that are registered in the state. USTs are regulated under Subtitle I of RCRA and must be registered with the state department responsible for administering the UST program.	0.25 mile	1
Voluntary Cleanup Program (VCP) The Voluntary Cleanup Program encourages owners of contaminated sites to take the initiative and conduct voluntary cleanups that meet state environmental standards.	0.5 mile	0
State Recycling Directory (SWRCY) This is a list of recycling facilities prepared by the MDE.	0.5 mile	0
Oil Control Program Cases (OCPCASES) These databases include cases that have or have had leaking USTs, other below ground releases, leaking ASTs, spills and inspections.	0.5 mile	2

3.1.2.1 *Morton Thiokol Ammunition Plant*

The EDR report indicates that the Morton Thiokol Ammunition Plant, now operating under the name ATK-Thiokol, is listed in the FUDS database. The property, used for testing rockets, is very large; it borders the majority of the southern boundary of the subject property and extends southward to U.S. Highway 40. No information about the status of the site in the FUDS database is provided in the EDR Report. MDE's site investigation of Unit 4 indicated that there are no impacts to the subject site from this property.

3.1.2.2 *Trinco Industrial Park (Three Sites)*

Three sites were identified with an address of Trinco Industrial Park (now Triumph Industrial Park) in the EDR Report: Central Chemical Co., IP Inc., and GE Rail. All three sites are listed on the SHWS list as no further remedial action planned (NFRAP) sites. Central Chemical was also on the CERCLIS list with indication of preliminary assessments in 1990 and 1999. It, too, is classified as NFRAP on the CERCLIS list. These properties are located south, or generally down-gradient, of the subject property; therefore, ERM does not consider these sites to pose a significant concern to the subject property.

3.1.2.3 *Colonial Metals, Inc.*

Colonial Metals, Inc. was identified on the RCRA database, the FINDS database (for various compliance and emissions-related activities), and the UST database. It is located at 505 Blue Ball Road, south of the subject property. The RCRA database identified the site as a conditionally-exempt small quantity generator of hazardous waste. The FINDS database indicated that the facility reports air emission to the state and submits a toxic release inventory (TRI) report to EPA.

The UST database indicates that Colonial Metals has three USTs: one 5,000 gallon heating oil tank, one 275 gallon heating oil tank, and one 4,000 gallon gasoline tank. All three of these are reported as being "permanently out of use"; however, no closure date is indicated. Given the distance of this site to the subject property and the "out of use" status of the tanks, ERM does not consider this property to pose a significant concern to the subject property.

3.1.2.4 *Oblate Retreat Center*

The Oblate Retreat Center was identified on the Historical UST (H UST), UST and OCP databases. This site is located more than one half mile north of the property at 1120 Blue Ball Road. The site was identified as having two historical USTs that have been removed (1,000 and 3,000 gallon gasoline tanks - on the H-UST database), three USTs that have been "permanently out of use" (1,500 gallon and 3,000 gallon gasoline and 6,000 gallon heating oil – on the UST database), and two USTs that are currently in use (6,000 gallon heating oil and 1,000 gallon heating oil – on the UST database). The OCP database indicates that there was no clean-up associated with the case and that the facility status is "closed". Given the distance of this site to the subject property and the "out of use" or "closed" status of the tanks, ERM does not consider this property to pose a significant concern to the subject property.

3.1.2.5 *Cecil County Board of Education*

Cecil County Board of Education owns a parcel at 555 Blue Ball Road, which the EDR Report identified as an OCP Case. The only information provided was that the status was "closed". Given that this site is approximately three quarters of a mile from the subject property and that the facility was classified as "closed", ERM does not consider this property to pose a significant concern to the subject property.

3.1.3 *Unplottable Sites*

The EDR database search cannot always accurately locate a facility in a given database due to poor or inadequate address information. EDR has supplied a list of sixty (60) unplottable sites (referred to as orphan sites) with an area address or zip code that could not be mapped. Based on maps of the area, the required database search radius for a given database, and site reconnaissance, it is possible to determine if an unplottable site falls within the applicable ASTM search radii for the listed database or if the site may be removed from consideration.

ERM conducted a site search with the limited property name and address information provided by EDR and determined that none of the 60 sites listed is the target property. ERM identified, however, that 24 of the 60 orphan sites are located within the Triumph Industrial Park south of the subject property. With the exception of three sites, the orphan sites either lie outside the applicable ASTM search radii or are not of concern to the subject property based on the nature of their database listing and/or their geographic location relative to the subject property.

The three orphan sites that were not outside the ASTM search radii are: Triumph Industrial Park (CERCLIS, SHWS, and FINDS), Stauffer Chemical Co. (SHWS), and GE Railcar Repair Services (VCP). These properties are located in what is now called the Triumph Industrial Park, which is located south, or generally downgradient, of the subject property. Therefore, ERM does not consider these properties to pose a significant concern to the subject property.

3.2 *HISTORICAL USE*

Historical use of the subject and adjoining properties was determined through a review of the following:

- Historical topographic maps;
- Historical aerial photographs; and,
- Information from Previous Reports and Interviews.

Historical Sanborn ® Fire Insurance Maps and City Directories were requested from EDR but were not available. A summary of historical uses of the subject property and adjoining properties is provided below, followed by detailed information from each informational source.

3.2.1 *Historical Use Summary for Subject Property*

The earliest record reviewed by ERM is the 1938 aerial photograph, which indicates that the property was a farm with tillable acreage similar to what is farmed today, along with generally the same buildings observed today. The subject property was a livestock farm since before the 1940's with much of the surrounding fields under cultivation. During the early 1940s MDE's reports (MDE 2004a, 2004b, 2004c) indicate that Triumph Explosives Inc. (TEI) acquired ownership of the subject site, which began a period when hazardous materials were stored and/or disposed on the farm.

According to Mr. David Herron, one of the current owners, his family purchased the farm in 1946 (MDE's report indicates the purchase in 1948) from a "syndicate" associated with the Peoples Bank of Elkton, who had purchased the farm from TEI. The Herron family has owned the property ever since, with a name change in 1997/1998 to Marva Limited Partnership just before Mr. Martin Herron passed away. The Herron family has had livestock on the property, cultivated crops, or leased the land to another farmer for cultivation since its purchase.

In addition to farming there have been various activities involving the storage or disposal of hazardous material that may have impacted the land in four specific locations on the property. These areas, identified as Units 1 – 4 are described below.

<u>Unit 1</u>

According to the MDE FUDS reports (MDE 2004a, 2004b, 2004c), Unit 1 is an area of the subject site that was used for the storage of hazardous waste, including 17 drums from a local printing company and 36 drums from Galaxy Chemical. At some previous point in time the owner of the subject property attempted to dispose the 36 drums from Galaxy at Norris Farm landfill in Baltimore County, Maryland. Norris Farm Landfill refused to accept the drums and Galaxy refused to take the drums back. Consequently, the owner stored the drums in the chicken coop building until their off-site disposal in 1992. The ink drums were stored in the dairy barn until their off-site disposal in 1992. A Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal action was completed at Unit 1 in 1992 by EPA, which resulted in the removal of all drums. The drums' contents were classified as hazardous waste and contained flammable organic compounds, base-neutral compounds, halogenated organic compounds, and solids. Ten tons of contaminated soil were also removed from Unit 1.

According to various files reviewed at MDE, including a Cecil Industrial Park Potential Responsible Party document, and 1979/1980 correspondence from Mr. David Healy of MDE, MDE also required an additional removal action at the subject site in 1979 and 1980 that involved various solid and hazardous wastes. The location of this removal action is not known and it is not officially part of Unit 1. Information on this action is provided in Section 3.2.5.2.

Unit 2

According to the MDE's Site Inspection Report (MDE, 2004a), Unit 2 is a World War II -era waste munitions combustion pit known as the "Firehole," which was used by TEI during the 1940s. The Firehole was defined as the approximately 32-acre area used for the disposal of waste explosives materials generated by the operations at TEI. TEI reportedly collected waste material from the manufacture of munitions and placed it in drums. This accumulated waste was wetted with alcohol or ether to prevent spontaneous combustion, and then transferred to a shallow pit off Zeitler Road, spread thinly, and allowed to burn. Plant personnel monitored the burn until the waste ordnance was consumed. Photographs in the TEI newsletter from the 1940s show the operation of the Firehole burn pit. Ordinance-related debris was observed on the ground surface during ERM's site reconnaissance on 8 February 2005.

Unit 3

According to the MDE's Site Inspection Report, Unit 3 (MDE, 2004b) was a one-acre plot of land in the south-central portion of the site leased by the Thiokol Corporation for the operation of a rocket motor cleaning and recovery area in the late 1950s and early 1960s (Unit 3 overlays a component of Unit 2). This activity continued until an explosion led to the site's abandonment. MDE reported little information regarding the operation of this "rocket test area."

Unit 4

According to the MDE's Site Inspection Report (MDE, 2004c), Unit 4 consists of approximately 55 acres of the south-eastern portion of the subject property. There are no waste disposal activities that are known to have occurred there. However, there is groundwater contamination under investigation at the GE Rail Car site to the south (generally down-gradient) of this part of the property, which prompted MDE to conduct a Site Inspection of this area.

3.2.2 *Historical Use Summary for Adjoining Properties*

Based on the review of historical topographic maps, historical aerial photographs and MDE records, ERM determined that adjoining properties were all agricultural prior to the late 1930s. To the north and the west, the adjoining properties remain this way. To the east, there has been a slow, continued development of this land for residential purposes.

In the late 1930s/early 1940s the property to the south was developed by Triumph Explosives, Inc. for firework and munitions manufacturing. This plant grew rapidly during World War II, but was shut down at the end of the war. After that, the area became the Trinco Industrial Park in the 1950s, the adjoining property to the south was purchased by Thiokol. It is now owned by ATK-Thiokol, performing generally the same operations as it has since they purchased it – testing rocket fuels. More details of the ownership of TEI can be found in the U.S. Army Corps of Engineers' "Operations and Ownership History of Triumph Explosives, Inc.," February 1992.

3.2.3 *Review of Historical Topographic Maps*

Historical topographic maps were reviewed to identify the structural improvements made to the subject property and to assist in identifying environmental concerns at the property. Historical topographic maps were available from EDR for the subject property for the years 1953, 1970, and 1990. The historical topographic maps reviewed are discussed below and included herein as Appendix D.

1953

The 1953 map shows the subject property to be developed much as it is currently with cleared areas in the south-eastern, north-central, south-central, and north-western portions of the property, Zeitler Road transecting the property, and a cluster of residences and farming structures in the central portion of the property. The following are additional items of note from the 1953 topographic map:

- the south-eastern portion contained some woodland extending into the fields;
- there is no structure where Unit 3 was reported to have been operated at that time; and
- the closest activity in the industrial park to the south appears to be a series of rail spurs running north-south, with one approaching within a few hundred feet south-east of the property line.

1970

The 1970 map shows the subject and adjoining properties much like in the 1953 map (including no structures where Unit 3 was reported to have been operated) with the following exception:

- a road on the Thiokol property to the south is evident very close to the subject property's southeastern property boundary.

1990

The 1990 map shows the subject property and surrounding area much like the 1970 map, with the following exceptions:

- Fischer Lane is present providing access to a structure that would be in Unit 3; and,
- the shape of the structures at the residential cluster were updated;
- the residence on the northwest corner of the intersection of Zeitler and Blue Ball Roads has been added (which is not part of the subject property); and
- the woods extending into the farm field on the south-eastern portion of the site have been cleared.

3.2.4 *Review of Historical Aerial Photographs*

Historical aerial photographs were reviewed to determine the alterations made to the subject property and surrounding properties over the years to assist in identifying environmental concerns at the property. Historical aerial photographs were not available from EDR for the subject property; however, they were available from MDE for the years 1938, 1942, 1947, 1952, 1957, 1969, 1979, 1990, and 1999. Each of these aerials provide a full view of the central and eastern portions of the property, but some only provide a partial view of the western and/or northern portions. According to MDE, there does not appear to be historical activity in the western or northern portions that would warrant further investigation. ERM corroborated this finding with its interviews with the property owner, and a review of the historical topographic maps. The historical aerial photographs reviewed are discussed below and included herein as Appendix E.

1938

The 1938 photograph shows the property in a similar state as exists today. The north-eastern and south-western portions are woodland, and the south-eastern, north-central, south-central and north-western portions are under cultivation. The south-eastern portion did have a tract of woods that extended into the field along approximately the western side of the hill in that corner of the property. The structures on the property are as follows, using the nomenclature provided by Mr. David Herron, and identified in Section 2.4:

- main residence;
- dairy barn;
- chicken coop;
- tractor shed;
- secondary residence;
- milk barn;
- main barn (with only two silos, and no southern extension);
- unknown building immediately south of the secondary residence; and
- unknown, small building further south of the secondary residence, along the Little Elk Creek floodplain/pasture.

There is an orchard north of the dairy barn (still on the subject property), and there is a road that transects the south-central farm field. This road appears to cross the confluence of Laurel Run and Little Elk Creek and continues to

another farm house south of the property. All of the adjacent or neighboring property to the south is farm fields, with little to no development along Blue Ball Road.

1942

The subject property appears to be the same as during the 1938 photograph with the following notable exceptions:

- the corn crib has been added to the north of the dairy barn;
- there is an unknown discoloration in the western part of the south-eastern portion of the property that is light in color on the southwest side and dark on the northwest. The dark area could be a shadow, indicating a pile of material (e.g. soil), or standing water (in his interview Mr. David Herron indicated that this area of the property was a fenced pasture for livestock; during the site visit in February 2005, this area was observed as being relatively flat with standing water); and
- increased development of the property to the south with multiple rail spurs and many "U-shaped" structures. One rail spur terminates (with an adjacent structure) at the subject property's southeastern boundary.

1947

The subject property appears to be the same as during the 1942 photograph with the following notable exceptions:

- the addition of Fischer Lane;
- evidence of land disturbance on both sides of Fischer Lane (i.e. Unit 2 – the Firehole);
- the disappearance of the old road down the center of the south-central field;
- the light and dark feature observed in the 1942 photograph in the south-eastern portion appears as a larger, more "mottled" spot on the photograph, with no relief apparent;
- in the south-eastern portion of the property there are a few light-colored areas (during a meeting on 19 May 2005, EPA indicated to ERM and to Herron 393 that these features on this photograph

resulted from dust in the photograph processing and were not a feature on the site); and

- the structure at the end of the rail spur (adjacent to the southeastern property boundary) is no longer visible.

1952

The subject property appears to be the same as during the 1947 photograph with the following notable exceptions:

- there is a road or path from Fischer Lane to the woods edge, near the banks of Laurel Run with additional disturbed land around this road; and

- the area around the rail spur south of the property appears to be less used and more overgrown.

1957

The subject property appears to be the same as during the 1952 photograph with the following notable exceptions:

- the mottled area in the south-eastern portion of the property is no longer visible;

- the woodlands that extended into the south-eastern farm field have been cleared;

- there is a new road near the subject property's southeastern boundary with new "U-shaped" structures on the road; and

- there appears to be a road between the property to the southeast and the subject property, which continues northward across the south-eastern portion of the property.

1969

The subject property appears to be the same as during the 1957 photograph with the following notable exceptions:

- there has been an addition to the south end of the main barn that includes a third silo;

- the orchard north of the corn crib now has very few trees and has various objects scattered throughout (Mr. David Herron indicated that his father had stored old vehicles in the old orchard); and

- there is no sign of the road crossing the southeastern boundary of the subject property (yet, there is a faint sign of the former road passing northward across the subject property's field).

1979

The subject property appears to be the same as during the 1969 photograph with the following notable exceptions:

- there is some new activity or new structures south of the main barn, along the edge of the floodplain/pasture area;

- there is a road or path traveling south from Unit 3, along Laurel Run, and crossing the confluence point with Little Elk Creek, thus providing access by Thiokol;

- with the exception of one small area on the east side of Fischer Lane, there are no more disturbances in the area of Unit 2;

- the area known as the Triumph Industrial Park now has additional industrial buildings and a series of new parallel rail spurs to the south (described as Stauffer Chemical and GE-Railcar, respectively by MDE (2004a, 2004b, 2004c)); and

- the residence at the northwest corner of Zeitler Road and Blue Ball Road is now apparent.

1990

The subject property appears to be the same as during the 1979 photograph with the following notable exception:

- there are no longer signs of activity south of the main barn;

1999

The subject property appears to be the same as during the 1990 photograph with the following notable exceptions:

- the structure south of the secondary residence no long exists; and

- there are high-voltage power lines crossing the south-central field.

In the 1999 aerial photograph the subject property has the same appearance as it did during the 2005 site visit.

3.2.5 *Information From Previous Reports and Interviews*

3.2.5.1 *MDE FUDS Site Inspection Reports*

Unit 2 (Firehole) - 8 November 2004

Unit 2 is known as the Firehole. It was here that TEI burned munitions in the early to mid 1940s. MDE, under the 2001 Cooperative Agreement with EPA was contracted to perform a FUDS Inspection at Unit 2 (MDE, 2004a). Section 3.2.1 describes the history of Unit 2. The Unit 2 Site Inspection Report (without Appendices) is included in Appendix F.

As part of the FUDS Inspection, MDE conducted geophysical surveys of the area and collected soil and groundwater samples. The geophysical survey indicated several distinct anomalies in the Unit 2 area, and that the Firehole is not one discreet area but rather a series of burn pits located across the property in an approximate 32-acre area.

MDE collected 14 surface soil samples, ten (10) subsurface soil samples, six (6) surface water samples, six (6) sediment samples and five (5) groundwater samples. The samples were analyzed for the presence of metals, cyanide (surface soils only), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), nitroaromatic compounds, and perchlorates.

Sample analysis showed elevated concentrations of lead, mercury, and arsenic as well as trichloroethylene (TCE) and Arochlor 1254, and the nitroaromatic compound TNT and associated daughter products. The groundwater collected from monitoring well MW2 was contaminated with TCE. Subsurface soil samples from the Firehole area were not collected because of refusal at less than 18 inches. Soil samples S/SS6 obtained from the vicinity of the Unit 3 and midway between the Firehole and TMRA also exhibited elevated levels of several explosive compounds. MDE recommended additional investigation of Unit 2.

Unit 3 (TMRA) – 15 September 2004

Unit 3 (MDE, 2004b), which reportedly operated in the late 1950s and the early 1960s, is located on a one-acre lot leased by Thiokol from Mr. and Mrs.

Martin Herron. A structure was constructed at the end of Fischer Lane for use in the combusting and cleaning of rocket motors. This activity continued until an explosion led to the site's abandonment. The Unit 3 Site Inspection Report (without Appendices) is included in Appendix F. The summary of results from this report are provided below.

The quantity of hazardous wastes disposed in Unit 3 is unknown. A geophysical survey conducted for MDE indicted several distinct anomalies on the one-acre plot.

MDE conducted a site investigation of Unit 3 on 24 and 25 June 2003 to characterize the site. MDE collected 15 surface soil samples, 12 subsurface soil samples, five (5) groundwater samples, five (5) surface water samples, and five (5) stream sediment samples. The samples were analyzed for the presence of metals, cyanide, VOCs, SVOCs, pesticides and PCBs, perchlorates and nitroaromatic compounds.

Due to historical activity, both perchlorates and explosive compounds were anticipated at Unit 3. Perchlorate was detected in the soil at Unit 3, but not detected in Unit 3 groundwater.

Sample analysis indicated a number of other contaminants including arsenic and bis-2-ethylhexylphthalate, however, not at levels of concern. Ground water, surface water, and sediment samples documented no significant levels of contamination (i.e. over levels established for protection of human health). MDE recommended further investigation of this Unit.

Unit 4 (south-eastern portion of the property) – 15 September 2004

Unit 4 (MDE, 2004c) consists of approximately 55 acres of the south-eastern portion of the subject property. There are no waste disposal activities that are known to have occurred there. However, there is ground water contamination under investigation at the GE Rail Car site to the south (generally down-gradient) of this part of the property. Therefore, under the 2001 cooperative agreement with EPA, MDE has conducted a Site Inspection of this area. The Unit 4 Site FUDS Report (without Appendices) is included in Appendix F. The summary of results from this report is provided below.

On 25 and 26 June 2003 MDE collected four (4) groundwater samples, three (3) surface water samples, and three (3) stream sediment samples. On 22 and 23 July 2003 MDE collected an additional eight (8) surface soil samples, eight (8) subsurface soil samples, and five (5) groundwater samples. The samples were analyzed for the presence of metals, cyanide, VOCs, SVOCs, pesticides and PCBs. This sampling represented conditions at the southern

boundary of Unit 4 (i.e. closest to GE Rail Car), up-gradient of Unit 4 (background), and within the GE Rail Car area.

In general, MDE reports that samples from Unit 4 did not reveal inorganic and organic contaminants at levels of concern for human health and the environment. The only samples containing measurable levels of VOCs were located south of Unit 4, off site. Samples of site soil indicated levels of arsenic, aluminum, iron and manganese on the margins of tilled soil above MDE Cleanup Standards for residential soils. MDE reports that these levels are low and may be indicative of local soil chemistry and/or historic farm chemical applications.

MDE concluded that the results of the sampling program do not indicate any undue influences on the Unit 4 parcel by past munitions manufacturing or disposal practices of TEI or chemical dumping by Galaxy Chemical and related companies.

As a follow-up to MDE's work, ERM performed a Phase II ESA at Unit 4 in February 2005 (ERM, 2005). The Phase II consisted of a sampling plan that was verbally approved by MDE prior tom implementation. The plan included soil, sediment and ground water sample collection and laboratory analysis for constituents of concern, including perchlorate. ERM concluded that Unit 4 posed no unacceptable risk under current land use or future residential land use. The results of all environmental media samples were benign, and other than one localized ground water detection of bis-2-ethylhexylphthalate and a few metals present at levels typical for Maryland, the results were either non-detect or well below Maryland's soil and ground water guidance and ambient water quality criteria for surface water.

3.2.5.2 *Records and Correspondence on Waste Removal Actions*

There were two documented removal actions at the Herron Farm: one resulting from a 13 July 1979 order from MDE to remove stored waste materials, and another resulting from a 15 October 1991 assessment of the farm (Unit 1) by EPA and MDE.

The first removal action was reported to be triggered by a neighbor's complaint. MDE issued an order requiring Mr. Martin Herron to remove 22, 55-gallon drums of printing ink, 400 – 500, 30-gallon drums of ash produced from the Thiokol rocket fuel testing area, and approximately six (6) cubic yards of 40 mm projectile parts left by the U.S. Government in 1943. By 12 June 1980 a Memo from MDE's Mr. David Healy to MDE's Mr. Doug John indicated that MDE was "pleased with the clean-up and condition of the

property." Through previous memos and inspection notes, MDE recorded that Mr. Herron properly removed and disposed these materials off site.

There is little to no mention of the exact location where these materials were stored. In various correspondence reviewed, there is reference to materials being on the "farm road" and on "high ground" where the creek does not get "that high." ERM has found no other reference to the "farm road"; however, the 1979 aerial photograph did indicate some temporary activity south of the main barn, which is where the field drops off into Little Elk Creek's flood plain.

The second removal action (in the areas known as Unit 1) was triggered when the Herrons responded to a waste survey from MDE. In this response, Mr. Herron reported that he had 17 drums of ink waste stored in the west end of the dairy barn and 36 drums of unknown chemical wastes from Galaxy Chemicals stored in the west end of the chicken coop on an earthen floor. The drums were found to contain flammable organic compounds, base-neutral compounds, halogenated organic compounds, and inert solids.

MDE filed for and received federal funding for an emergency removal action and by 29 February 1992 all drums were secured in a trailer and ten tons of contaminated soil from the chicken coop earthen floor were removed. Correspondence from EPA generally indicates that their confirmation analytical results only showed low or trace levels of organic compounds, "all well below regulatory levels."

References:

- Federal On-scene Coordinator's Report for Elkton Farm Site, 183 Zeitler Road;
- Site Survey – Elkton Farm Site, April 2001;
- MDE and Mr. Martin Herron Correspondence between 7 August 1979 and 12 June 1980;
- Site Survey of Thiokol Ammo Plant, January 2001;
- Letter from Alex M. Cox to Michael Taurino 20 September 1993 on the Hazard Ranking system prescore for the Herron Farm;
- Letter from Mr. Martin Herron to Mr. James J. Pittman III on 2 October 1991;
- 11 July 1979 Order between MDE and Mr. Martin Herron concerning his waste storage and disposal practices; and
- 10 October 1991 Interview with Mr. and Mrs. Martin Herron.

3.2.5.3 *Interview with David Herron – Current Owner*

On 28 February 2005, ERM spoke with Mr. David Herron about the subject property. Generally, his recollection confirmed the subject property's history documented through other sources. Neither does he recall any different activities anywhere on the property nor does he recall anything associated with the storage of the drums from Galaxy or Thiokol.

Mr. Herron said his dad was a "scavenger", which is how he would explain the boxes of electrical components stored in one of the sheds on the property. He also indicated that his father collected junk cars for parts and stored them in the former orchard north of the corn crib.

Mr. Herron did not recall any significant spills or disposal of hazardous materials on site, and did not recall his family applying any pesticides/herbicides to the fields. He does not think his family disposed of trash on site; he remembers his father hauling trash to an off-site landfill.

He indicated that there was a spring that came out of the side of the hill south of the barn. He said that the tractor maintenance was performed on the south end of the long tractor shed across the driveway from the primary residence (that is where he recalls cans or buckets of oil being stored). He recalls the primary residence burning oil for heat, and that oil was stored in an AST. He does not remember anything about the secondary residence. He reported that the septic system for the primary residence was in the yard north of the house.

Mr. Herron did recall that an AST of gasoline was located south of the dairy barn. This tank, which he remembers as having a hand-crank for a pump, was used to fuel the tractors and other vehicles on the farm. He has not aware of any facts surrounding its removal. This tank was not observed during ERM's site reconnaissance.

3.2.5.4 *Interview with Pat Ulrich - Rental Property Manager*

Mr. Pat Ulrich is the rental property manager for Marva Limited Partnership and he manages the rental of the three units on the property. Mr. Ulrich provided information about the utilities on the property. He indicated that the primary residence's septic system runs to the east in the field south of the chicken coops (he recently had a large clean-out installed for the tank). He was not sure where the septic system(s) were located for the other two houses.

He indicated that all three houses receive drinking water from the one well at the primary residence.

3.2.5.5 *Interview with Susan Platt - U.S. Army Corp of Engineers*

Ms. Platt is the Assistant District Counsel for the Army Corp of Engineers (ACE) and she is involved with the ACE's investigation and remediation of FUDS under the Defense and Environmental Restoration Program. The subject property, as part of the former TEI operations, was owned by the Department of Defense (DoD) for a brief period during the 1940s, which classifies it as a FUDS and causes the ACE to be a principle responsible party (PRP) to the remediation.

Ms. Platt indicated that the ACE is not playing an active role in the current investigation. She is aware of the general history of the subject property relative to its ownership by the DoD; however, she did not know any details about potential contamination in specific areas such as Unit 4.

4.0 INFORMATION FROM SITE RECONNAISSANCE

Mr. Thomas Weissinger, Ms. Robin Guynn, and Mr. Leonard Rafalko performed the site reconnaissance of the subject property on 8 February 2005. Mr. Matthew Morgan of Herron 393 and Mr. Alex Cox of MDE provided the ERM team with a site tour of the Units 2, 3, and 4, and the farm house area. ERM also performed a visual survey of the other wooded areas and fields. ERM did not have access to the interior of the three residences, and, therefore, cannot address the items below in the context of these locations.

The assessment of the subject property is based on observations of the site, interviews with personnel familiar with the subject property, and any historical data relevant to the site. Photographs taken during the site reconnaissance are included herein as Appendix B.

4.1 AIR EMISSIONS

There are no sources of air emissions that would require a permit.

4.2 SOLID AND HAZARDOUS WASTE STORAGE AND DISPOSAL

4.2.1 Hazardous and Universal Wastes

The property is not currently being operated as a fully functional farm. The land is being leased to a farmer that brings equipment onto the property to cultivate the fields. Therefore, there is no longer any farming "operations" that would generate hazardous waste or universal waste. There were a number of drums or buckets filled with liquid waste, such as used oil and used antifreeze. Potential types of hazardous and/or universal wastes that may have been generated at the subject property during the farming operation would be pesticides/herbicides, batteries, and miscellaneous cleaning/maintenance materials.

4.2.2 Solid Wastes

The subject property does not have any active farming operations generating solid waste. However, there were various areas where solid wastes have been left after previous operations. These areas include:

- used oil, used antifreeze, and miscellaneous waste materials in and around the tractor shed;
- an oil drum in the corn crib;
- miscellaneous electrical debris/waste in the small storage shed;
- miscellaneous trash, debris, and three drums of unknown liquids (either with indistinguishable or no labels) inside the main barn and its attached buildings;
- demolished building materials (e.g. concrete, metal roofing, wood supports) at the dairy barn and south of the main barn; and
- miscellaneous trash piles south and west of Unit 3 (reported by Mr. Alex Cox of MDE as the location of the farm's trash disposal site).

There were signs of staining on the ground in the tractor shed and the corn crib, where some of the above wastes appear to have leaked.

4.3 *WATER SUPPLY AND WASTEWATER/STORMWATER DISCHARGES*

4.3.1 *Water Supply*

The subject property is not provided with municipal water supply services. There is a well northwest of the primary residence that provides water to all three residences. The depth of the well is not marked on the well; however, MDE's FUDS Site Investigation Reports (MDE, 2004a, 2004b, 2004c) approximated the depth at 99 feet, based on other wells in the Elkton area.

Mr. David Herron reported that there was a spring south of the main barn, along the hillside down to Little Elk Creek's flood plain. During the site visit a concrete culvert pipe was observed protruding from the hillside. It was very overgrown, the inside appeared to be collapsed and no water was observed coming from it.

4.3.2 *Wastewater Discharges*

The subject property is not provided with municipal wastewater collection services. East of the primary residence ERM observed a capped concrete pipe approximately 30 inches in diameter extending out of the field adjacent to the driveway. Mr. Pat Ulrich, the rental unit manager indicated that this was a clean-out for the septic tank used for the primary residence. He was

not aware of how sewage was disposed from the other two residences, and ERM did not observe any signs indicating the septic system locations.

4.3.3 *Stormwater*

Stormwater collection and runoff is only managed on the property through road-side ditches and other cuts in the field to improve overland drainage in the fields.

4.4 *MATERIAL USAGE AND STORAGE*

As mentioned in Section 4.2.2 the farm no longer has active operations on site. There are no materials being actively used or store; however, materials left or stored from the previous operations are listed and identified in Section 4.2.2 as solid waste.

4.5 *PCB MANAGEMENT*

A PCB survey of the subject property was not conducted as part of this Phase I work. However, the following observations were noted during the site reconnaissance.

Several electrical poles along Zeitler Road were observed by ERM during the site visit, and four were equipped with elevated transformers. Identification information for these transformers was not observed.

4.6 *STORAGE TANKS*

ERM observed the following storage tanks and/or indication of potential storage tanks during the site visit:

- Primary Residence UST – A fill pipe and vent pipe were observed protruding from the ground approximately ten feet west of the primary residence. The fill pipe was covered with a large aluminum cap and there were no signs of oil residue or leakage at these pipes;
- Primary Residence AST – An AST was located outside of the west side of the primary residence. There were no signs of leakage or spillage around this tank;
- Secondary Residence AST – On the east side of the secondary residence there was a fill pipe and a vent pipe protruding from the side of the house, indicating that there is likely a heating oil tank

located in the basement. There were no signs of leaks or spillage at these pipes.

4.7 *CONDITION OF SURFACE AND SURFACE DISTURBANCE*

The majority of the property is either farm fields or woodlands. The fields are actively cultivated and had a winter cover crop planted.

4.8 *SURFACE WATER, PITS, SUMPS AND FLOOR DRAINS*

Surface water running through the property includes Little Elk Creek, Laurel Run and Gravelly Run. There are numerous ditches from roadsides and drainage cuts from the fields directing storm water to these streams. There were no discharges into these streams or any unusual observations associated with these streams with the exception of a vehicle chassis in Laurel Run adjacent to the bridge. No pits and/or sumps were observed in or around the structures on the property.

4.9 *POTENTIALLY ASBESTOS-CONTAINING MATERIALS*

An asbestos survey of the subject property was not conducted as a part of this Phase I work. However, the following observations were noted during the site reconnaissance.

The majority of the structures on the subject property were constructed prior to 1938 with additional structures added over the years prior to the 1970s. Due to the age of these buildings, the potential exists for asbestos containing materials (ACM) to be present in construction, surfacing, and insulation materials. A pile of corrugated building panels staged in the Unit 3 area appears to be transite, which is an ACM.

4.10 *GENERAL HOUSEKEEPING*

The farm fields appeared to be clean and well kept. The woodlands also were free of debris and trash with the exception of one truck tire observed in the north-eastern portion of the property. The residences were in fair condition with some toys and furniture in the yards.

The farming structures were in poor condition. As mentioned before, some buildings such as the dairy barn have been demolished and left in place,

while others are in disrepair (i.e., roofs and walls in poor condition). The barn and other farming structures were filled with piles of trash or had old, unused equipment and farming parts scattered about.

As noted previously, Unit 3 was formerly used by Thiokol for testing and recovering rocket motors. During the site visit, ERM observed aboveground test racks, a gantry, and other debris at Unit 3 resulting from past rocket testing activities.

5.0 *CONCLUSIONS*

ERM has completed a Phase I Environmental Site Assessment (ESA) of the subject property identified as the parcels 21 and 23 on Cecil County Tax Map No. 26 located on the north and south sides of Zeitler Road, west of Blue Ball Road.

5.1 *ASTM RECOGNIZED ENVIRONMENTAL CONDITIONS*

Based on the site reconnaissance of the property, review of current and past land use, interviews with personnel knowledgeable of the property, review of readily available environmental agency databases provided by EDR, and review of site investigation information provided by MDE, ERM identified five recognized environmental conditions (RECs) for the subject property as that term is defined by ASTM Standard E 1527-00 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*. These RECs include:

- EPA implemented a removal action for hazardous waste at Unit 1;
- Unit 2, the Firehole with documented surface and sub-surface contamination;
- Unit 3, the TMRA with documented surface and sub-surface contamination;
- Primary Residence's UST with no documentation of status or closure, and ASTs; and
- A trash pile in the southwestern portion of Unit 3, which resulted from rocket motor testing and recovery operations.

5.2 *OTHER AREAS OF CONCERN*

Although not a REC, ERM did observe the improper disposal of miscellaneous appliances, metal drums, buckets of waste materials, solid waste, and construction debris. The on-site residence use a septic system. Also, the age of the existing buildings indicates the potential for ACM. A pile of corrugated building panels staged in the Unit 3 area appears to be transite, which is an ACM.

6.0 *REFERENCES*

MDE, 2004a. Formerly Used Defense Site Inspection for the Elkton Farm Firehole Site (MD-433), 15 September 2004.

MDE, 2004a. Preliminary Assessment/Site Inspection of the Elkton Farm TMRA Site (MD-433), 15 September 2005.

MDE, 2004c. Formerly Used Defense Site Inspection Unit 4 (MD-433), 15 September 2005.

ERM, 2005. Phase II Environmental Site Assessment Report for Herron Farm Unit 4, Elkton, Maryland, August 2005.

7.0 *LIMITATIONS*

7.1 *SCOPE OF ACTIVITY*

The report is based upon the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts currently available within the limits of the existing data, scope of work, budget and schedule. To the extent that more definitive conclusions are desired by the client than are warranted by the currently available facts, it is specifically ERM's intent that the conclusions and recommendations stated herein will be intended as guidance and not necessarily a firm course of action except where explicitly stated as such. We make no warranties, express or implied, including, without limitation, warranties as to merchantability or fitness for a particular purpose. In addition, the information provided to client in this report is not to be construed as legal advice.

While ASTM Standard E-1527 states that the standard practice is intended to permit a user to satisfy one of the requirements to qualify for the innocent landowner defense to liability under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) Section 101 (35) (B), ERM does not represent that this Phase I work, in and of itself, constitutes "all appropriate inquiry into the previous ownership and uses of the property."

7.2 *USE OF THIS REPORT*

ERM is not engaged in environmental auditing and reporting for the purpose of advertising, sales promotion, or endorsement of any client's interests, including raising investment capital, recommending investment decisions, or other publicity purposes. Client acknowledges this report has been prepared for the exclusive use of the Client and agrees that ERM reports or correspondence will not be used or reproduced in full or in part for such purposes, and may not be used or relied upon in any prospectus or offering circular. Client also agrees that none of its advertising, sales promotion, or other publicity matter containing information obtained from this report will mention or imply the name of ERM.

8.0 *QUALIFICATIONS AND SIGNATURES OF ENVIRONMENTAL PROFESSIONALS PARTICIPATING IN THE ASSESSMENT*

Signatory Section

Environmental Resources Management (ERM) has performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E-1527-00. Any exceptions to, or deletions from, these standards were described in previous text. This assessment has revealed no evidence of recognized environmental conditions in connection with the property except for those listed in Section 5.0 of this report.

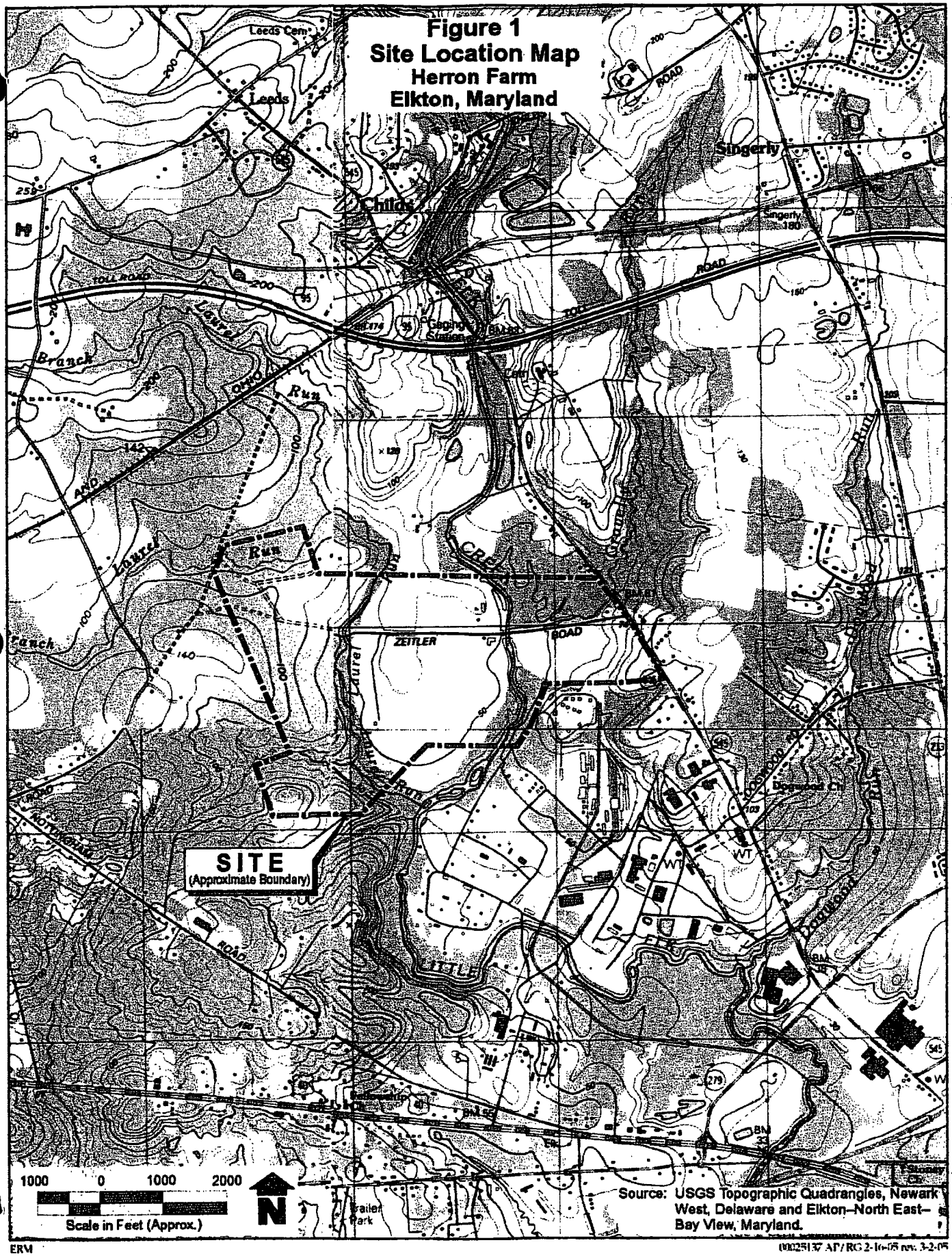
Thomas R. Weissinger, P.E.

Mr. Weissinger is a registered professional engineer with over thirteen years of environmental engineering, compliance auditing, due diligence, and management experience. Mr. Weissinger has conducted and assisted in environmental site assessments on a national basis at commercial and industrial sites.

Thomas R. Weissinger, P.E.

FIGURES

Figure 1
Site Location Map
Herron Farm
Elkton, Maryland

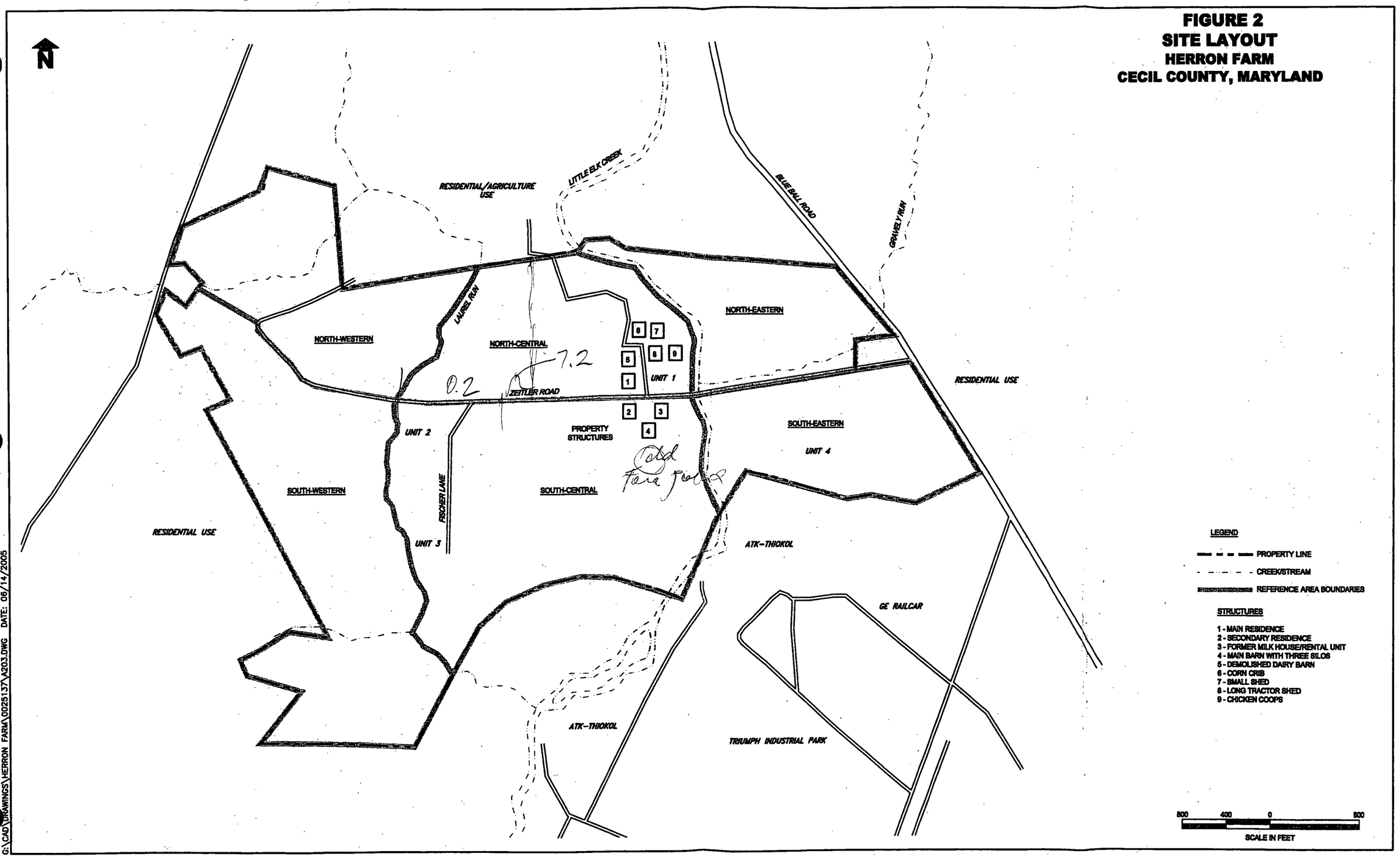


Source: USGS Topographic Quadrangles, Newark West, Delaware and Elkton–North East–Bay View, Maryland.

ERM

00025137 AP/RG 2-16-05 rev. 3-2-05

FIGURE 2
SITE LAYOUT
HERRON FARM
CECIL COUNTY, MARYLAND



G:\CAD\DRAWINGS\HERRON FARM\0025137\A203.DWG DATE: 06/14/2005

MLB/06-14-05

ERM, INC.

APPENDICES

A

Appendix A
Site-Specific Property
Topographic Map

SDMS US EPA Region III

Imagery Insert Form

Site Name & OU: ELKTON FARM FIREHOLE **Document ID:** 2209938

Site DSN: MD-533 **Site Status:** REMOVAL **Releasability:** REL

Some images in this document may be illegible or unavailable in SDMS. Please see reason(s) indicated below:

[ ] ILLEGIBLE due to bad source documents. Images(s) in SDMS equivalent to hard copy.

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[ ] Includes ____ COLOR or ____ RESOLUTION variations. Unless otherwise noted, these pages are available in monochrome. The source document page(s) is more legible than the images. The original document is available for viewing at the Superfund Records Center.

Specify Type of Document(s) / Comments:

[ ] RESTRICTED CONFIDENTIAL BUSINESS INFORMATION (CBI-R): Restricted and or copyrighted documents that cannot be imaged.

Specify Type of Document(s) / Comments:

[X] UNSCANNABLE MATERIAL:
x Oversized or ___ Format. Due to certain scanning equipment capability limitations, the document page(s) is not available in SDMS. The original document is available for viewing at the EPA Region 3 Superfund Records Center.

Specify Type of Document(s) / Comments:

APPENDIX A SITE-SPECIFIC PROPERTY TOPOGRAPHIC MAP

[X] Document is available at the EPA Region 3 Superfund Records Center.

Specify Type of Document(s) / Comments:

8.003 8A

B

Appendix B
Site Photographs

Photo 1: ***Farm field in south- eastern portion, looking southeast***

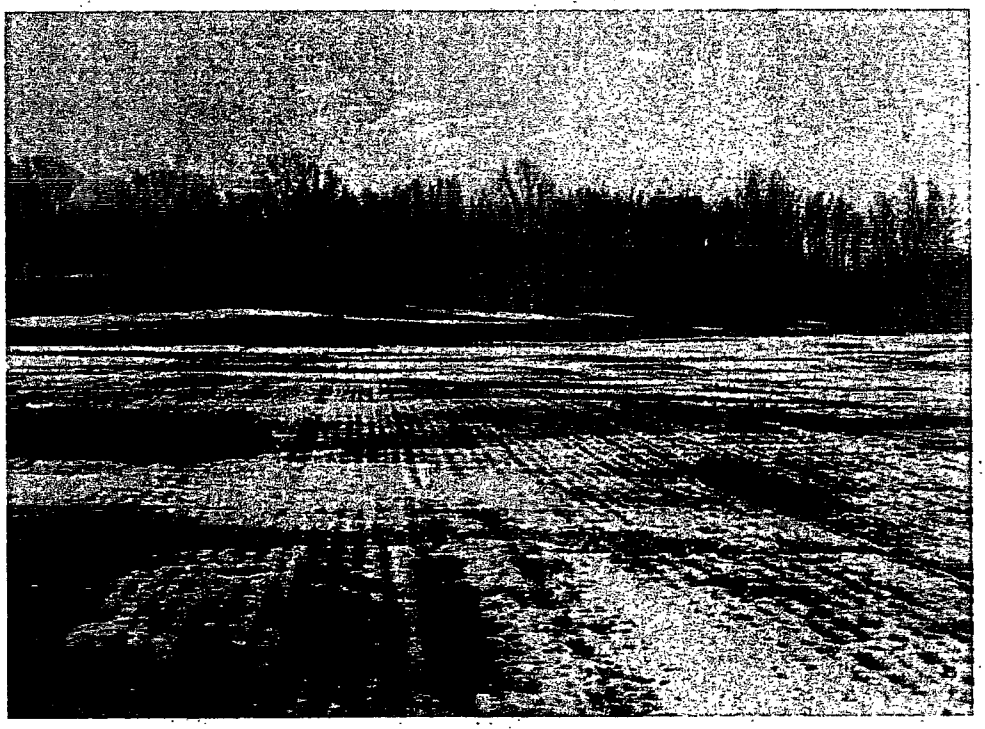

Photo 2: ***Farm field in south- eastern portion, looking south***

Photo 3: ***Farm field in south-eastern portion, looking west***

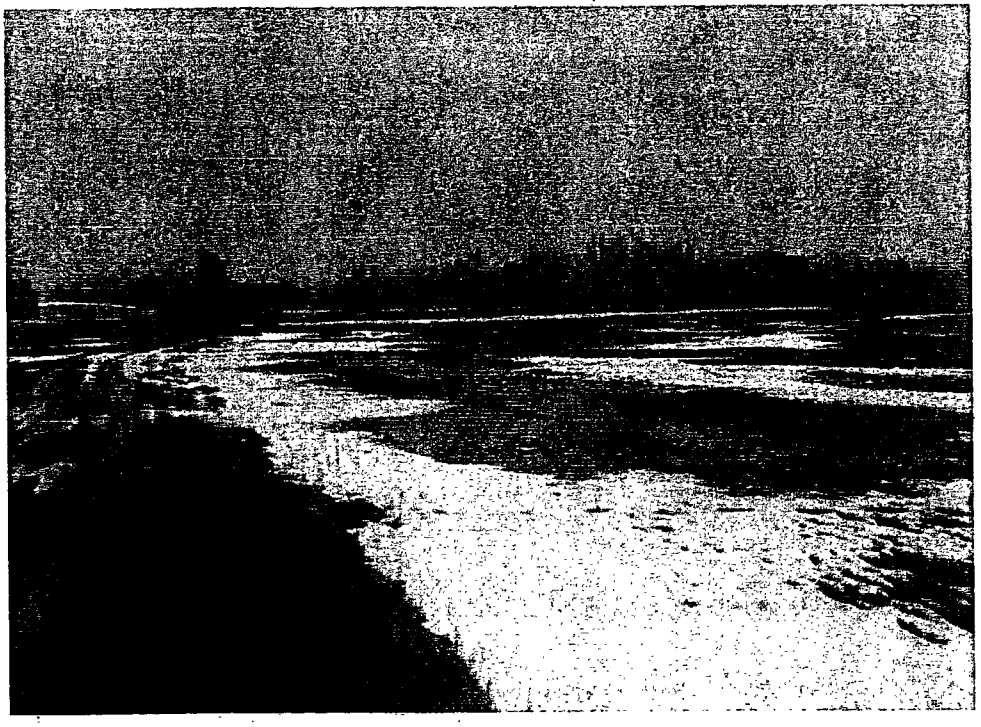

Photo 4: ***Farm field in south-central portion, looking north, adjacent to Fischer Lane (Unit 2)***

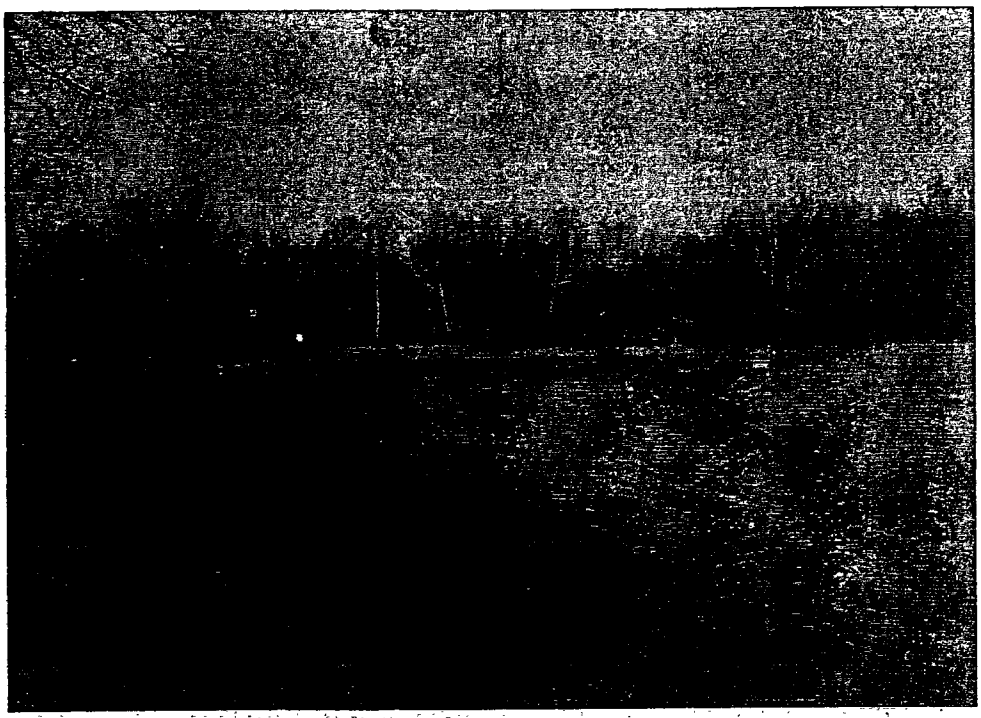

Photo 5: Tractor Shed and Chicken Coops N. of Zeitler Rd.

Photo 6: 180 Zeitler Road (Secondary Residence)

Photo 7: ***AST at primary residence***

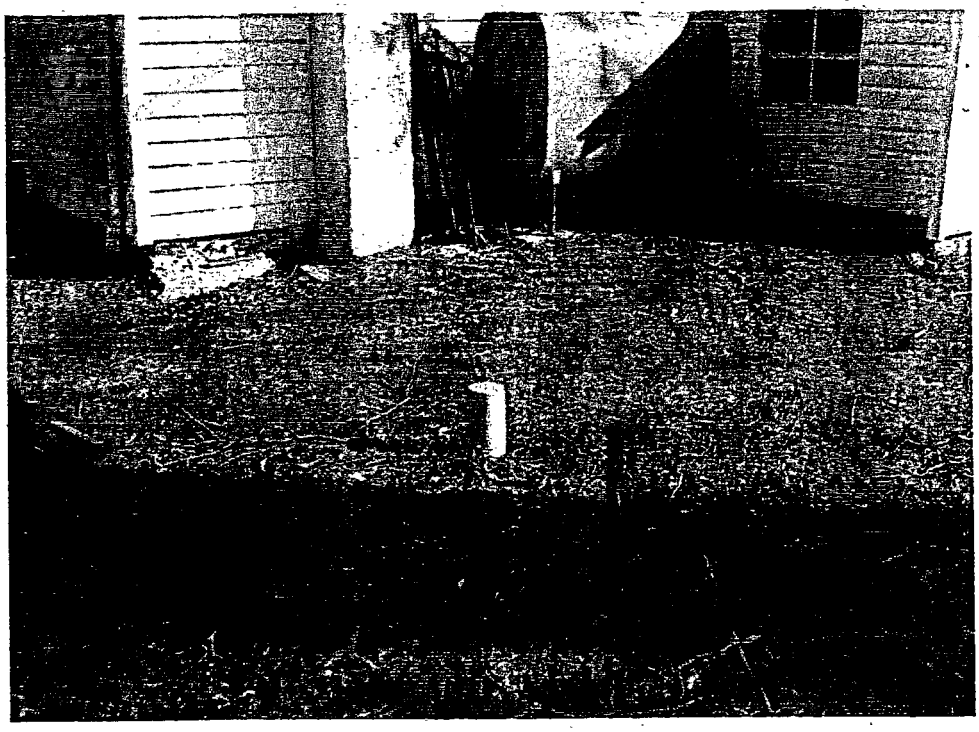

Photo 8: ***UST at primary residence***

Photo 9: ***180 Zeitler Road fuel fill and vent pipe***

Photo 10: ***Concrete septic tank clean-out E. of Primary Residence***

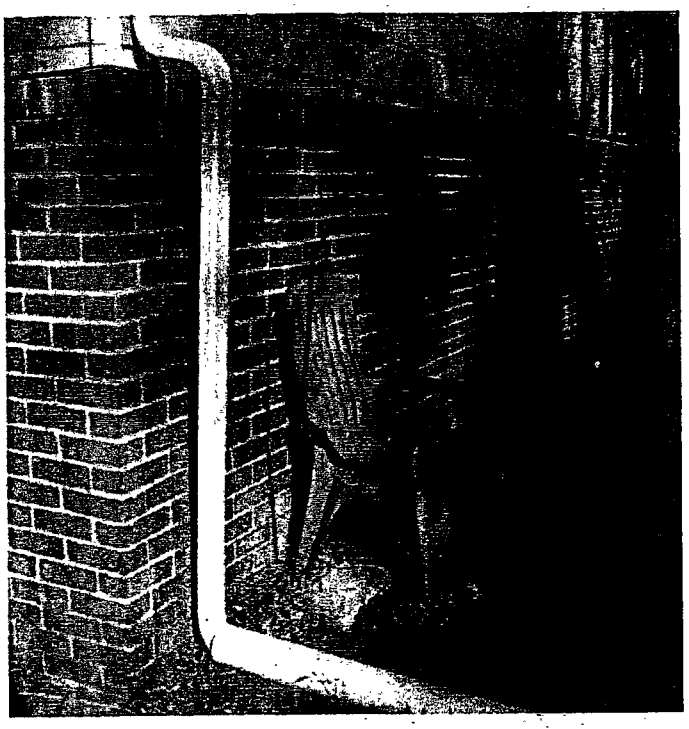

Photo 11: ***Former propane connection at primary residence***

Photo 12: ***Concrete culvert S. of barn (possibly spring)***

Photo 13: ***Corn Crib structure N of Zeitler Rd.***

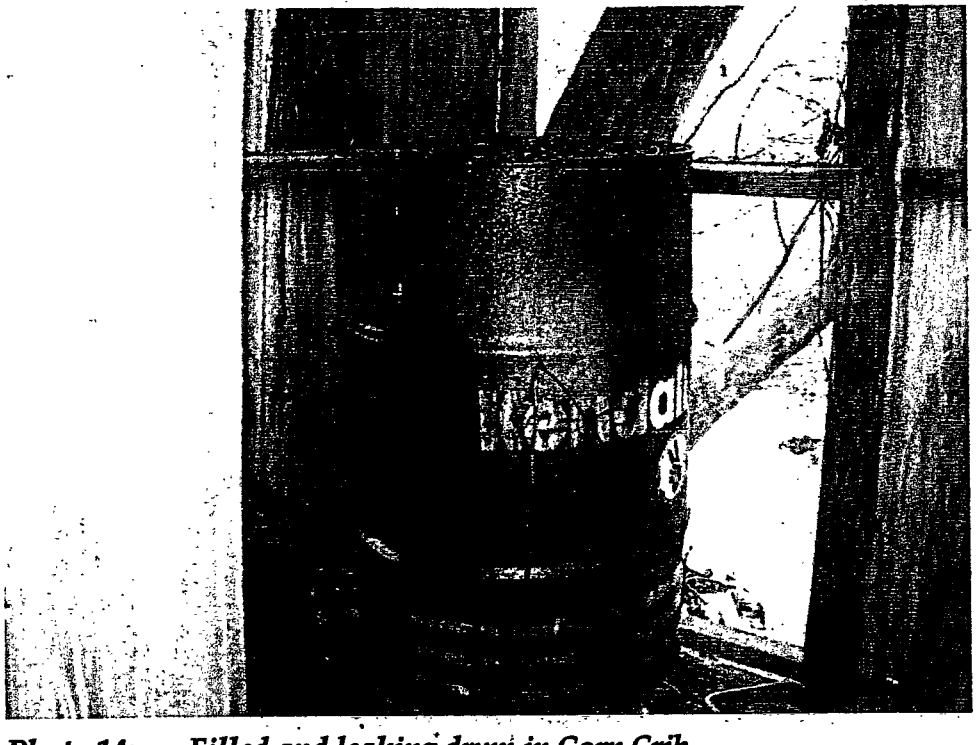

Photo 14: ***Filled and leaking drum in Corn Crib***

Photo 15: ***Old equipment storage in Tractor Shed***

Photo 16: ***Remaining used oil and anti-freeze buckets in Tractor Shed***

Photo 17: ***Used oil and anti-freeze buckets in Tractor Shed (close-up)***

Photo 18: ***Electric components stored in Small Storage Shed***

Photo 19: ***Southern stalls in Barn***

Photo 20: ***Northern stalls in Barn***

Photo 21: Garbage can of unknown material inside barn

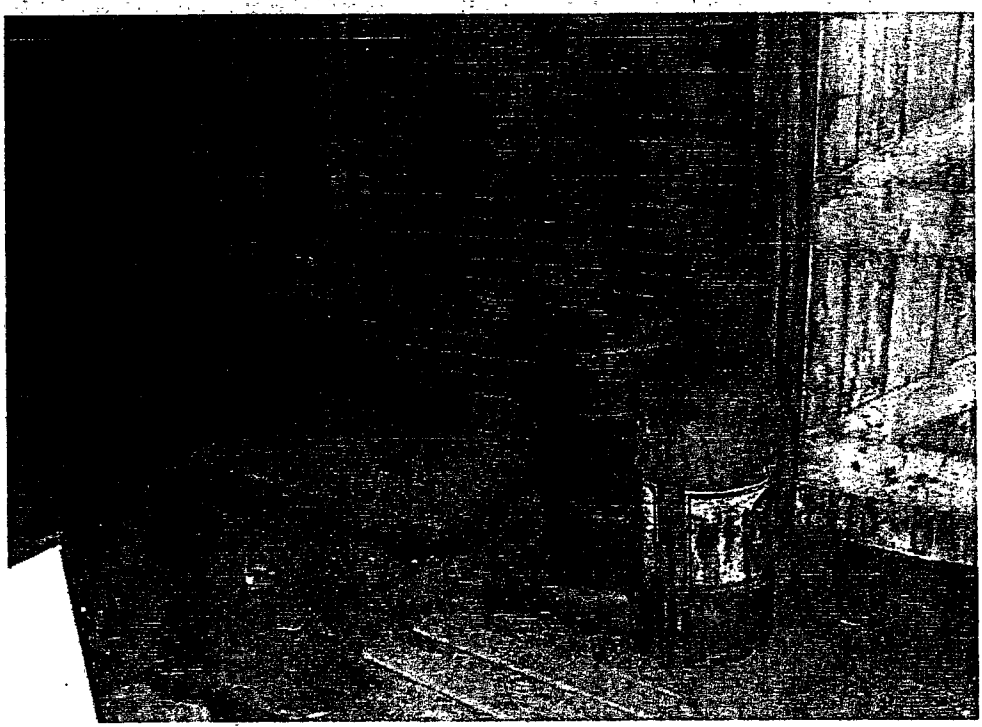

Photo 22: Drums of unknown material inside barn (western end)

Photo 23: Drum of unknown material inside barn (western end)

Photo 24: Overgrown construction debris (siding) at barn

Photo 25: ***Demolished horse barn north of Primary Residence***

Photo 26: ***Abandoned truck behind horse barn***

Photo 27: Debris between Tractor Shed and Small Storage Shed

Photo 28: TMRA building remnants (Unit 3)

Photo 31: ***Unexploded ordinance (UXO) debris found in field (Unit 2)***

Photo 32: ***Unexploded ordinance (UXO) debris found in field (Unit 2) (Glove for reference)***

C

Appendix C
EDR Radius Report

The EDR Radius Map
with GeoCheck®

Former Herron Farm
183 Zeitler Road
Elkton, MD 21921

Inquiry Number: 01326372.1r

December 15, 2004

EDR™ Environmental
Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

FORM-MEN

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Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	6
Orphan Summary	31
EPA Waste Codes	EPA-1
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting Source Map	A-7
Physical Setting Source Map Findings	A-8
Physical Setting Source Records Searched	A-14

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

183 ZEITLER ROAD
ELKTON, MD 21921

COORDINATES

Latitude (North):	39.629000 - 39° 37' 44.4"
Longitude (West):	75.863200 - 75° 51' 47.5"
Universal Tranverse Mercator:	Zone 18
UTM X (Meters):	425917.8
UTM Y (Meters):	4386728.0
Elevation:	47 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	39075-F7 NEWARK WEST, DE PA MD
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following government records. For more information on this property see page 6 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
ELKTON FARM 183 ZEITLER ROAD ELKTON, MD 21921	CERCLIS SHWS FINDS	MDD985407196
ELKTON FARM SITE ELKTON FARM SITE ELKTON, MD 21921	ERNS	N/A
NRCS HERRON LANE PROJECT HERRON LANE ELKTON, MD 21921	OCPCASES	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL..... National Priority List

EXECUTIVE SUMMARY

Proposed NPL..... Proposed National Priority List Sites
RCRA-TSDF..... Resource Conservation and Recovery Act Information
RCRA-LQG..... Resource Conservation and Recovery Act Information

STATE ASTM STANDARD

SWF/LF..... Permitted Solid Waste Disposal Facilities
VCP..... Voluntary Cleanup Program Applicants/Participants
SWRCY..... Recycling Directory

FEDERAL ASTM SUPPLEMENTAL

CONSENT..... Superfund (CERCLA) Consent Decrees
ROD..... Records Of Decision
Delisted NPL..... National Priority List Deletions
HMIRS..... Hazardous Materials Information Reporting System
MLTS..... Material Licensing Tracking System
MINES..... Mines Master Index File
NPL Liens..... Federal Superfund Liens
PADS..... PCB Activity Database System
UMTRA..... Uranium Mill Tailings Sites
ODI..... Open Dump Inventory
INDIAN RESERV..... Indian Reservations
DOD..... Department of Defense Sites
RAATS..... RCRA Administrative Action Tracking System
TRIS..... Toxic Chemical Release Inventory System
TSCA..... Toxic Substances Control Act
SSTS..... Section 7 Tracking Systems
FTTS INSP..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

Historical LUST..... Recovery Sites
AST..... Permitted Aboveground Storage Tanks
DRYCLEANERS..... Registered Drycleaning Facilities

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas..... Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS..... A Listing of Brownfields Sites
VCP..... Voluntary Cleanup Program Applicants/Participants
INST CONTROL..... Voluntary Cleanup Program Applicants/Participants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

EXECUTIVE SUMMARY

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

CERCLIS-NFRAP: As of February 1995. CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

A review of the CERC-NFRAP list, as provided by EDR, and dated 08/10/2004 has revealed that there is 1 CERC-NFRAP site within approximately 0.75 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
CENTRAL CHEMICAL COMPANY	*TRINCO INDUSTRIAL PARK*	*1/2 - 1 SSE*	*9*	*10*

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 09/23/2004 has revealed that there are 3 CORRACTS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
BOULDEN INC T/A DIRT MAGNET	*895 NOTTINGHAM ROAD*	*1 - 2 SW*	*17*	*14*
THIOKOL CORP ELKTON	*RTE 40*	*1 - 2 S*	*E20*	*22*

Lower Elevation	Address	Dist / Dir	Map ID	Page
P & R RAIL CAR SERVICE CORPORA	*TRINCO INDUSTRIAL PARK*	*1 - 2 SSE*	*14*	*12*

RCRAInfo: RCRAInfo is EPA's comprehensive information system, providing access to data supporting and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System(RCRIS). The database includes selective information on sites which generate, transport, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less

than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-SQG list, as provided by EDR, and dated 08/10/2004 has revealed that there are 2 RCRA-SQG sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
COLONIAL METALS INC	*505 BLUE BALL AND DOGWO*	*1/2 - 1 SE*	*B4*	*7*

Lower Elevation	Address	Dist / Dir	Map ID	Page
CENTRAL CHEMICAL COMPANY	*TRINCO INDUSTRIAL PARK*	*1/2 - 1 SSE*	*9*	*10*

STATE ASTM STANDARD

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of the Environment's Notice of Potential Hazardous Waste Sites list.

A review of the SHWS list, as provided by EDR, has revealed that there are 7 SHWS sites within approximately 1.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
VICON PROPERTY	DOGWOOD / SINGERLY RD	1 - 2 ESE	15	14
CHILDS PROPERTY	180 CHILDS RD	1 - 2 N	18	22
THIOKOL CORP ELKTON	RT 40	1 - 2 S	E19	22

Lower Elevation	Address	Dist / Dir	Map ID	Page
CENTRAL CHEMICAL COMPANY	*TRINCO INDUSTRIAL PARK*	*1/2 - 1 SSE*	*9*	*10*
IP INC	TRINCO INDUSTRIAL PARK	1/2 - 1 S	D10	11
GE RAIL	TRINCO INDUSTRIAL PARK	1/2 - 1 S	D11	11
DWYER PROPERTY	RTS 279 / 545 PARCEL	1 - 2 SE	16	14

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of the Environment's Listing of Underground Storage Tanks Reported in Maryland.

A review of the UST list, as provided by EDR, and dated 11/15/2004 has revealed that there are 2 UST sites within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
COLONIAL METALS, INC.	505 BLUEBALL ROAD TRIUM	1/2 - 1 SE	B5	7
OBLATE RETREAT CENTER	1120 BLUE BALL ROAD P.O	1/2 - 1 N	C8	9

EXECUTIVE SUMMARY

MD OCPCASES: Cases monitored by the Oil Control Program.

A review of the OCPCASES list, as provided by EDR, has revealed that there are 2 OCPCASES sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
OBLATE RETREAT CTR/DESALES CTR	1120 BLUE BALL RD.	1/2 - 1 N	C6	8
CE CO BOARD OF EDUCATION	555 BLUE BALL RD	1/2 - 1 SE	13	11

FEDERAL ASTM SUPPLEMENTAL

FUDS: The Listing includes locations of Formerly Used Defense Sites Properties where the US Army Corps Of Engineers is actively working or will take necessary cleanup actions.

A review of the FUDS list, as provided by EDR, and dated 12/31/2003 has revealed that there is 1 FUDS site within approximately 1.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
MORTON THIOKOL AMMO PLANT		1/2 - 1 S	12	11

STATE OR LOCAL ASTM SUPPLEMENTAL

HIST UST: Historical UST Registered Database.

A review of the Historical UST list, as provided by EDR, and dated 11/21/1996 has revealed that there is 1 Historical UST site within approximately 0.75 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
OBLATE RETREAT CENTER	1120 BLUE BALL RD.	1/2 - 1 N	C7	8

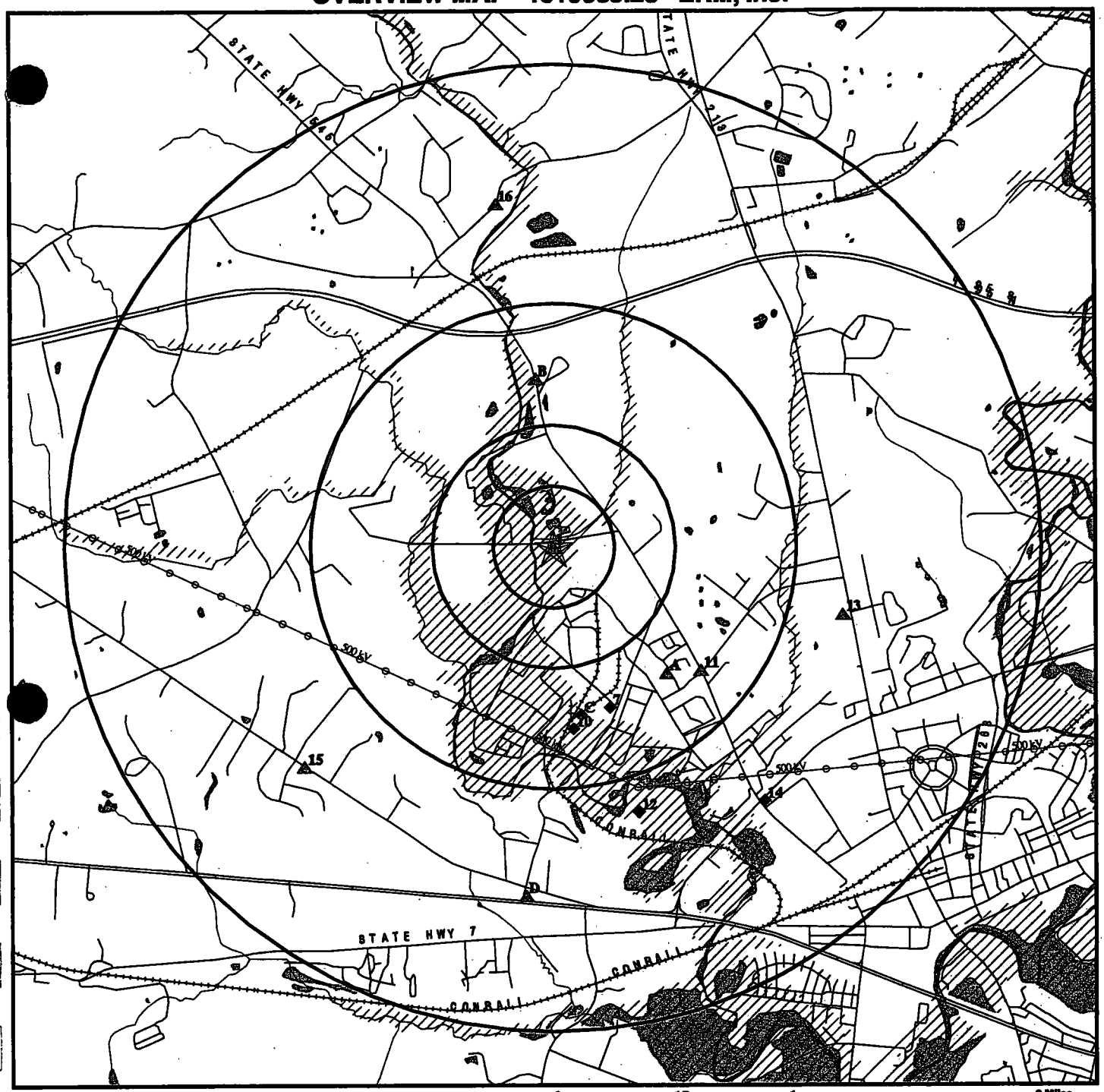
EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
SAND GRAVEL & STONE SITE	SHWS
HOG HILL LF	SHWS
TRIUMPH INDUSTRIAL PARK	SHWS
STAUFFER CHEM CO	CERCLIS, SHWS, FINDS
OLD ELKTON DUMP	SHWS
RT 7 CHEM DUMP SITE	SHWS
WHITTAKER TROJAN YACHT	SHWS
OLD ELKTON DUMP	CERCLIS, FINDS
DWYER PROPERTY	CERCLIS, FINDS
HOG HILL LANDFILL	CERC-NFRAP
CROUSE BROS. EXCAVATING, INC.	CERC-NFRAP
IP, INC	CERC-NFRAP
ROUTE 7 CHEM DUMP SITE	CERC-NFRAP
TORRY E. COLES DRV/ROYAL FARM	OCPCASES
VICON	VCP
GE RAILCAR REPAIR SERVICES	VCP
THE COLUMBUS COMPANY	Historical UST
ST. JOHN'S UNITED METHOD. CHURCH	Historical UST
SINGERLY FIRE COMPANY	Historical UST
OVERNITE TRANSPORTATION COMPANY (E	UST, Historical UST
SINGERLY FIRE COMPANY	Historical UST
WELL #1	Historical UST
SINGERLY FIRE COMPANY	Historical UST
BRENTWOOD MOBIL	Historical UST
CHESTERTOWN ELECTRIC SERVICE	Historical UST
EXXON OIL STATION	Historical UST
THE COLUMBUS COMPANY	UST
FORMER CECIL COUNTY AIRPARK	UST
THE BOHEMIA MANOR EVANGELICAL CHRI	UST
CHARLESTOWN ELECTRIC SERVICE	UST
OVERNITE TRANSPORTATION CO	RCRA-SQG, FINDS
DELMARVA POWER ANDORA	RCRA-SQG, FINDS
DELMARVA POWER PERCH SUBSTATION	RCRA-SQG
DELMARVA POWER MIDDLE SUBSTATION	RCRA-SQG, FINDS
MARYLAND STATE HIGHWAY ADMINISTRAT	RCRA-SQG, FINDS
THERM-X	RCRA-SQG, FINDS
MOUNT ARARAT FARM ROAD LAST POLE O	ERNS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - LOT 52-I	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL-5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - LOTS 18	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 6	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 1	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - LOT 12	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - LOT 11	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
TRIUMPH INDUSTRIAL PARK - PARCEL 5	US BROWNFIELDS
CENTRAL CHEMICAL CORPORATION	SSTS

EXECUTIVE SUMMARY

OVERVIEW MAP - 1319583.2s - ERM, Inc.



0 1/2 1 2 Miles

★ Target Property

▲ Sites at elevations higher than or equal to the target property

◆ Sites at elevations lower than the target property

♟ Coal Gasification Sites

National Priority List Sites

Landfill Sites

Dept. Defense Sites

Indian Reservations BIA

Power transmission lines

Oil & Gas pipelines

100-year flood zone

500-year flood zone

Federal Wetlands

TARGET PROPERTY:	Former Herron Farm	CUSTOMER:	ERM, Inc.
ADDRESS:	183 Zeitler Road	CONTACT:	Christy Hartmann
CITY/STATE/ZIP:	Elkton MD 21921	INQUIRY #:	1319583.2s
LAT/LONG:	39.6290 / 75.8632	DATE:	December 06, 2004 7:59 am

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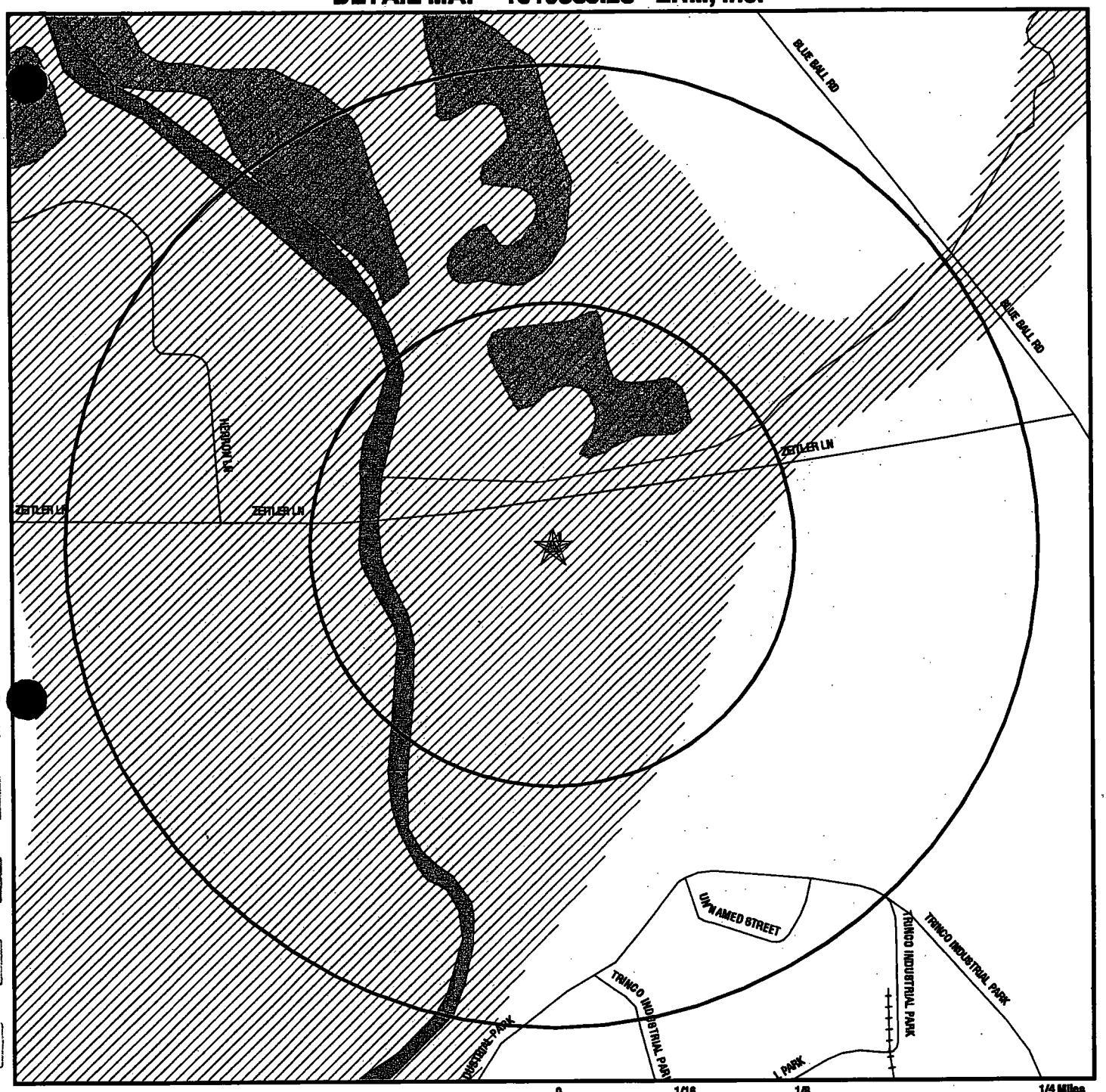
DETAIL MAP - 1319583.2s - ERM, Inc.



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Federal Wetlands

TARGET PROPERTY:	Former Herron Farm	CUSTOMER:	ERM, Inc.
ADDRESS:	183 Zeitler Road	CONTACT:	Christy Hartmann
CITY/STATE/ZIP:	Elkton MD 21921	INQUIRY #:	1319583.2s
LAT/LONG:	39.6290 / 75.8632	DATE:	December 06, 2004 7:59 am

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.500	0	0	0	0	0	0
Proposed NPL		1.500	0	0	0	0	0	0
CERCLIS	X	1.000	0	0	0	0	NR	0
CERC-NFRAP		0.750	0	0	0	1	NR	1
CORRACTS		1.500	0	0	0	0	3	3
RCRA TSD		1.000	0	0	0	0	NR	0
RCRA Lg. Quan. Gen.		0.750	0	0	0	0	NR	0
RCRA Sm. Quan. Gen.		0.750	0	0	0	2	NR	2
ERNS	X	0.500	0	0	0	NR	NR	0
STATE ASTM STANDARD								
State Haz. Waste	X	1.500	0	0	0	3	4	7
State Landfill		1.000	0	0	0	0	NR	0
UST		0.750	0	0	0	2	NR	2
VCP		1.000	0	0	0	0	NR	0
SWRCY		1.000	0	0	0	0	NR	0
OCPCASES	X	1.000	0	0	0	2	NR	2
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.500	0	0	0	0	0	0
ROD		1.500	0	0	0	0	0	0
Delisted NPL		1.500	0	0	0	0	0	0
FINDS	X	0.500	0	0	0	NR	NR	0
HMIRS		0.500	0	0	0	NR	NR	0
MLTS		0.500	0	0	0	NR	NR	0
MINES		0.750	0	0	0	0	NR	0
NPL Liens		0.500	0	0	0	NR	NR	0
PADS		0.500	0	0	0	NR	NR	0
FUDS		1.500	0	0	0	1	0	1
UMTRA		1.000	0	0	0	0	NR	0
ODI		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.500	0	0	0	0	0	0
DOD		1.500	0	0	0	0	0	0
RAATS		0.500	0	0	0	NR	NR	0
TRIS		0.500	0	0	0	NR	NR	0
TSCA		0.500	0	0	0	NR	NR	0
SSTS		0.500	0	0	0	NR	NR	0
FTTS		0.500	0	0	0	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
Historical LUST		1.000	0	0	0	0	NR	0
AST		0.500	0	0	0	NR	NR	0
Historical UST		0.750	0	0	0	1	NR	1

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DRYCLEANERS		0.750	0	0	0	0	NR	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.500	0	0	0	0	0	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		1.000	0	0	0	0	NR	0
VCP		1.000	0	0	0	0	NR	0
INST CONTROL		1.000	0	0	0	0	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

A1 Target Property — ELKTON FARM, 183 ZEITLER ROAD, ELKTON, MD 21921 — CERCLIS 1000466320, SHWS MDD985407196, FINDS

Actual: 47 ft.

Site 1 of 3 in cluster A

CERCLIS Classification Data:
Site incident category: Not reported
Non NPL Status: Combined PA/SI Ongoing
Ownership Status: Private
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL

CERCLIS Assessment History:

Assessment:	DISCOVERY	Completed:	10/15/1991
Assessment:	REMOVAL ASSESSMENT	Completed:	02/24/1992
Assessment:	REMOVAL	Completed:	06/23/1992
Assessment:	PRELIMINARY ASSESSMENT	Completed:	11/22/1993
Assessment:	SITE REASSESSMENT	Completed:	08/22/2001

CERCLIS Site Status:
Low

To make an informed judgement about the potential liabilities associated with the CERCLIS site above contact your EDR representative to order a CERCLIS Alerts summary. CERCLIS Alerts summaries, available for this and other select CERCLIS sites, provide detailed data on groundwater depth and flow direction, site history, EPA identified areas of concern, and available sampling results.

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Comprehensive Environmental Response, Compensation and Liability Information System

SHWS:
Facility ID: (MD-433)
Facility Type: State Master List
Status: NFRAP
Alias Name: NONE

A2 Target Property — ELKTON FARM SITE, ELKTON FARM SITE, ELKTON, MD 21921 — ERNS 91257710, N/A

Actual: 47 ft.

Site 2 of 3 in cluster A

Click this hyperlink while viewing on your computer to access additional ERNS detail in the EDR Site Report.

A3 Target Property — NRCS HERRON LANE PROJECT, HERRON LANE, ELKTON, MD 21921 — OCPCASES S104617751, N/A

Actual: 47 ft.

Site 3 of 3 in cluster A

OCP Cases:
Facility ID: 00-0661CE
Cleanup: NO
Date Open: Not reported
Date Closed: Not reported
Facility Status: CLOSED
Release: NO
Missing in Action: False

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported emergency releases to the soil

DATABASE: Emergency Response Notification System (ERNS)

ELKTON FARM SITE
ELKTON FARM SITE
ELKTON, MD 21921
EDR ID #91257710

Site ID:	91257710		
Site Location:	ELKTON FARM SITE ELKTON, MD 21921- CECIL County		
Report No:	Not reported	EPA Region:	03
Spill Date:	10/15/1991	Spill Time:	00:00
Medium Desc:	Land, Water	Damage/Amt:	Yes / $0.00
Evacuation:	Yes	Injured:	None
Fatalities:	None	Notes:	POTENTIAL TO DAGWOOD CREEK
Disch Org:	MARTIN HERRON		
Disch Add:	183 ZEITLER RD.		
Disch City:	ELKTON		
Disch ST:	MD		
Disch Zip:	21921-		
Disch County:	CECIL		
C.G. Unit:	Not reported		
Cause:	OTHER		

Spilled Material	Total Qty	In Water	Undot	Cas	Qty
HAZ SUB.	0.00 UNK	0.00 UNK	Not reported	Not reported	0.00 lbs.

Description:	DRUMS OF HAZ. SUB. STORED ON-SITE. OWNER RECEIVED MAT'L FROM GALAXY & ATTEMPTED TO TRANSPORT MAT'L TO LANDFILL
Location:	ELKTON FARM SITE
Action:	EPA PERFORMED ASSESSMENTIN 10/91. ACTIVATED CERCLA FOR SITE CLEANUP.
Comments:	STATE HAS ASKED FOR EPA ASSISTANCE FOR SITE CLEANUP. GALAXY CEASED OPERATIONS AND LANDFILL REFUSED THE MATERIAL.

NRCS HERRON LANE PROJECT (Continued) — S104617751

Facility Code: Other (Specify)

B4
SE
1/2-1
3668 ft.

COLONIAL METALS INC
505 BLUE BALL AND DOGWOOD RD
ELKTON, MD 21922

RCRA-SQG 1000338906
FINDS 21921CLNLM50
TRIS

Site 1 of 2 in cluster B

Relative:
Higher

Actual:
81 ft.

RCRAInfo:

Owner: OPERNAME
(215) 555-1212
EPA ID: MDD054900287

Contact: Not reported

Classification: Conditionally Exempt Small Quantity Generator
TSDF Activities: Not reported

Violation Status: No violations found

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Aerometric Information Retrieval System/AIRS Facility Subsystem
MD-EPSC
National Compliance Data Base
National Emissions Inventory
Resource Conservation and Recovery Act Information system
Toxics Release Inventory

B5
SE
1/2-1
3668 ft.

COLONIAL METALS, INC.
505 BLUEBALL ROAD TRIUMPH INDUSTRIAL
ELKTON, MD 21922

UST U003734953
N/A

Site 2 of 2 in cluster B

Relative:
Higher

Actual:
81 ft.

UST:

Facility ID:	2699
Facility Phone:	(410) 398-7200
Capacity:	275
Tank Status:	PERMANENTLY OUT OF USE
Product:	Heating Oil
Owner Id:	1738
Owner Name:	Colonial Metals, Inc.
Address:	PO Box 726 Elkton, MD 21922
Contact:	Edward H. Webster
Phone:	(410) 398-7200
First Name:	Edward H.
Last Name:	Webster

Facility ID:	2699
Facility Phone:	(410) 398-7200
Capacity:	4000
Tank Status:	PERMANENTLY OUT OF USE
Product:	GASOLINE
Owner Id:	1738
Owner Name:	Colonial Metals, Inc.
Address:	PO Box 726 Elkton, MD 21922

COLONIAL METALS, INC. (Continued) — U003734953

Contact: Edward H. Webster
Phone: (410) 398-7200
First Name: Edward H.
Last Name: Webster

Facility ID: 2699
Facility Phone: (410) 398-7200
Capacity: 5000
Tank Status: PERMANENTLY OUT OF USE
Product: Heating Oil
Owner Id: 1738
Owner Name: Colonial Metals, Inc.
Address: PO Box 726
Elkton, MD 21922
Contact: Edward H. Webster
Phone: (410) 398-7200
First Name: Edward H.
Last Name: Webster

C6 North 1/2-1 3674 ft. — OBLATE RETREAT CTR/DESALES CTR — OCPCASES — S104617431 / N/A
1120 BLUE BALL RD.
CHILDS, MD 21916

Site 1 of 3 in cluster C

Relative: Higher
Actual: 77 ft.

OCP Cases:
Facility ID: 00-0307CE
Cleanup: NO
Date Open: Not reported
Date Closed: Not reported
Facility Status: CLOSED
Release: NO
Missing in Action: False
Facility Code: B-9

C7 North 1/2-1 3674 ft. — OBLATE RETREAT CENTER — Historical UST — S104631030 / N/A
1120 BLUE BALL RD.
CHILDS, MD 21916

Site 2 of 3 in cluster C

Relative: Higher
Actual: 77 ft.

UST HISTORICAL:

Facility ID:	3005623	Tank ID:	001
Age:	30	Capacity:	1,000
Tank Status:	Removed	Product:	Gasoline
Product:	Gasoline		

Facility ID:	3005623	Tank ID:	002
Age:	25	Capacity:	3,000
Tank Status:	Removed	Product:	Gasoline
Product:	Gasoline		

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
C8 North 1/2-1 3674 ft.	OBLATE RETREAT CENTER 1120 BLUE BALL ROAD P.O. BOX 43 CHESAPEAKE CI, MD 21915	UST	U003734560 N/A

Site 3 of 3 in cluster C

Relative: Higher

Actual: 77 ft.

UST:

Facility ID:	210
Facility Phone:	(410) 398-3040
Capacity:	1500
Tank Status:	PERMANENTLY OUT OF USE
Product:	GASOLINE
Owner Id:	184
Owner Name:	Oblates of St. Francis de Sales
Address:	220 Kentmere Parkway P.O. Box 1452 Wilmington, DE 19806
Contact:	Rev. Robert Mancini
Phone:	(302) 656-8529
First Name:	Rev. John
Last Name:	Brennan, OSFS

Facility ID:	210
Facility Phone:	(410) 398-3040
Capacity:	3000
Tank Status:	PERMANENTLY OUT OF USE
Product:	GASOLINE
Owner Id:	184
Owner Name:	Oblates of St. Francis de Sales
Address:	220 Kentmere Parkway P.O. Box 1452 Wilmington, DE 19806
Contact:	Rev. Robert Mancini
Phone:	(302) 656-8529
First Name:	Rev. John
Last Name:	Brennan, OSFS

Facility ID:	210
Facility Phone:	(410) 398-3040
Capacity:	6000
Tank Status:	PERMANENTLY OUT OF USE
Product:	Heating Oil
Owner Id:	184
Owner Name:	Oblates of St. Francis de Sales
Address:	220 Kentmere Parkway P.O. Box 1452 Wilmington, DE 19806
Contact:	Rev. Robert Mancini
Phone:	(302) 656-8529
First Name:	Rev. John
Last Name:	Brennan, OSFS

Facility ID:	210
Facility Phone:	(410) 398-3040
Capacity:	6000
Tank Status:	CURRENTLY IN USE
Product:	Heating Oil
Owner Id:	184
Owner Name:	Oblates of St. Francis de Sales
Address:	220 Kentmere Parkway P.O. Box 1452 Wilmington, DE 19806
Contact:	Rev. Robert Mancini

OBLATE RETREAT CENTER (Continued) — U003734560

Phone: (302) 656-8529
First Name: Rev. John
Last Name: Brennan, OSFS

Facility ID: 210
Facility Phone: (410) 398-3040
Capacity: 1000
Tank Status: CURRENTLY IN USE
Product: Heating Oil
Owner Id: 184
Owner Name: Oblates of St. Francis de Sales
Address: 220 Kentmere Parkway P.O. Box 1452
Wilmington, DE 19806
Contact: Rev. Robert Mancini
Phone: (302) 656-8529
First Name: Rev. John
Last Name: Brennan, OSFS

8
SSE
1/2-1
3599 ft.

CENTRAL CHEMICAL COMPANY
TRINCO INDUSTRIAL PARK
ELKTON, MD 21921

RCRA-SQG 1000418591
SHWS 21921CNTRLZE
TRIS
CERC-NFRAP

Relative:
Lower

Actual:
44 ft.

CERCLIS-NFRAP Classification Data:
Site Incident Category: Not reported — Federal Facility: Not a Federal Facility
Non NPL Code: NFRAP
Ownership Status: Private — NPL Status: Not on the NPL
Site Description: SITE IS A CHEMICAL PLANT THAT MIXED AND PACKAGED INSECTICIDES AND PESTICIDES.

CERCLIS-NFRAP Assessment History:

Assessment:	DISCOVERY	Completed:	09/29/1989
Assessment:	PRELIMINARY ASSESSMENT	Completed:	07/12/1990
Assessment:	ARCHIVE SITE	Completed:	07/12/1990
Assessment:	COMFORT/STATUS LETTER	Completed:	08/09/1999
Assessment:	PRELIMINARY ASSESSMENT	Completed:	09/27/1999

CERCLIS-NFRAP Alias Name(s):
CENTRAL CHEMICAL COMPANY

RCRAInfo:
Owner: CENTRAL CHEMICAL CORPORATION
(301) 733-4702
EPA ID: MDD041953803

Contact: SAMUEL NICKELS
(301) 398-7100

Classification: Small Quantity Generator
TSDF Activities: Not reported

Violation Status: No violations found

SHWS:
Facility ID: (MD-325)
Facility Type: State Master List
Status: NFRAP
Alias Name: NONE

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
D10 South 1/2-1 3710 ft.	IP INC TRINCO INDUSTRIAL PARK ELKTON, MD 21921	SHWS	S101472570 N/A

Site 1 of 2 in cluster D

Relative: Lower
Actual: 39 ft.

SHWS:

Facility ID:	(MD-372)
Facility Type:	State Master List
Status:	NFRAP
Alias Name:	NONE

D11 South 1/2-1 3710 ft.	GE RAIL TRINCO INDUSTRIAL PARK ELKTON, MD 21921	SHWS	S101517381 N/A

Site 2 of 2 in cluster D

Relative: Lower
Actual: 39 ft.

SHWS:

Facility ID:	(MD-294)
Facility Type:	State Master List
Status:	NFRAP
Alias Name:	P & R RAILCAR SERV CORP

---

12 South 1/2-1 3988 ft.	MORTON THIOKOL AMMO PLANT ELKTON, MD	FUDS	1007372649 N/A

Relative: Lower
Actual: 37 ft.

FUDS:

Federal Facility ID:	MD9799F1442
Facility Name:	MORTON THIOKOL AMMO PLANT
City:	ELKTON
State:	MD
EPA Region:	3
County:	CECIL
Congressional District:	01
US Army District:	Baltimore District (NAB)
Fiscal Year:	2003
First Name:	RAYMOND
Last name:	MCNEIL
Phone:	410-962-2809
Inst ID:	59239
CTC:	Not reported
RAB:	Not reported

---

13 SE 1/2-1 4169 ft.	CE CO BOARD OF EDUCATION 555 BLUE BALL RD ELKTON, MD 21921	OCPCASES	S104606446 N/A

Relative: Higher
Actual: 102 ft.

OCP Cases:

Facility ID:	95-1768CE
Cleanup:	Not reported
Date Open:	Not reported
Date Closed:	Not reported
Facility Status:	CLOSED
Release:	Not reported
Missing in Action:	False
Facility Code:	Not reported

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
14 SSE > 1 8069 ft.	P & R RAIL CAR SERVICE CORPORATION TRINCO INDUSTRIAL PARK ELKTON, MD 21921	FINDS RCRA-LQG RCRA-TSDF CORRACTS	1000199989 MDD078288354

Relative: Lower

Actual: 22 ft.

CORRACTS Data:

EPA Id: MDD078288354
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 09/16/1994
Corrective Action: CA225IN - Stabilization Measures Evaluation, This facility is not , amenable to stabilization activity because of, a lack of technical data. An evaluation has been completed, but further data is necessary to determine stabilization measures, feasibility or appropriateness. This status should be changed when data becomes available
2002 NAICS Title: Railroad Rolling Stock Manufacturing

EPA Id: MDD078288354
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 10/06/1999
Corrective Action: CA070YE - RFA Determination Of Need For An RFI, RFI Is Necessary
2002 NAICS Title: Railroad Rolling Stock Manufacturing

EPA Id: MDD078288354
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 05/28/1993
Corrective Action: CA075HI - CA Prioritization, Facility or area was assigned a high corrective action priority
2002 NAICS Title: Railroad Rolling Stock Manufacturing

EPA Id: MDD078288354
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 01/30/1990
Corrective Action: CA600SR - Stabilization Measures Implemented , Primary measure is source removal and/or treatment
2002 NAICS Title: Railroad Rolling Stock Manufacturing

EPA Id: MDD078288354
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 01/27/2000
Corrective Action: CA725IN - Current Human Exposures Under Control , More information is needed to make a determination
2002 NAICS Title: Railroad Rolling Stock Manufacturing

Click this hyperlink while viewing on your computer to access
4 additional CORRACTS record(s) in the EDR Site Report.

P & R RAIL CAR SERVICE CORPORATION (Continued) 1000199989

RCRAInfo Corrective Action Summary:

Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
Event Date: 04/03/2003

Event: RFI Imposition
Event Date: 10/09/2001

Event: Current Human Exposures under Control, More information is needed to make a determination.
Event Date: 01/27/2000

Event: Igration of Contaminated Groundwater under Control, More information is needed to make a determination.
Event Date: 01/27/2000

Event: RFA Determination Of Need For An RFI, RFI is Necessary;
Event Date: 10/06/1999

Event: RFI Imposition
Event Date: 10/06/1999

Event: Stabilization Measures Evaluation,This facility is not amenable to stabilization activity because of a lack of technical data. An evaluation has been completed, but further data is necessary to determine stabilization measures, feasibility or appropriateness. This status should be changed when data becomes available.
Event Date: 09/16/1994

Event: CA Prioritization, Facility or area was assigned a high corrective action priority.
Event Date: 05/28/1993

Event: Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event Date: 01/30/1990

RCRAInfo:

Owner: QUALITY SERVICE RAILCAR REPAIR CORP
(312) 853-5396
EPA ID: MDD078288354

Contact: ROMAN GERUS
(312) 853-5396

Classification: Large Quantity Generator, TSDF
TSDF Activities: Not reported

P & R RAIL CAR SERVICE CORPORATION (Continued) 1000199989

Violation Status: Violations exist

Regulation Violated:	Not reported
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	10/17/1985
Actual Date Achieved Compliance:	10/29/1985
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	10/17/1985
Penalty Type:	Not reported

There are 1 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Sampling Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19851029

NY MANIFEST

Click this hyperlink while viewing on your computer to access additional NY MANIFEST detail in the EDR Site Report.

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Integrated Compliance Information
Resource Conservation and Recovery Act Information system

15
ESE
> 1
6458 ft.

VICON PROPERTY
DOGWOOD / SINGERLY RDS
ELKTON, MD 21921

SHWS 1000943334
N/A

Relative:
Higher

Actual:
86 ft.

SHWS:

Facility ID:	(MD-366)
Facility Type:	State Master List
Status:	NFRAP
Alias Name:	NONE

16
SE
> 1
7193 ft.

DWYER PROPERTY
RTS 279 / 545 PARCEL 1037 SW
ELKTON, MD 21921

SHWS S101517379
N/A

Relative:
Lower

Actual:
38 ft.

SHWS:

Facility ID:	(MD-313)
Facility Type:	State Master List
Status:	NFRAP
Alias Name:	NONE

17
SW
> 1
7225 ft.

BOULDEN INC T/A DIRT MAGNET
895 NOTTINGHAM ROAD
CECIL, MD 21921

RCRA-SQG 1000278503
FINDS MDD980550198
RCRA-TSDF
CORRACTS

Relative:
Higher

Actual:
170 ft.

CORRACTS Date:

EPA Id:	MDD980550198
Region:	3
Area Name:	SOILS
Actual Date:	06/21/1995
Corrective Action:	CA150 - RFI Workplan Approved

BOULDEN INC T/A DIRT MAGNET (Continued) 1000276503

2002 NAICS Title: 23511

EPA Id: MDD980550198
Region: 3
Area Name: GROUNDWATER
Actual Date: 04/29/1997
Corrective Action: CA150 - RFI Workplan Approved
2002 NAICS Title: 23511

EPA Id: MDD980550198
Region: 3
Area Name: GROUNDWATER
Actual Date: 04/24/1998
Corrective Action: CA200 - RFI Approved
2002 NAICS Title: 23511

EPA Id: MDD980550198
Region: 3
Area Name: SOILS
Actual Date: 09/09/1996
Corrective Action: CA200 - RFI Approved
2002 NAICS Title: 23511

EPA Id: MDD980550198
Region: 3
Area Name: ENTIRE FACILITY
Actual Date: 03/29/1993
Corrective Action: CA225YE - Stabilization Measures Evaluation, This facility ,is amenable to stabilization activity based on the, status of corrective action work at the facility, technical factors, the degree of risk, timing considerations and administrative considerations
2002 NAICS Title: 23511

Click this hyperlink while viewing on your computer to access
11 additional CORRACTS record(s) in the EDR Site Report.

RCRAInfo Corrective Action Summary:

Event: Date For Remedy Selection (CM Imposed)
Event Date: 07/17/1998

Event: Corrective Action Process Terminated, No Further Action
Event Date: 07/17/1998

Event: Stabilization Construction Completed
Event Date: 06/24/1998

Event: RFI Approved
Event Date: 04/24/1998

Event: RFI Workplan Approved
Event Date: 04/29/1997

Event: RFI Approved
Event Date: 09/09/1996

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
Event Date: 08/28/1996

Event: Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
Event Date: 08/28/1996

Event: RFI Workplan Approved
Event Date: 06/21/1995

Event: Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event Date: 06/21/1995

Event: RFA Determination Of Need For An RFI, RFI is Necessary;
Event Date: 11/29/1994

Event: RFI Imposition
Event Date: 11/29/1994

Event: Stabilization Measures Evaluation,This facility is amenable to stabilization activity based on the status of corrective action work at the facility, technical factors, the degree of risk, timing considerations and administrative considerations.
Event Date: 03/29/1993

Event: CA Prioritization, Facility or area was assigned a high corrective action priority.
Event Date: 11/01/1991

RCRAInfo:
Owner: OPERNAME
(215) 555-1212
EPA ID: MDD980550198

Contact: Not reported

Classification: TSDF
TSDF Activities: Not reported

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Violation Status: Violations exist

Regulation Violated: CONAR 26.13.05.02G
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: 02/03/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.05.02D
Area of Violation: TSD-CHEMICAL/PHYSICAL/BIOLOGICAL REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: 02/03/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.0703E(1)
Area of Violation: TSD-CONTAINERS REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: 01/31/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.05.09
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: 02/18/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: 40 CFR PART 268.7(a)
Area of Violation: GENERATOR-LAND BAN REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: Not reported

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: 40 CFR PART 268.7(a)
Area of Violation: GENERATOR-LAND BAN REQUIREMENTS
Date Violation Determined: 12/22/1993
Actual Date Achieved Compliance: Not reported

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 12/22/1993
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: TRANSPORTER-GENERAL REQUIREMENTS
Date Violation Determined: 05/21/1992
Actual Date Achieved Compliance: 05/22/1992

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 07/22/1992
Penalty Type: Final Monetary Penalty

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Regulation Violated: Not reported
Area of Violation: TSD-GENERAL STANDARDS
Date Violation Determined: 05/12/1992
Actual Date Achieved Compliance: 05/20/1992

Regulation Violated: Not reported
Area of Violation: TSD-CONTAINERS REQUIREMENTS
Date Violation Determined: 05/12/1992
Actual Date Achieved Compliance: 05/20/1992

Regulation Violated: Not reported
Area of Violation: TSD-CONTAINERS REQUIREMENTS
Date Violation Determined: 05/12/1992
Actual Date Achieved Compliance: 05/20/1992

Regulation Violated: Not reported
Area of Violation: TSD-GENERAL STANDARDS
Date Violation Determined: 05/12/1992
Actual Date Achieved Compliance: 05/20/1992

Regulation Violated: Not reported
Area of Violation: TSD-TANKS REQUIREMENTS
Date Violation Determined: 05/12/1992
Actual Date Achieved Compliance: 05/20/1992

Regulation Violated: Not reported
Area of Violation: TRANSPORTER-GENERAL REQUIREMENTS
Date Violation Determined: 10/24/1991
Actual Date Achieved Compliance: 10/25/1991

Regulation Violated: Not reported
Area of Violation: GENERATOR-GENERAL REQUIREMENTS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 12/12/1991

Regulation Violated: Not reported
Area of Violation: GENERATOR-GENERAL REQUIREMENTS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 12/12/1991

Regulation Violated: Not reported
Area of Violation: TSD-GENERAL STANDARDS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 12/12/1991

Regulation Violated: Not reported
Area of Violation: TSD-GENERAL STANDARDS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 12/12/1991

Regulation Violated: Not reported
Area of Violation: TSD-OTHER REQUIREMENTS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 06/22/1992

Regulation Violated: Not reported
Area of Violation: GENERATOR-RECORDKEEPING REQUIREMENTS
Date Violation Determined: 10/23/1991
Actual Date Achieved Compliance: 12/12/1991

Regulation Violated: Not reported
Area of Violation: GENERATOR-MANIFEST REQUIREMENTS
Date Violation Determined: 06/28/1991

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Actual Date Achieved Compliance: 10/25/1991

Regulation Violated: COMAR 26.13.03.05E
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 12/14/1990
Actual Date Achieved Compliance: 12/17/1996

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 12/14/1990
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05E
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 07/26/1990
Actual Date Achieved Compliance: 12/17/1996

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 07/26/1990
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.04.02
Area of Violation: Transporter-manifest/record keeping requirements
Date Violation Determined: 07/26/1990
Actual Date Achieved Compliance: 12/17/1996

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 07/26/1990
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 03/28/1990
Actual Date Achieved Compliance: 04/26/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 03/28/1990
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 03/06/1990
Actual Date Achieved Compliance: 07/26/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 03/06/1990
Penalty Type: Final Monetary Penalty

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 04/29/1991
Penalty Type: Final Monetary Penalty

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 03/06/1990
Actual Date Achieved Compliance: 07/26/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 03/06/1990
Penalty Type: Final Monetary Penalty

Enforcement Action: FINAL CONSENT DECREES
Enforcement Action Date: 04/29/1991
Penalty Type: Final Monetary Penalty

Regulation Violated: Not reported

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 12/19/1989
Actual Date Achieved Compliance: 01/18/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 12/19/1989
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 09/26/1989
Actual Date Achieved Compliance: 07/26/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 09/26/1989
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 09/26/1989
Actual Date Achieved Compliance: 07/26/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 09/26/1989
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 04/17/1989
Actual Date Achieved Compliance: 09/26/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 04/17/1989
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 12/22/1987
Actual Date Achieved Compliance: 12/23/1987

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 12/22/1987
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 12/22/1987
Actual Date Achieved Compliance: 04/17/1989

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 12/22/1987
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: GENERATOR-ALL REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 01/13/1987
Actual Date Achieved Compliance: 05/27/1987

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 01/13/1987
Penalty Type: Not reported

Penalty Summary:

Penalty Description	Penalty Date	Penalty Amount	Lead Agency

BOULDEN INC T/A DIRT MAGNET (Continued) 1000278503

Final Monetary Penalty	7/22/1992	1250	STATE
Proposed Monetary Penalty	7/22/1992	1125	STATE
Proposed Monetary Penalty	4/29/1991	23000	STATE

There are 33 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Compliance Schedule Evaluation	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940218
Compliance Schedule Evaluation	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940203
	TSD-CHEMICAL/PHYSICAL/BIOLOGICAL REQUIREMENT	19940203
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940218
	TSD-CONTAINERS REQUIREMENTS	19940131
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940203
	TSD-CHEMICAL/PHYSICAL/BIOLOGICAL REQUIREMENT	19940203
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940218
	TSD-CONTAINERS REQUIREMENTS	19940131
	GENERATOR-LAND BAN REQUIREMENTS	
	GENERATOR-LAND BAN REQUIREMENTS	
Compliance Schedule Evaluation	TSD-OTHER REQUIREMENTS	19920622
Other Evaluation	TRANSPORTER-GENERAL REQUIREMENTS	19920522
Other Evaluation	TSD-GENERAL STANDARDS	19920520
	TSD-GENERAL STANDARDS	19920520
	TSD-CONTAINERS REQUIREMENTS	19920520
	TSD-CONTAINERS REQUIREMENTS	19920520
	TSD-TANKS REQUIREMENTS	19920520
Compliance Evaluation Inspection	GENERATOR-GENERAL REQUIREMENTS	19911212
	GENERATOR-GENERAL REQUIREMENTS	19911212
	TSD-GENERAL STANDARDS	19911212
	GENERATOR-RECORDKEEPING REQUIREMENTS	19911212
	TSD-GENERAL STANDARDS	19911212
	GENERATOR-MANIFEST REQUIREMENTS	19911025
	TRANSPORTER-GENERAL REQUIREMENTS	19911025
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19961217
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19961217
	Transporter-manifest/record keeping requirements	19961217
Non-Financial Record Review	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900426
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900726
	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900726
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900118
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900726
	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19900726
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19890926
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19871223
	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19890417
Compliance Evaluation Inspection	GENERATOR-ALL REQUIREMENTS (OVERSIGHT)	19870527

CT MANIFEST

Click this hyperlink while viewing on your computer to access additional CT MANIFEST detail in the EDR Site Report.

Map ID / Direction / Distance / Distance (ft.) / Elevation	Site	Database(s)	EDR ID Number / EPA ID Number
	BOULDEN INC T/A DIRT MAGNET (Continued)		1000278503

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Aerometric Information Retrieval System/AIRS Facility Subsystem
Integrated Compliance Information
MD-EPSC
National Compliance Data Base
Resource Conservation and Recovery Act Information system

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18 North > 1 7580 ft.	CHILDS PROPERTY 180 CHILDS RD CHILDS, MD 21921	SHWS	1000770196 N/A

Relative: Higher
Actual: 129 ft.

SHWS:
Facility ID: (MD-318)
Facility Type: State Master List
Status: NFRAP
Alias Name: PAUL MRAZ

E19 South > 1 7531 ft.	THIOKOL CORP ELKTON RT 40 ELKTON, MD 21921	SHWS	S101517391 N/A

Site 1 of 2 in cluster E

Relative: Higher
Actual: 51 ft.

SHWS:
Facility ID: (MD-100)
Facility Type: State Master List
Status: NFRAP
Alias Name: MORTON-THIOKOL, CIBA-GEIGY

E20 South > 1 7531 ft.	THIOKOL CORP ELKTON RTE 40 ELKTON, MD 21921	PADS FINDS RCRA-LQG RCRA-TSDF CORRACTS CERC-NFRAP	1000416443 MDD003067121

Site 2 of 2 in cluster E

Relative: Higher
Actual: 51 ft.

CERCLIS-NFRAP Classification Data:
Site Incident Category: Not reported
Non NPL Code: DR
Ownership Status: Other

Federal Facility: Not a Federal Facility

NPL Status: Not on the NPL

CERCLIS-NFRAP Assessment History:

Assessment:	DISCOVERY	Completed: 06/01/1981
Assessment:	PRELIMINARY ASSESSMENT	Completed: 05/01/1984
Assessment:	SITE INSPECTION	Completed: 05/13/1986
Assessment:	ARCHIVE SITE	Completed: 01/23/1996

CERCLIS-NFRAP Alias Name(s):
MORTON-THIOKOL
CIBA - GEIGY

CORRACTS Data:

EPA Id:	MDD003067121
Region:	3
Area Name:	PESTICIDE AREA
Actual Date:	08/21/1991
Corrective Action:	CA150 - RFI Workplan Approved

THIOKOL CORP ELKTON (Continued) 1000416443

2002 NAICS Title: Guided Missile and Space Vehicle Manufacturing

EPA Id: MDD003067121
Region: 3
Area Name: AB PROP OPEN BURN
Actual Date: 02/01/1992
Corrective Action: CA150 - RFI Workplan Approved
2002 NAICS Title: Guided Missile and Space Vehicle Manufacturing

EPA Id: MDD003067121
Region: 3
Area Name: SOL REC STILL BOT
Actual Date: 10/01/1993
Corrective Action: CA150 - RFI Workplan Approved
2002 NAICS Title: Guided Missile and Space Vehicle Manufacturing

EPA Id: MDD003067121
Region: 3
Area Name: BUR BERYLL WASTE
Actual Date: 10/01/1993
Corrective Action: CA150 - RFI Workplan Approved
2002 NAICS Title: Guided Missile and Space Vehicle Manufacturing

EPA Id: MDD003067121
Region: 3
Area Name: AB PROP OPEN BURN
Actual Date: 09/30/1998
Corrective Action: CA200 - RFI Approved
2002 NAICS Title: Guided Missile and Space Vehicle Manufacturing

Click this hyperlink while viewing on your computer to access
20 additional CORRACTS record(s) in the EDR Site Report.

RCRAInfo Corrective Action Summary:

Event: CMS Workplan Approved
Event Date: Not reported

Event: Stabilization Measures Implemented, Groundwater extraction and treatment (e.g., to achieve groundwater containment, to achieve MCL).
Event Date: Not reported

Event: Current Human Exposures under Control, More information is needed to make a determination.
Event Date: 03/02/1999

Event: Igration of Contaminated Groundwater under Control, More information is needed to make a determination.
Event Date: 03/02/1999

Event: RFI Approved
Event Date: 09/30/1998

Event: RFI Approved
Event Date: 09/30/1998

THIOKOL CORP ELKTON (Continued) 1000416443

Event: CMS Workplan Approved
Event Date: 09/30/1998

Event: RFI Approved
Event Date: 01/13/1998

Event: Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event Date: 10/08/1997

Event: RFI Approved
Event Date: 09/30/1997

Event: RFI Workplan Approved
Event Date: 10/01/1993

Event: Stabilization Measures Evaluation,This facility is not amenable to stabilization activity because of a lack of technical data. An evaluation has been completed, but further data is necessary to determine stabilization measures, feasibility or appropriateness. This status should be changed when data becomes available.
Event Date: 06/26/1992

Event: RFI Workplan Approved
Event Date: 02/01/1992

Event: CA Prioritization, Facility or area was assigned a high corrective action priority.
Event Date: 10/01/1991

Event: RFI Workplan Approved
Event Date: 08/21/1991

Event: Stabilization Construction Completed
Event Date: 08/05/1991

Event: Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).
Event Date: 08/01/1991

Event: RFA Determination Of Need For An RFI, RFI is Necessary;
Event Date: 09/08/1989

Event: RFI Imposition
Event Date: 09/08/1989

Event: RFA Completed
Event Date: 07/31/1986

THIOKOL CORP ELKTON (Continued) 1000416443

RCRAInfo:

Owner: THIOKOL CORP.
(301) 398-3000
EPA ID: MDD003067121

Contact: WILLIAM_E LUCAS
(301) 398-3000

Classification: Large Quantity Generator, TSDF
TSDF Activities: Not reported

BIENNIAL REPORTS:
Last Biennial Reporting Year: 2001

Waste	Quantity (Lbs)	Waste	Quantity (Lbs)
D001	12395.00	D002	8695.00
D003	8695.00	D006	117944.00
D007	8695.00	D009	11155.00
D011	117944.00	D035	11945.00
D038	12395.00	D039	3611.00
F001	11945.00	F003	3700.00
F005	6950.00	F007	8695.00
U044	8695.00	U210	8695.00

Violation Status: Violations exist

Regulation Violated: 40CFR265.1087(c)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 09/29/1999
Actual Date Achieved Compliance: 04/18/2001

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 09/20/1989
Penalty Type: Proposed Monetary Penalty

Enforcement Action: INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 09/27/2000
Penalty Type: Proposed Monetary Penalty

Enforcement Action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 04/18/2001
Penalty Type: Proposed Monetary Penalty

Regulation Violated: 40 CFR 265.173(a)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 09/29/1999
Actual Date Achieved Compliance: 04/18/2001

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 03/09/1990
Penalty Type: Proposed Monetary Penalty

Enforcement Action: INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 09/27/2000
Penalty Type: Proposed Monetary Penalty

Enforcement Action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 04/18/2001
Penalty Type: Proposed Monetary Penalty

Regulation Violated: 40 CFR262.34(a)(3)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 09/29/1999
Actual Date Achieved Compliance: 04/18/2001

THIOKOL CORP ELKTON (Continued) 1000416443

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 03/09/1990
Penalty Type: Proposed Monetary Penalty

Enforcement Action: INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 09/27/2000
Penalty Type: Proposed Monetary Penalty

Enforcement Action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 04/18/2001
Penalty Type: Proposed Monetary Penalty

Regulation Violated: COMAR 26.13.03.05E(1)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 08/19/1997
Actual Date Achieved Compliance: 08/20/1997

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 08/19/1997
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05E(1)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 08/19/1997
Actual Date Achieved Compliance: 08/27/1997

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 08/19/1997
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05E(1)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 11/15/1995
Actual Date Achieved Compliance: 11/15/1995

Enforcement Action: COMPLAINT AND ORDER
Enforcement Action Date: 07/01/1996
Penalty Type: Proposed Monetary Penalty

Regulation Violated: COMAR 26.13.05.06
Area of Violation: TSD-GOUNDWATER MONITORING REQUIREMENTS
Date Violation Determined: 03/30/1995
Actual Date Achieved Compliance: 12/18/1996

Regulation Violated: COMAR 26.13.03.05E(1)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 03/29/1994
Actual Date Achieved Compliance: 03/29/1994

Enforcement Action: SITE COMPLAINT
Enforcement Action Date: 03/29/1994
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05E(1)
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 03/29/1994
Actual Date Achieved Compliance: 03/29/1994

Enforcement Action: SITE COMPLAINT
Enforcement Action Date: 03/29/1994
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.05.16H
Area of Violation: TSD-INCINERATOR REQUIREMENTS

THIOKOL CORP ELKTON (Continued) 1000416443

Date Violation Determined: 03/16/1994
Actual Date Achieved Compliance: 05/14/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 03/16/1994
Penalty Type: Final Monetary Penalty

Enforcement Action: MARYLAND NOTICE OF VIOLATION
Enforcement Action Date: 01/24/1995
Penalty Type: Final Monetary Penalty

Regulation Violated: COMAR 26.13.05.16H
Area of Violation: TSD-INCINERATOR REQUIREMENTS
Date Violation Determined: 03/16/1994
Actual Date Achieved Compliance: 05/14/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 03/16/1994
Penalty Type: Final Monetary Penalty

Enforcement Action: MARYLAND NOTICE OF VIOLATION
Enforcement Action Date: 01/24/1995
Penalty Type: Final Monetary Penalty

Regulation Violated: COMAR 26.13.05.09.
Area of Violation: TSD-CONTAINERS REQUIREMENTS
Date Violation Determined: 09/22/1993
Actual Date Achieved Compliance: 03/29/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 09/22/1993
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.05.10.
Area of Violation: TSD-TANKS REQUIREMENTS
Date Violation Determined: 09/22/1993
Actual Date Achieved Compliance: 03/29/1994

Enforcement Action: WRITTEN COMPLAINT
Enforcement Action Date: 09/22/1993
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05.E(1)(c)
Area of Violation: GENERATOR-GENERAL REQUIREMENTS
Date Violation Determined: 07/23/1992
Actual Date Achieved Compliance: 08/11/1992

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 07/23/1992
Penalty Type: Not reported

Regulation Violated: COMAR 26.13.03.05E(3)
Area of Violation: GENERATOR-GENERAL REQUIREMENTS
Date Violation Determined: 07/23/1992
Actual Date Achieved Compliance: 08/11/1992

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 07/23/1992
Penalty Type: Not reported

Regulation Violated: PERMIT A-052, PART III A
Area of Violation: GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined: 06/18/1991
Actual Date Achieved Compliance: 06/25/1991

THIOKOL CORP ELKTON (Continued) 1000416443

Enforcement Action:	WRITTEN COMPLAINT
Enforcement Action Date:	06/18/1991
Penalty Type:	Not reported
Regulation Violated:	COMAR 26.13.05.05 D
Area of Violation:	GENERATOR-PRE-TRANSPORT REQUIREMENTS
Date Violation Determined:	06/18/1991
Actual Date Achieved Compliance:	06/25/1991
Enforcement Action:	WRITTEN COMPLAINT
Enforcement Action Date:	06/18/1991
Penalty Type:	Not reported
Regulation Violated:	268.50(a)(2)(i) &(ii)
Area of Violation:	TSD-LAND BAN REQUIREMENTS
Date Violation Determined:	06/18/1991
Actual Date Achieved Compliance:	08/15/1995
Regulation Violated:	COMAR 26.13.05.09
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	07/19/1990
Actual Date Achieved Compliance:	07/19/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	07/19/1990
Penalty Type:	Not reported
Regulation Violated:	Not reported
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	03/09/1990
Actual Date Achieved Compliance:	06/13/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	03/09/1990
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	09/27/2000
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	04/18/2001
Penalty Type:	Proposed Monetary Penalty
Regulation Violated:	Not reported
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	03/09/1990
Actual Date Achieved Compliance:	06/13/1990
Enforcement Action:	WRITTEN INFORMAL
Enforcement Action Date:	03/09/1990
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	09/27/2000
Penalty Type:	Proposed Monetary Penalty
Enforcement Action:	FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date:	04/18/2001
Penalty Type:	Proposed Monetary Penalty
Regulation Violated:	COMAR 26.13.05.05
Area of Violation:	TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined:	09/20/1989

THIOKOL CORP ELKTON (Continued) 1000416443

Actual Date Achieved Compliance: 06/13/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 09/20/1989
Penalty Type: Proposed Monetary Penalty

Enforcement Action: INITIAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 09/27/2000
Penalty Type: Proposed Monetary Penalty

Enforcement Action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement Action Date: 04/18/2001
Penalty Type: Proposed Monetary Penalty

Regulation Violated: COMAR 26.13.05.026
Area of Violation: TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 09/20/1989
Actual Date Achieved Compliance: 06/13/1990

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 09/20/1989
Penalty Type: Not reported

Regulation Violated: Not reported
Area of Violation: TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 11/14/1988
Actual Date Achieved Compliance: 06/13/1990

Regulation Violated: Not reported
Area of Violation: TSD-OTHER REQUIREMENTS (OVERSIGHT)
Date Violation Determined: 01/31/1986
Actual Date Achieved Compliance: 02/15/1986

Enforcement Action: WRITTEN INFORMAL
Enforcement Action Date: 01/31/1986
Penalty Type: Not reported

Penalty Summary:

Penalty Description	Penalty Date	Penalty Amount	Lead Agency
Proposed Monetary Penalty	9/27/2000	17597.8	EPA
Proposed Monetary Penalty	7/1/1996	5000	STATE
Final Monetary Penalty	1/24/1995	1500	STATE

There are 25 violation record(s) reported at this site:

Evaluation	Area of Violation	Date of Compliance
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	20010418
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	20010418
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	20010418
Non-Financial Record Review	TSD-LAND BAN REQUIREMENTS	19950815
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19970820
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19970827
Other Evaluation	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19951115
Compliance Evaluation Inspection	TSD-GOUNDWATER MONITORING REQUIREMENTS	19961218
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940329
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19940329
INC	TSD-INCINERATOR REQUIREMENTS	19940514
	TSD-INCINERATOR REQUIREMENTS	19940514
Compliance Evaluation Inspection	TSD-CONTAINERS REQUIREMENTS	19940329
	TSD-TANKS REQUIREMENTS	19940329
Compliance Evaluation Inspection	GENERATOR-GENERAL REQUIREMENTS	19920811

THIOKOL CORP ELKTON (Continued) 1000416443

	GENERATOR-GENERAL REQUIREMENTS	19920811
Compliance Evaluation Inspection	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19910625
	GENERATOR-PRE-TRANSPORT REQUIREMENTS	19910625
	TSD-LAND BAN REQUIREMENTS	19950815
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900719
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900613
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900613
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900613
	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900613
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19900613
Compliance Evaluation Inspection	TSD-OTHER REQUIREMENTS (OVERSIGHT)	19860215

NY MANIFEST

Click this hyperlink while viewing on your computer to access additional NY MANIFEST detail in the EDR Site Report.

FINDS:

Other Pertinent Environmental Activity Identified at Site:

Aerometric Information Retrieval System/AIRS Facility Subsystem
Integrated Compliance Information
MD-EPSC
National Compliance Data Base
National Emissions Inventory
Permit Compliance System
Resource Conservation and Recovery Act Information system
SC-EFIS
Toxics Release Inventory

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ELKTON	1004719935	OVERNITE TRANSPORTATION CO	I95 & RTE 279	21921	RCRA-SQG, FINDS
ELKTON	S104631016	THE COLUMBUS COMPANY	RT.279 / JFK MEMORIAL HIGHWA	21921	Historical UST
ELKTON	1005416559	DELMARVA POWER ANDORA	RT 213	21921	RCRA-SQG, FINDS
ELKTON	1005416597	DELMARVA POWER PERCH SUBSTATION	RT 213	21921	RCRA-SQG
ELKTON	S105421663	VICON	ROUTE 213 AND DOGWOOD ROAD	21921	VCP
ELKTON	S104637364	ST. JOHN'S UNITED METHOD. CHURCH	ROUTE 213, LEWISVILLE ROAD	21921	Historical UST
ELKTON	S104637417	SINGERLY FIRE COMPANY	ROUTE 213, KENMORE	21921	Historical UST
ELKTON	1005416591	DELMARVA POWER MIDDLE SUBSTATION	RT 273	21921	RCRA-SQG, FINDS
ELKTON	U003734287	OVERNITE TRANSPORTATION COMPANY (E	ROUTE 279	21921	UST, Historical UST
ELKTON	U003865516	THE COLUMBUS COMPANY	RT. 279 & JFK MEMORIAL HIGHWAY	21921	UST
ELKTON	S104637403	SINGERLY FIRE COMPANY	ROUTE 279, NEWARK AVENUE	21921	Historical UST
ELKTON	S101517389	SAND GRAVEL & STONE SITE	RT 40	21921	SHWS
ELKTON	S104637307	WELL #1	RT 40 / RT 213	21921	Historical UST
ELKTON	S104637416	SINGERLY FIRE COMPANY	ROUTE 40	21921	Historical UST
ELKTON	1003867061	HOG HILL LANDFILL	ROUTE 7	21921	CERC-NFRAP
ELKTON	1004719063	MARYLAND STATE HIGHWAY ADMINISTRAT	RTE 7 3/4 MI W US 40 & MD 279	21921	RCRA-SQG, FINDS
ELKTON	S102259352	HOG HILL LF	RT 7	21921	SHWS
ELKTON	U003888078	FORMER CECIL COUNTY AIRPARK	AIRPORT ROAD	21921	UST
ELKTON	S105508984	TORRY E. COLES DRV/ROYAL FARM	AUGUSTINE HERMAN HWY.		OCPCASES
ELKTON	S104637341	BRENTWOOD MOBIL	1055 AUGUSTINE HWY	21921	Historical UST
ELKTON	U003876947	THE BOHEMIA MANOR EVANGELICAL CHRI	AUGUSTINE HERMAN HWY	21921	UST
ELKTON	1000364716	THERM-X	BLUE BALL ROAD	21921	RCRA-SQG, FINDS
ELKTON	1007265838	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265839	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265840	TRIUMPH INDUSTRIAL PARK - LOT 52-I	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265841	TRIUMPH INDUSTRIAL PARK - PARCEL-5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265842	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265843	TRIUMPH INDUSTRIAL PARK - LOTS 18	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265844	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265845	TRIUMPH INDUSTRIAL PARK - PARCEL 6	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265846	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265847	TRIUMPH INDUSTRIAL PARK - PARCEL 1	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265848	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265849	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265850	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265851	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265852	TRIUMPH INDUSTRIAL PARK - LOT 12	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265853	TRIUMPH INDUSTRIAL PARK - LOT 11	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265854	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL	21921	US BROWNFIELDS
ELKTON	1007265855	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265856	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265857	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS
ELKTON	1007265858	TRIUMPH INDUSTRIAL PARK - PARCEL 5	BLUE BALL ROAD	21921	US BROWNFIELDS

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
ELKTON	S104228747	TRIUMPH INDUSTRIAL PARK	3 BLUE BALL RD - PO BOX 1130	21921	SHWS
ELKTON	1000424768	STAUFFER CHEM CO	BLUEBELL RD TRINCO IND COM	21921	CERCLIS, SHWS, FINDS
ELKTON	1000111916	OLD ELKTON DUMP	JONES CHAPEL RD	21921	SHWS
ELKTON	1003864712	OLD ELKTON DUMP	JONES CHAPEL RD	21921	CERCLIS, FINDS
ELKTON	S101472582	RT 7 CHEM DUMP SITE	1.9 MILES W OF RT 40	21921	SHWS
ELKTON	94383010	MOUNT ARARAT FARM ROAD LAST POLE O	MOUNT ARARAT FARM ROAD LAST PO		ERNS
ELKTON	S101517393	WHITTAKER TROJAN YACHT	OLDFIELD POINT RD	21921	SHWS
ELKTON	1003866631	CROUSE BROS. EXCAVATING, INC.	PULASKI HWY. & RT. 279	21921	CERC-NFRAP
ELKTON	S104631135	CHESTERTOWN ELECTRIC SERVICE	EAST PULASKI HIGHWAY	21921	Historical UST
ELKTON	U003738397	CHARLESTOWN ELECTRIC SERVICE	EAST PULASKI HIGHWAY	21921	UST
ELKTON	S104637318	EXXON OIL STATION	US RT. 40 / US RT. 213	21921	Historical UST
ELKTON	1003866760	IP, INC	TRINCO INDUSTRIAL PARK, PARCEL	21921	CERC-NFRAP
ELKTON	1005426269	CENTRAL CHEMICAL CORPORATION	TRIUMPH INDUS. PK.,ZEITLER'S L	21921	SSTS
ELKTON	1005426270	CENTRAL CHEMICAL CORP	TRIUMPH INDUS. PK.,_505 BLUE B	21921	SSTS
ELKTON	S105584931	GE RAILCAR REPAIR SERVICES	TRIUMPH INDUSTRIAL PARK, BLUE	21921	VCP
ELKTON	1003864731	ROUTE 7 CHEM DUMP SITE	1.9 M W OF ROUTE 40	21921	CERC-NFRAP
NEAR ELKTON	1003866629	DWYER PROPERTY	RTS. 279 & 545 PARCEL 1037 SW	21921	CERCLIS, FINDS

EPA Waste Codes Addendum

Code	Description
D001	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
D002	A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
D003	A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
D006	CADMIUM
D007	CHROMIUM
D009	MERCURY
D011	SILVER
D035	METHYL ETHYL KETONE
D038	PYRIDINE
D039	TETRACHLOROETHYLENE
F001	THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F003	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND

EPA Waste Codes Addendum

Code	Description
	F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F005	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
F007	SPENT CYANIDE PLATING BATH SOLUTIONS FROM ELECTROPLATING OPERATIONS
U044	CHLOROFORM
U044	METHANE, TRICHLORO-
U210	ETHENE, TETRACHLORO-
U210	TETRACHLOROETHYLENE

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/12/04
Date Made Active at EDR: 12/09/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 11/02/04
Elapsed ASTM days: 37
Date of Last EDR Contact: 11/02/04

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 09/23/04
Date Made Active at EDR: 12/09/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 11/02/04
Elapsed ASTM days: 37
Date of Last EDR Contact: 11/02/04

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 08/10/04
Date Made Active at EDR: 10/27/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 09/21/04
Elapsed ASTM days: 36
Date of Last EDR Contact: 09/21/04

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 08/10/04
Date Made Active at EDR: 10/27/04
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 09/21/04
Elapsed ASTM days: 36
Date of Last EDR Contact: 09/21/04

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/23/04
Date Made Active at EDR: 11/18/04
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 10/07/04
Elapsed ASTM days: 42
Date of Last EDR Contact: 12/07/04

RCRA: Resource Conservation and Recovery Act Information
Source: EPA
Telephone: 800-424-9346
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRAInfo replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS). The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 08/10/04
Date Made Active at EDR: 10/11/04
Database Release Frequency: Varies

Date of Data Arrival at EDR: 08/24/04
Elapsed ASTM days: 48
Date of Last EDR Contact: 11/24/04

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/03
Date Made Active at EDR: 03/12/04
Database Release Frequency: Annually

Date of Data Arrival at EDR: 01/26/04
Elapsed ASTM days: 46
Date of Last EDR Contact: 10/25/04

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/01/01
Database Release Frequency: Biennially

Date of Last EDR Contact: 09/20/04
Date of Next Scheduled EDR Contact: 12/13/04

CONSENT: Superfund (CERCLA) Consent Decrees
Source: Department of Justice, Consent Decree Library
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/05/04
Database Release Frequency: Varies

Date of Last EDR Contact: 10/25/04
Date of Next Scheduled EDR Contact: 01/24/05

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 09/09/04
Database Release Frequency: Annually

Date of Last EDR Contact: 10/06/04
Date of Next Scheduled EDR Contact: 01/03/05

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/12/04
Database Release Frequency: Quarterly

Date of Last EDR Contact: 11/02/04
Date of Next Scheduled EDR Contact: 01/31/05

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 09/09/04
Database Release Frequency: Quarterly

Date of Last EDR Contact: 09/08/04
Date of Next Scheduled EDR Contact: 01/03/05

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/08/04
Database Release Frequency: Annually

Date of Last EDR Contact: 10/28/04
Date of Next Scheduled EDR Contact: 01/17/05

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/15/04
Database Release Frequency: Quarterly

Date of Last EDR Contact: 10/04/04
Date of Next Scheduled EDR Contact: 01/03/05

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 09/13/04
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 09/28/04
Date of Next Scheduled EDR Contact: 12/27/04

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 11/22/04
Date of Next Scheduled EDR Contact: 02/21/05

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-564-3887
PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/29/04
Database Release Frequency: Annually
Date of Last EDR Contact: 11/12/04
Date of Next Scheduled EDR Contact: 02/07/05

DOD: Department of Defense Sites
Source: USGS
Telephone: 703-692-8801
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/12/04
Date of Next Scheduled EDR Contact: 02/07/05

UMTRA: Uranium Mill Tailings Sites
Source: Department of Energy
Telephone: 505-845-0011
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized. In 1978, 24 inactive uranium mill tailings sites in Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, Texas, North Dakota, South Dakota, Pennsylvania, and on Navajo and Hopi tribal lands, were targeted for cleanup by the Department of Energy.

Date of Government Version: 04/22/04
Database Release Frequency: Varies
Date of Last EDR Contact: 09/20/04
Date of Next Scheduled EDR Contact: 12/20/04

ODI: Open Dump Inventory
Source: Environmental Protection Agency
Telephone: 800-424-9346
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/85
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 05/23/95
Date of Next Scheduled EDR Contact: N/A

FUDS: Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/03
Database Release Frequency: Varies
Date of Last EDR Contact: 10/04/04
Date of Next Scheduled EDR Contact: 01/03/05

INDIAN RESERV: Indian Reservations
Source: USGS
Telephone: 202-208-3710
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 10/01/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 11/12/04
Date of Next Scheduled EDR Contact: 02/07/05

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 12/06/04
Date of Next Scheduled EDR Contact: 03/07/05

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/02
Database Release Frequency: Annually
Date of Last EDR Contact: 09/20/04
Date of Next Scheduled EDR Contact: 12/20/04

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/02
Database Release Frequency: Every 4 Years
Date of Last EDR Contact: 12/06/04
Date of Next Scheduled EDR Contact: 03/07/05

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-564-2501

Date of Government Version: 04/13/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 09/07/04
Date of Next Scheduled EDR Contact: 12/20/04

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-5008
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/01
Database Release Frequency: Annually
Date of Last EDR Contact: 10/18/04
Date of Next Scheduled EDR Contact: 01/17/05

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-2501
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 09/13/04
Database Release Frequency: Quarterly

Date of Last EDR Contact: 09/07/04
Date of Next Scheduled EDR Contact: 12/20/04

STATE OF MARYLAND ASTM STANDARD RECORDS

SHWS: Notice of Potential Hazardous Waste Sites
Source: Department of the Environment
Telephone: 410-537-3000
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 09/01/03
Date Made Active at EDR: 10/01/03
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 09/11/03
Elapsed ASTM days: 20
Date of Last EDR Contact: 12/06/04

SWF/LF: Permitted Solid Waste Disposal Facilities
Source: Department of the Environment
Telephone: 410-537-3375
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 04/15/04
Date Made Active at EDR: 06/16/04
Database Release Frequency: Annually

Date of Data Arrival at EDR: 05/18/04
Elapsed ASTM days: 29
Date of Last EDR Contact: 10/22/04

UST: Registered Underground Storage Tank List
Source: Department of the Environment
Telephone: 410-537-3433
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 11/15/04
Date Made Active at EDR: 12/09/04
Database Release Frequency: Varies

Date of Data Arrival at EDR: 11/15/04
Elapsed ASTM days: 24
Date of Last EDR Contact: 11/08/04

VCP: Voluntary Cleanup Program Applicants/Participants
Source: Dept. of the Environment
Telephone: 410-537-3000
The Voluntary Cleanup Program, administrated by the Dept. of the Environment, streamlines the environmental cleanup process for sites, usually industrial or commercial properties, that are contaminated, or perceived to be contaminated, by hazardous substances. Developers and lenders are provided with certain limitations on liability and participants in the program are provided certainty in the process by knowing exactly what will be required.

Date of Government Version: 10/14/04
Date Made Active at EDR: 12/08/04
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 10/25/04
Elapsed ASTM days: 44
Date of Last EDR Contact: 10/25/04

SWRCY: Recycling Directory
Source: Department of the Environment
Telephone: 410-631-3314
A listing of recycling facilities.

Date of Government Version: 09/14/04
Date Made Active at EDR: 12/08/04
Database Release Frequency: Varies

Date of Data Arrival at EDR: 10/19/04
Elapsed ASTM days: 50
Date of Last EDR Contact: 10/19/04

OCPCASES: Oil Control Program Cases
Source: Department of Environment
Telephone: 410-537-3433
Cases monitored by the Oil Control Program. these cases can be leaking underground storage tanks and other belowground releases, leaking aboveground storage tanks, spills and inspections.

Date of Government Version: 10/18/04
Date Made Active at EDR: 11/19/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 10/22/04
Elapsed ASTM days: 28
Date of Last EDR Contact: 10/18/04

STATE OF MARYLAND ASTM SUPPLEMENTAL RECORDS

Historical LUST: Recovery Sites
Source: Department of the Environment
Telephone: 410-537-3433
In 1999, the Department of the Environment stopped adding new sites to its Recovery Sites Database. Current leaking underground storage tank information maybe found in the OCPCASES database.

Date of Government Version: 03/01/99
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/19/01
Date of Next Scheduled EDR Contact: N/A

AST: Permitted Aboveground Storage Tanks
Source: Department of The Environment
Telephone: 410-537-3000
Registered Aboveground Storage Tanks.

Date of Government Version: 11/09/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 11/08/04
Date of Next Scheduled EDR Contact: 02/07/05

Historical UST: Historical UST Registered Database
Source: Department of Environment
Telephone: 410-537-3433

Date of Government Version: 11/21/96
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 05/15/00
Date of Next Scheduled EDR Contact: N/A

DRYCLEANERS: Registered Drycleaning Facilities
Source: Department of the Environmental
Telephone: 410-537-3220
A listing of registered drycleaning facilities.

Date of Government Version: 07/23/04
Database Release Frequency: Varies
Date of Last EDR Contact: 11/10/04
Date of Next Scheduled EDR Contact: 02/07/05

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer Provided by Real Property Scan, Inc.

The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of toxins at any site. This report does not constitute a legal opinion.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

BROWNFIELDS DATABASES

VCP: Voluntary Cleanup Program Applicants/Participants
Source: Dept. of the Environment
Telephone: 410-537-3000
The Voluntary Cleanup Program, administrated by the Dept. of the Environment, streamlines the environmental cleanup process for sites, usually industrial or commercial properties, that are contaminated, or perceived to be contaminated, by hazardous substances. Developers and lenders are provided with certain limitations on liability and participants in the program are provided certainty in the process by knowing exactly what will be required.

Date of Government Version: 10/14/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 10/25/04
Date of Next Scheduled EDR Contact: 01/10/05

INST CONTROL: Voluntary Cleanup Program Applicants/Participants
Source: Department of the Environment
Telephone: 410-537-3493
Sites included in the Voluntary Cleanup Program Applicants/Participants listing that have Deed Restrictions.

Date of Government Version: 10/14/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 10/25/04
Date of Next Scheduled EDR Contact: 01/10/05

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: N/A
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Child Care Providers
Source: Department of Human Resources
Telephone: 410-767-7805

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

FORMER HERRON FARM
183 ZEITLER ROAD
ELKTON, MD 21921

TARGET PROPERTY COORDINATES

Latitude (North):	39.629002 - 39° 37' 44.4"
Longitude (West):	75.863197 - 75° 51' 47.5"
Universal Tranverse Mercator:	Zone 18
UTM X (Meters):	425917.8
UTM Y (Meters):	4386728.0
Elevation:	47 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3. Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

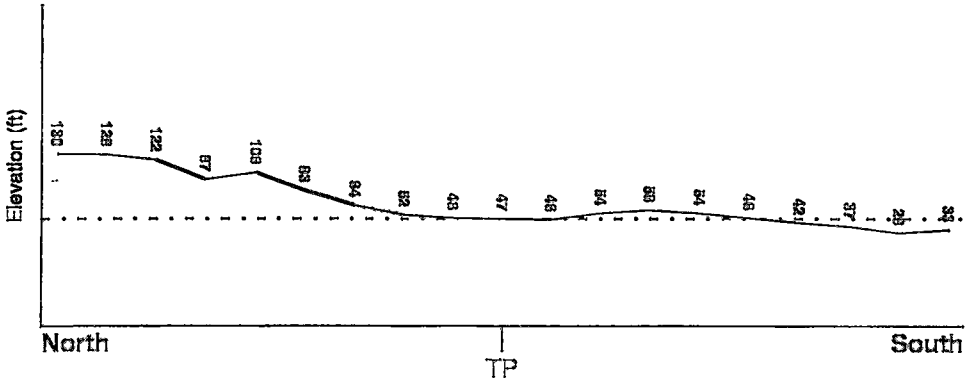
TOPOGRAPHIC INFORMATION

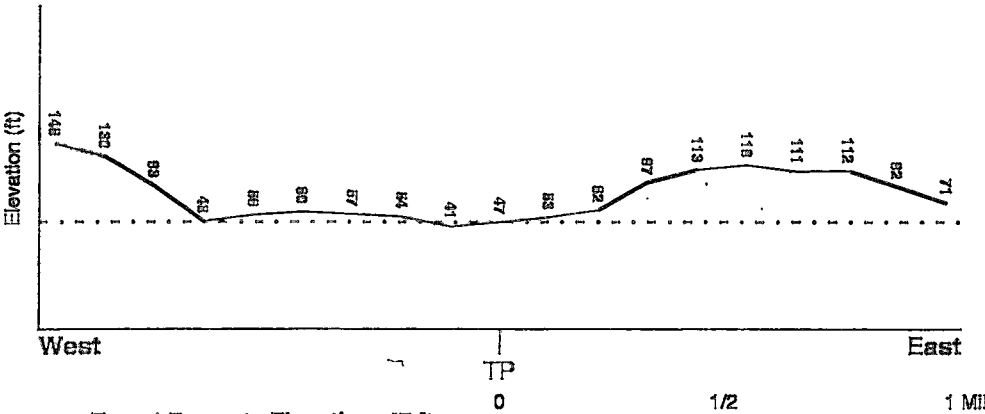
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

USGS Topographic Map:	39075-F7 NEWARK WEST, DE PA MD
General Topographic Gradient:	General West
Source:	USGS 7.5 min quad index

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 47 ft.

0 1/2 1 Miles

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
CECIL, MD	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 2400190031B

Additional Panels in search area:
2400190020A
2400190019A
2400190027A
2400220001C
2400220003C
2400190033A

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NEWARK WEST	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT		GEOLOGIC AGE IDENTIFICATION	
Era:	Mesozoic	Category:	Stratified Sequence
System:	Cretaceous		
Series:	Lower Cretaceous		
Code:	lK *(decoded above as Era, System & Series)*		

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	OTHELLO
Soil Surface Texture:	silt loam
Hydrologic Group:	Class C/D - Drained/undrained hydrology class of soils that can be drained and classified.
Soil Drainage Class:	Poorly. Soils may have a saturated zone, a layer of low hydraulic conductivity, or seepage. Depth to water table is less than 1 foot.

Hydric Status: Soil meets the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	HIGH
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	9 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 5.50 Min: 4.50
2	9 inches	29 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 5.50 Min: 3.60
3	29 inches	50 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.20	Max: 5.50 Min: 3.60
4	50 inches	72 inches	sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 5.50 Min: 3.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: sandy loam
loam
gravelly - loam

Surficial Soil Types: sandy loam
loam
gravelly - loam

Shallow Soil Types: silt loam

Deeper Soil Types: very fine sandy loam
silt loam
sandy loam
stratified
gravelly - sandy loam

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked, in the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objective of the records review (see 7.1.1), and (3) whether they are obtained, pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	USGS0389410	1/4 - 1/2 Mile ENE
2	USGS0389399	1/2 - 1 Mile SE
A3	USGS0389430	1/2 - 1 Mile North
A4	USGS0389431	1/2 - 1 Mile North
B5	USGS0389383	1/2 - 1 Mile SSE
B6	USGS0389312	1/2 - 1 Mile SSE
B7	USGS0389313	1/2 - 1 Mile SSE
B8	USGS0389382	1/2 - 1 Mile SSE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

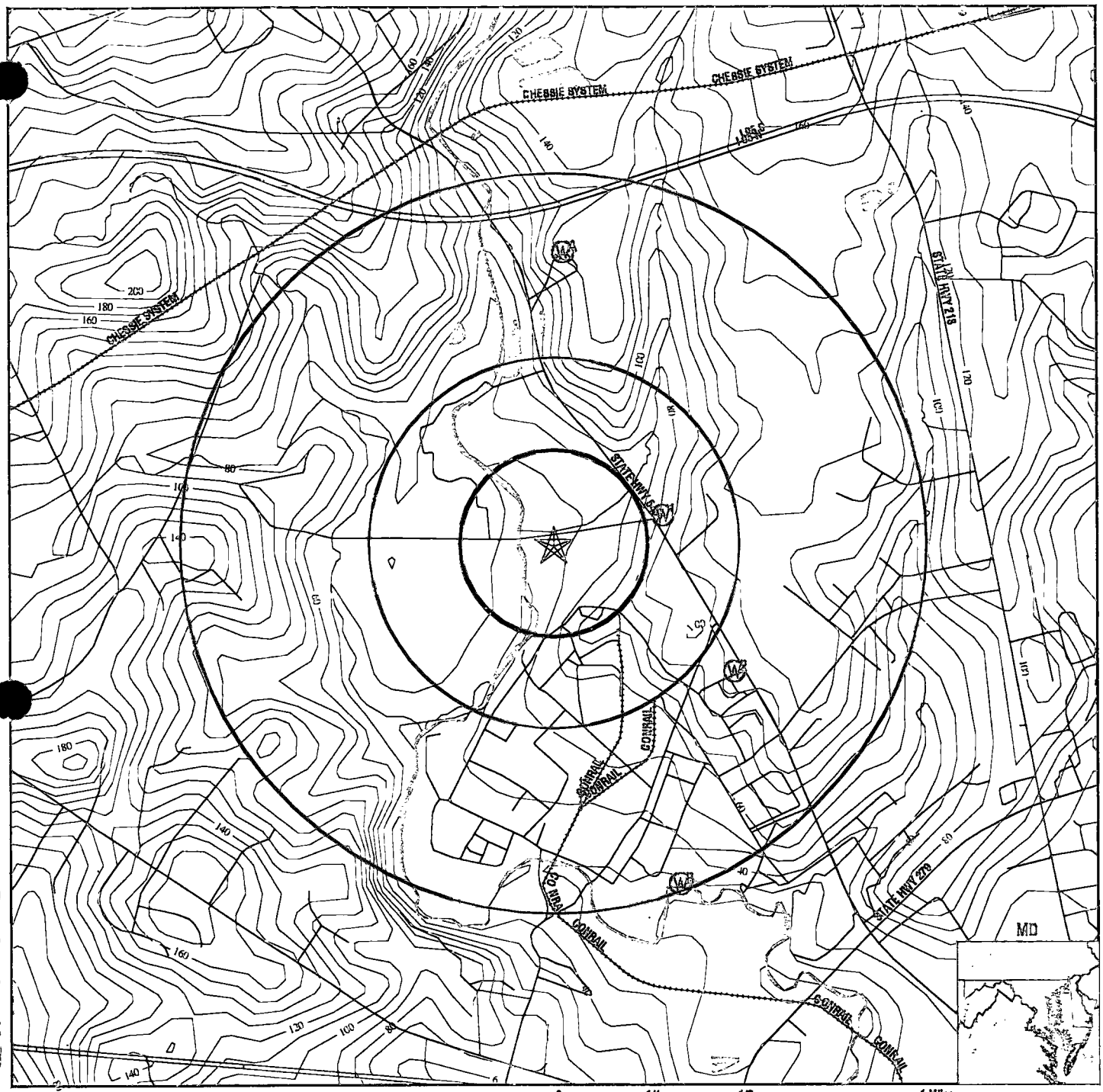
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

PHYSICAL SETTING SOURCE MAP - 1319583.2s



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- (GI) Indeterminate Groundwater Flow at Location
- (GV) Groundwater Flow Varies at Location

N

TARGET PROPERTY:	Former Herron Farm	CUSTOMER:	ERM, Inc.
ADDRESS:	183 Zeitler Road	CONTACT:	Christy Hartmann
CITY/STATE/ZIP:	Elkton MD 21921	INQUIRY #:	1319583.2s
LAT/LONG:	39.6290 / 75.8632	DATE:	December 06, 2004 7:59 am

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GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation		Database	EDR ID Number
1 ENE 1/4 - 1/2 Mile Higher		FED USGS	USGS0389410

Agency:	USGS	Site ID:	393748075512901
Site Name:	CE Be 114		
Dec. Latitude:	39.63011		
Dec. Longitude:	-75.85772		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	90.00		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	19710827	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	300UFGB		
Aquifer type:	Not Reported		
Well depth:	192		
Hole depth:	192	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1971-08-27	12.00	

2 SE 1/2 - 1 Mile Higher		FED USGS	USGS0389399

Agency:	USGS	Site ID:	393726075511601
Site Name:	CE Be 9		
Dec. Latitude:	39.624		
Dec. Longitude:	-75.85411		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	100.00		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	19521004	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	300UFGB		
Aquifer type:	Not Reported		
Well depth:	115		
Hole depth:	115	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1952-10-04	35.00	

A3
North
1/2 - 1 Mile
Higher

FED USGS USGS0389430

Agency:	USGS	Site ID:	393825075514701
Site Name:	CE Be 52		
Dec. Latitude:	39.64039		
Dec. Longitude:	-75.86272		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	130.00		
Hydrologic code:	02060002		
Topographic:	Hilltop		
Site Type:	Ground-water other than Spring		
Const Date:	1910	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	300LFPF		
Aquifer type:	Not Reported		
Well depth:	216		
Hole depth:	216	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

A4
North
1/2 - 1 Mile
Higher

FED USGS USGS0389431

Agency:	USGS	Site ID:	393825075514702
Site Name:	CE Be 53		
Dec. Latitude:	39.64039		
Dec. Longitude:	-75.86272		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	130.00		
Hydrologic code:	02060002		
Topographic:	Hilltop		
Site Type:	Ground-water other than Spring		
Const Date:	1935	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	300LFPF		
Aquifer type:	Not Reported		
Well depth:	90.0		
Hole depth:	90.0	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
B5 SSE 1/2 - 1 Mile Lower	FED USGS	USGS0389383

Agency:	USGS	Site ID:	393656075512603
Site Name:	CE Be 22		
Dec. Latitude:	39.61567		
Dec. Longitude:	-75.85688		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	30.00		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	1942	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	217PTMC		
Aquifer type:	Not Reported		
Well depth:	22.4		
Hole depth:	22.4	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
0000-00	6	

B6 SSE 1/2 - 1 Mile Lower	FED USGS	USGS0389312

Agency:	USGS	Site ID:	393656075512604
Site Name:	CE Be 23		
Dec. Latitude:	39.61567		
Dec. Longitude:	-75.85688		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	30.00		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	1942	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	217PTMC		
Aquifer type:	Not Reported		
Well depth:	37.2		
Hole depth:	37.2	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
0000-00	6	

B7
SSE
1/2 - 1 Mile
Lower

FED USGS USGS0389313

Agency:	USGS	Site ID:	393656075512605
Site Name:	CE Be 24		
Dec. Latitude:	39.61567		
Dec. Longitude:	-75.85688		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	25		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	1942	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	217PTMC		
Aquifer type:	Not Reported		
Well depth:	21.9		
Hole depth:	21.9	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
0000-00	6	

B8
SSE
1/2 - 1 Mile
Lower

FED USGS USGS0389382

Agency:	USGS	Site ID:	393656075512601
Site Name:	CE Be 20		
Dec. Latitude:	39.61567		
Dec. Longitude:	-75.85688		
Coord Sys:	NAD83		
State:	MD		
County:	Cecil County		
Altitude:	30.00		
Hydrologic code:	02060002		
Topographic:	Flat surface		
Site Type:	Ground-water other than Spring		
Const Date:	1942	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	217PTMC		
Aquifer type:	Not Reported		
Well depth:	21.8		
Hole depth:	21.8	Source:	Not Reported
Project no:	Not Reported		

GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1942-01-01	6.00	

GEOCHECK®- PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 21921

Number of sites tested: 211.

Maximum Radon Level: 217.1 pCi/L
Minimum Radon Level: -0.2 pCi/L

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
163 (77.25%)	36 (17.06%)	7 (3.32%)	2 (0.95%)	2 (0.95%)	1 (0.47%)

Federal EPA Radon Zone for CECIL County: 2

Note: Zone 1 indoor average level > 4 pCi/L
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L
: Zone 3 indoor average level < 2 pCi/L

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-Minute DEMs correspond to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW[R] Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

Maryland Community Public Drinking Water Wells
Source: Department of the Environment
Telephone: 410-631-3586

RADON

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

EPA Region 3 Statistical Summary Readings
Source: Region 3 EPA
Telephone: 215-814-2082
Radon readings for Delaware, D.C., Maryland, Pennsylvania, Virginia and West Virginia.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

D

The EDR – Historical Topographic Map Report

183 Zeitler Road
Elkhart, MD

Inquiry Number: 1319583-5
December 8, 2004

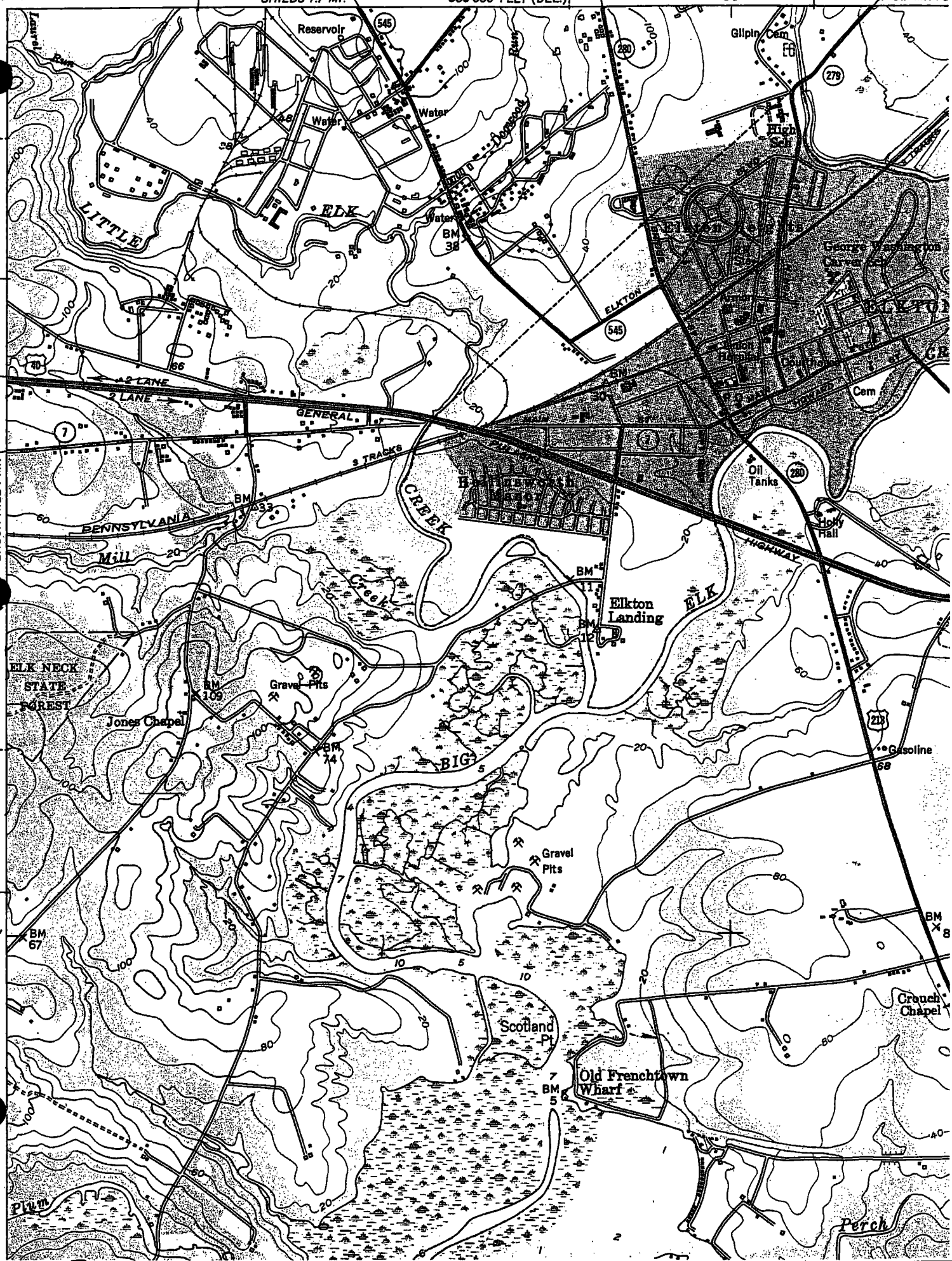
EDR™ Environmental Data Resources Inc.

***The* Source for Environmental Risk Management Data**

440 Wheelers Farm Road
Milford, CT 06460

Nationwide Customer Service
Telephone: 1-800-352-0050
Fax: 1-800-231-6802

GEOLOGICAL SURVEY



Environmental Data Resources, Inc.
Historical Topographic Map Report

Environmental Data Resources, Inc.'s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property, and its surrounding area, resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable is defined as information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.*

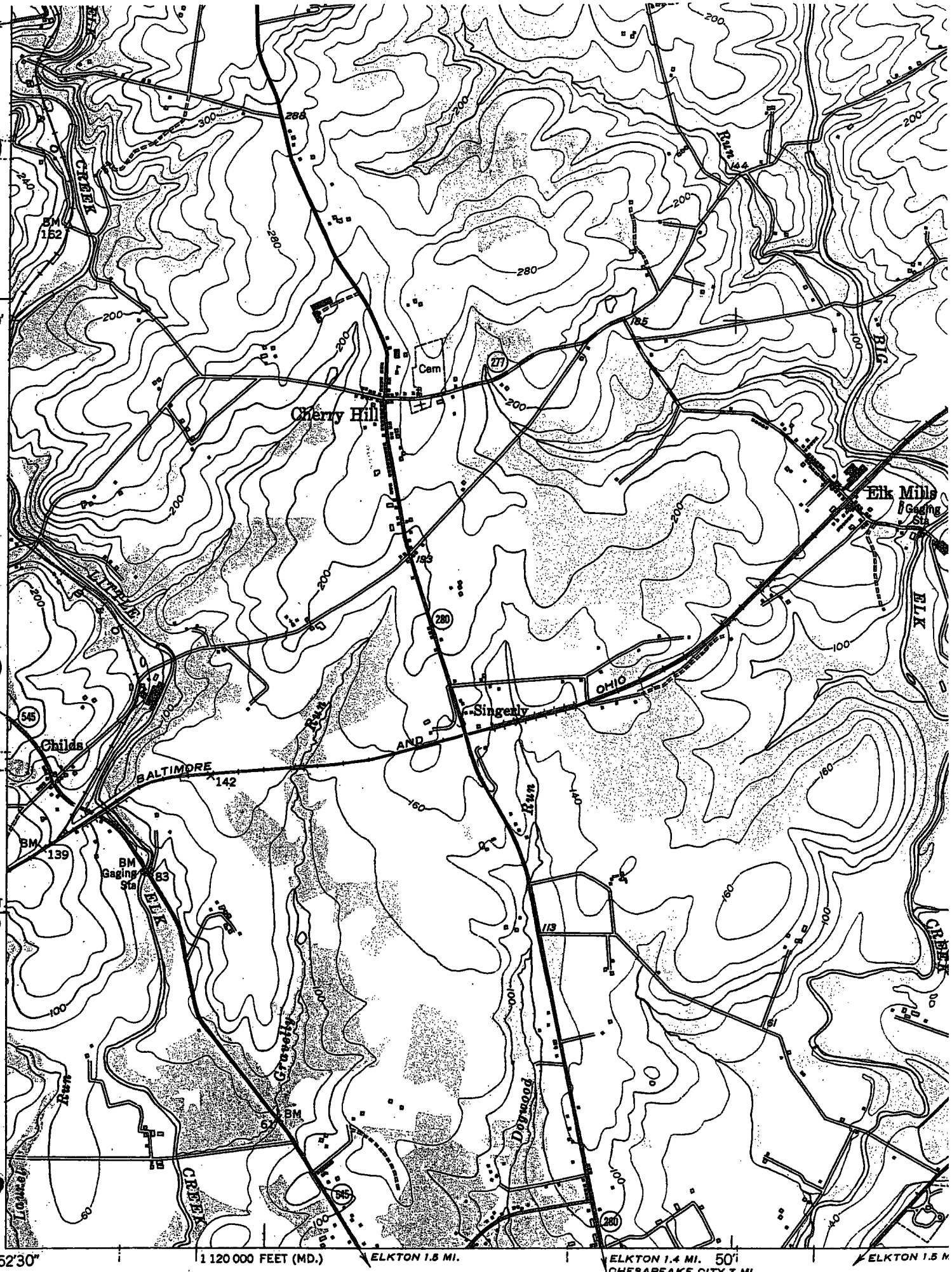
To meet the prior use requirements of ASTM E 1527-00, Section 7.3.4, the following *standard historical sources* may be used: aerial photographs, city directories, fire insurance maps, topographic maps, property tax files, land title records (although these cannot be the sole historical source consulted), building department records, or zoning/and use records. ASTM E 1527-00 requires *"All obvious uses of the property shall be identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier. This task requires reviewing only as many of the standard historical sources as are necessary, and that are reasonably ascertainable and likely to be useful."* (ASTM E 1527-00, Section 7.3.2 page 12.)

EDR's Historical Topographic Map Report includes a search of available public and private color historical topographic map collections.

Topographic Maps

A topographic map (topo) is a color coded line-and-symbol representation of natural and selected artificial features plotted to a scale. Topos show the shape, elevation, and development of the terrain in precise detail by using contour lines and color coded symbols. Many features are shown by lines that may be straight, curved, solid, dashed, dotted, or in any combination. The colors of the lines usually indicate similar classes of information. For example, topographic contours (brown); lakes, streams, irrigation ditches, etc. (blue); land grids and important roads (red); secondary roads and trails, railroads, boundaries, etc. (black); and features that have been updated using aerial photography, but not field verified, such as disturbed land areas (e.g., gravel pits) and newly developed water bodies (purple).

For more than a century, the USGS has been creating and revising topographic maps for the entire country at a variety of scales. There are about 60,000 U.S. Geological Survey (USGS) produced topo maps covering the United States. Each map covers a specific quadrangle (quad) defined as a four-sided area bounded by latitude and longitude. Historical topographic maps are a valuable historical resource for documenting the prior use of a property and its surrounding area, and due to their frequent availability can be particularly helpful when other standard historical sources (such as city directories, fire insurance maps, or aerial photographs) are not reasonably ascertainable.



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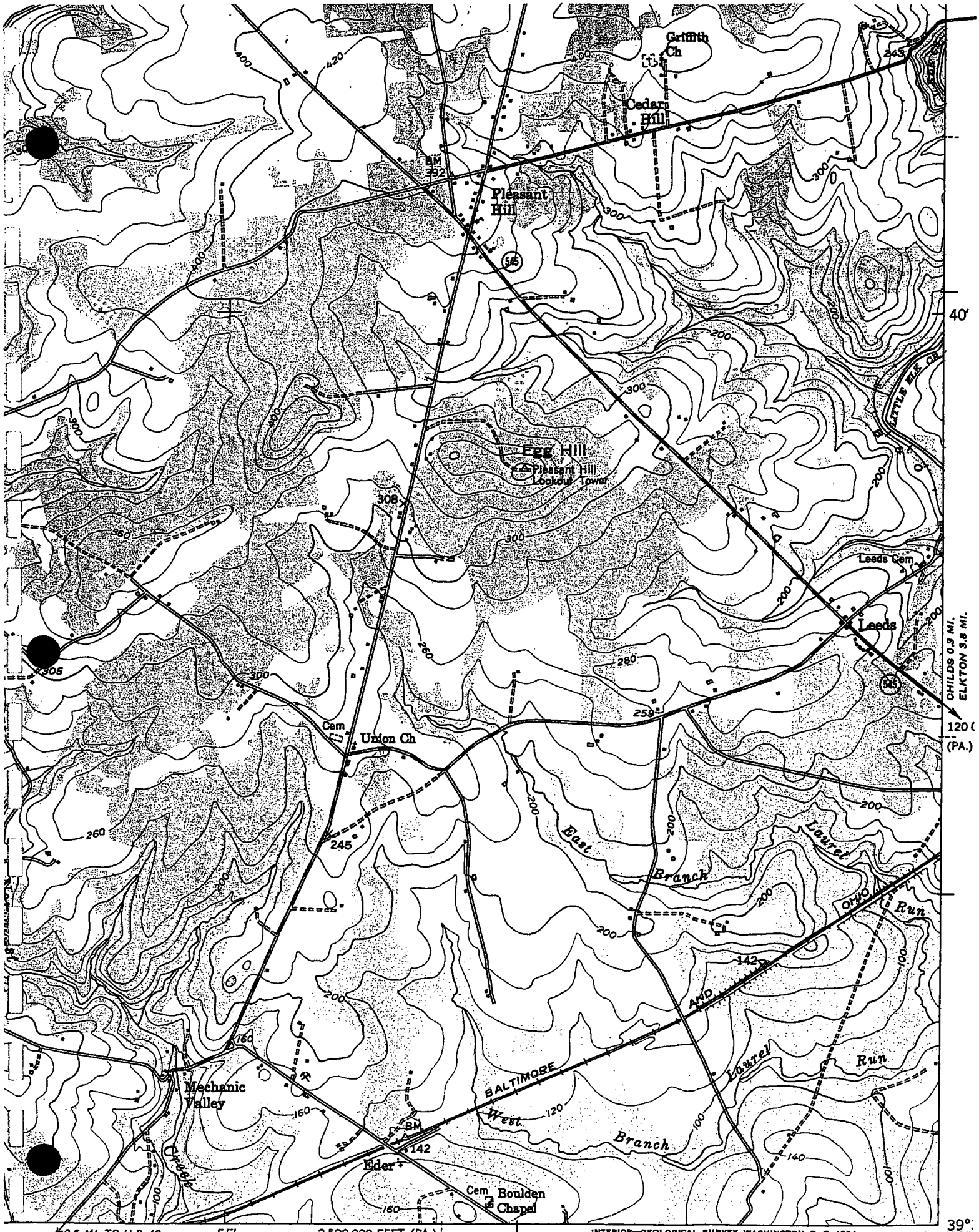
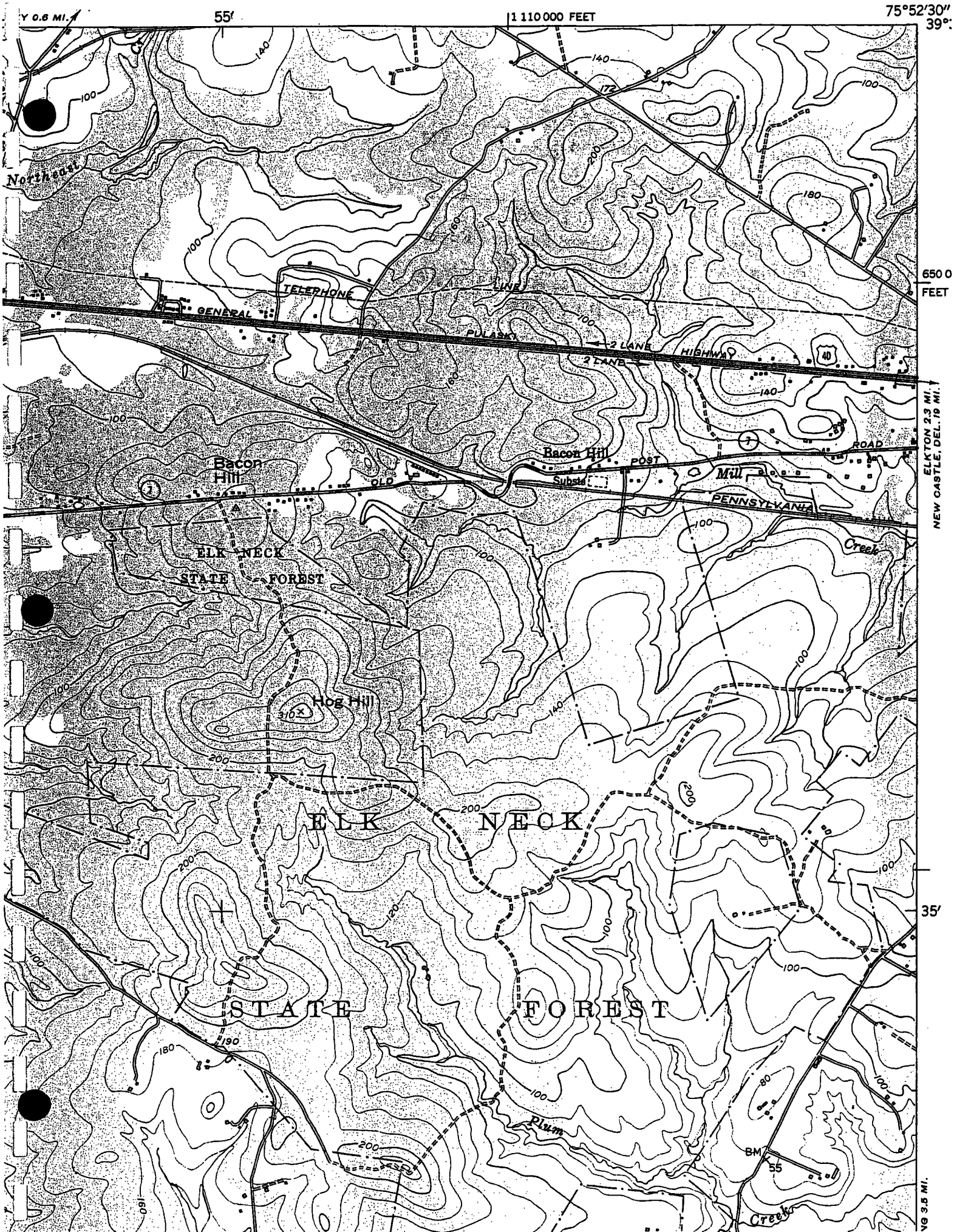
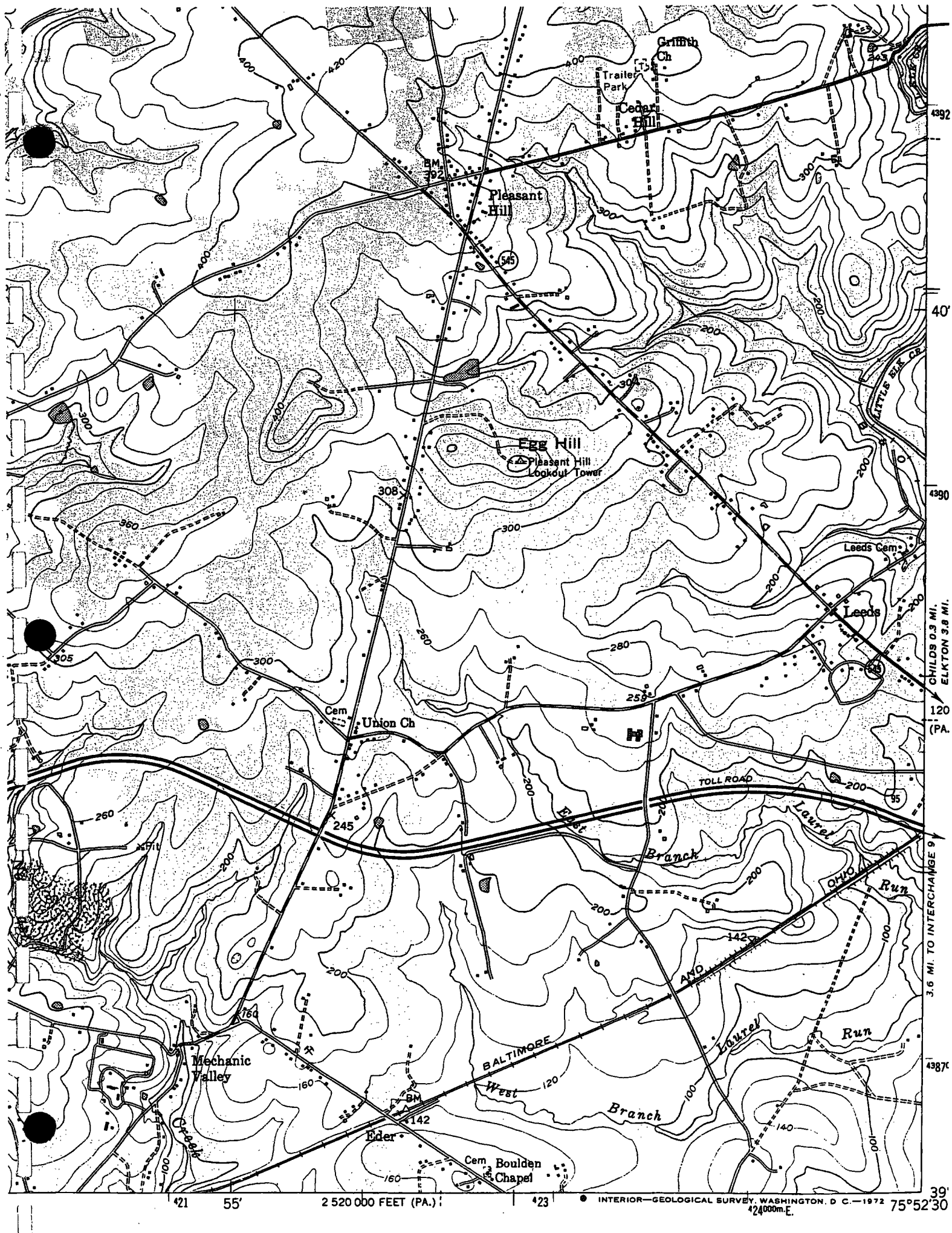


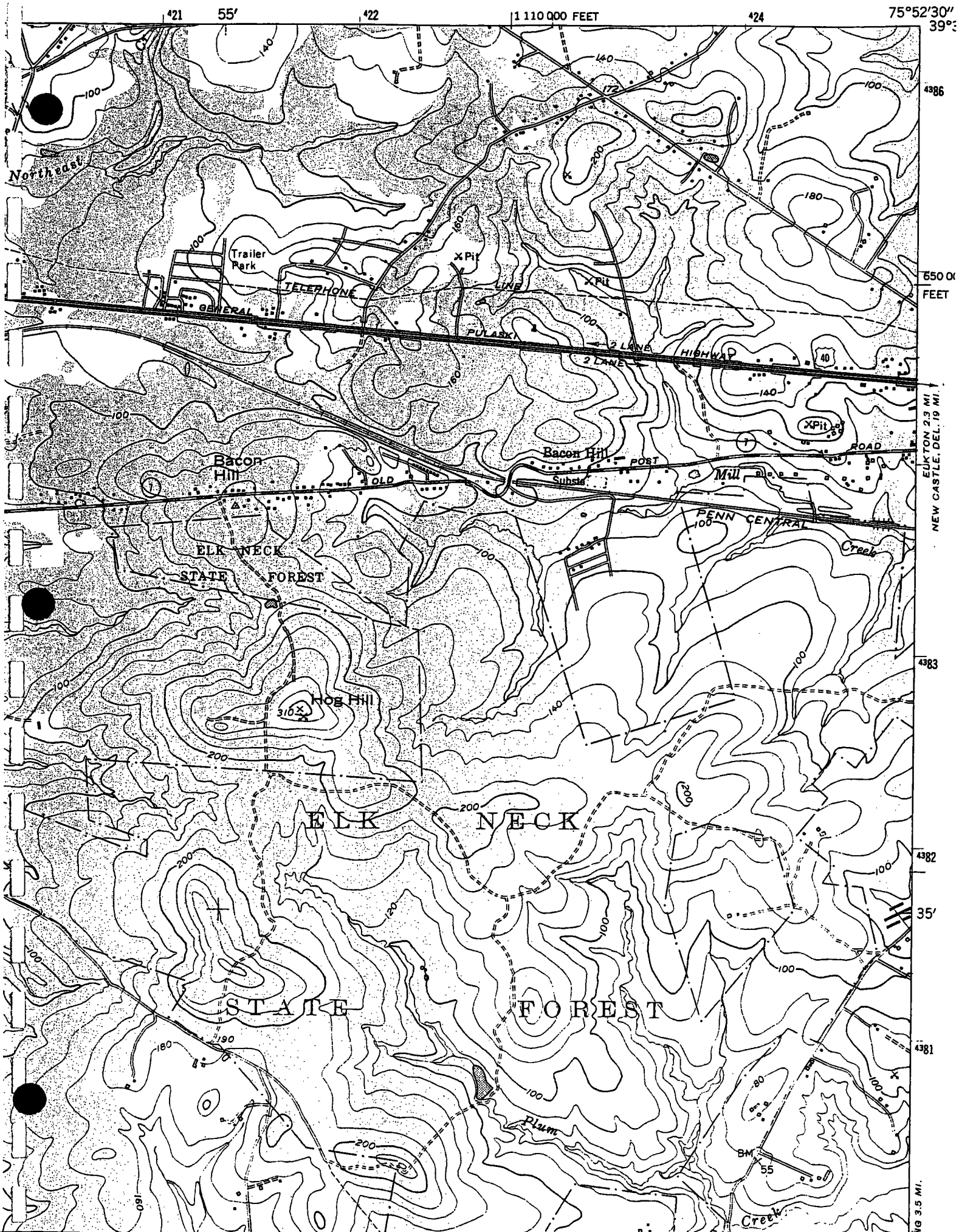
ROAD CLASSIFICATION

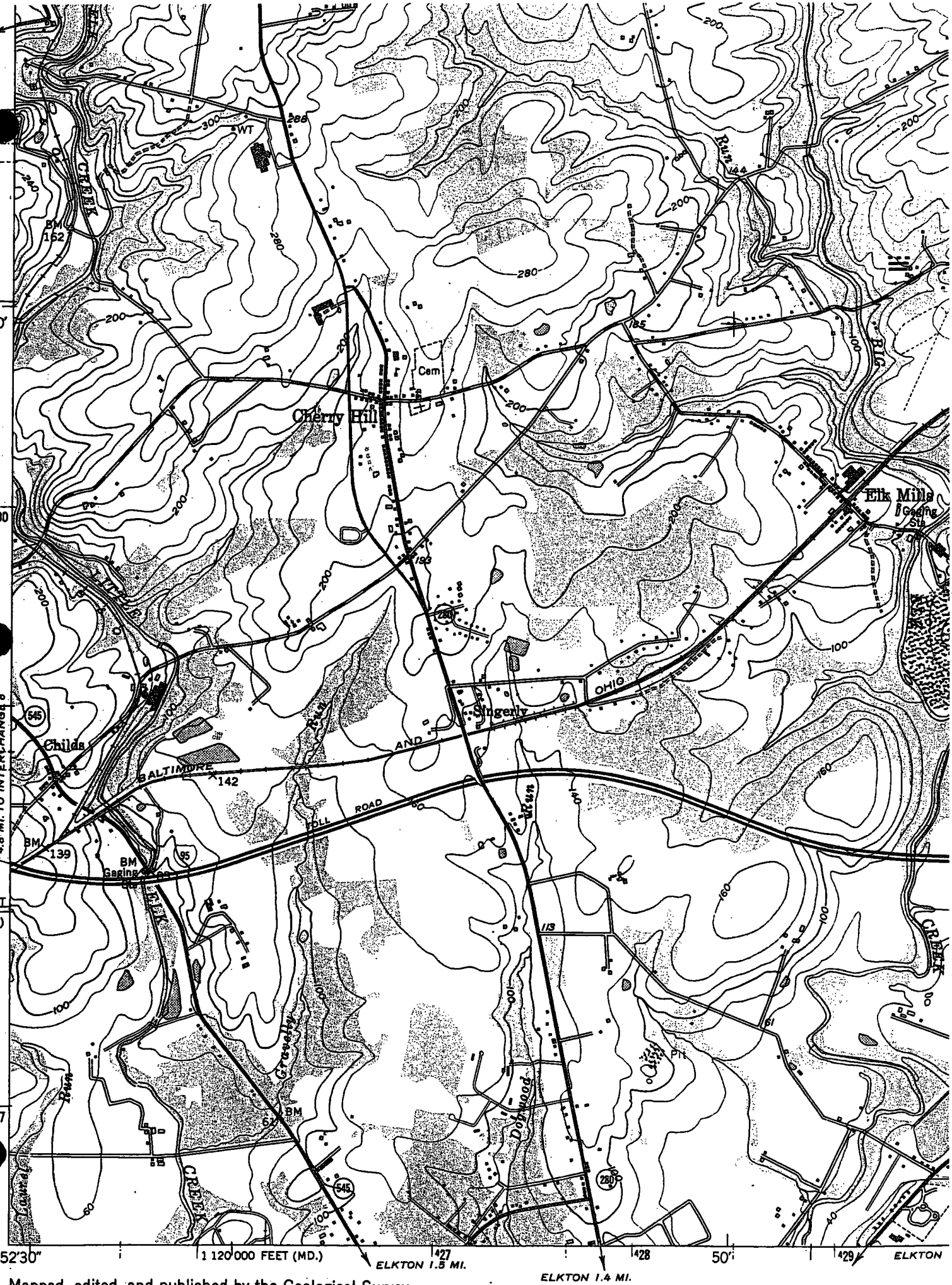

Y 0.6 MI.
55'
1 110 000 FEET
75°52'30"
39°
Northeast
TELEPHONE
LINE
GENERAL
PULASKI
2 LANE
HIGHWAY
2 LANE
40
650 0
FEET
ELKTON 2.3 MI.
NEW CASTLE, DEL. 19 MI.
Bacon Hill
Bacon Hill
POST
ROAD
Mill
Substa
OLD
PENNSYLVANIA
Creek
ELK NECK
STATE FOREST
Hog Hill
310
ELK NECK
STATE FOREST
35'
Plum
Creek
BM
55
VG 3.5 MI.


Griffith Ch
Trailer Park
Cedar Hill
BM 392
Pleasant Hill
545
Egg Hill
Pleasant Hill Lookout Tower
308
Leeds Cem
Leeds
LITTLE ELK CR
CHILDS 0.3 MI.
ELKTON 3.8 MI.
Cem
Union Ch
TOLL ROAD
95
East Branch
Laurel Run
OHIO
AND
BALTIMORE
West Branch
Laurel Run
Mechanic Valley
Creek
Eder
Cem
Boulden Chapel
3.6 MI. TO INTERCHANGE 9
40'
120
(PA.
39'
55'
2 520 000 FEET (PA.)
INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1972
75°52'30
1 MILE
ROAD CLASSIFICATION

GEOLOGICAL SURVEY
PLEASANT HILL 4 MI.
CHILDS 1.7 MI.
380 000 FEET (DEL.)
5.5 MI. TO MD. 273
CHERRY HILL 2.6 MI.
NEWARK, 0.7 MI. TO
75°52'30"
50'
35'
Reservoir
Water
Gilpin Cem
High Sch
LITTLE ELK
Dorwood
George Washington Carver Sch
ELKTON
Armory
Union Baptist
Courthouse
Cem
HOWARD
MAIN
2 LANE
3 TRACKS
PENN CENTRAL
Trailer Park
Bainbridge Manor
Sewage Disposal
Holly Hall
Mill Creek
Elkton Landing
BIG ELK
ELK NECK STATE FOREST
Jones Chapel
Gravel Pits
Scotland Pt
Old Frenchtown Wharf
Crouch Chapel
Plum
Perch
NORTH EAST 3.8 MI.
BACON HILL 1 MI.
4 MI. TO MD. 272

SW/4 ELKTON 15' QUADRANGLE





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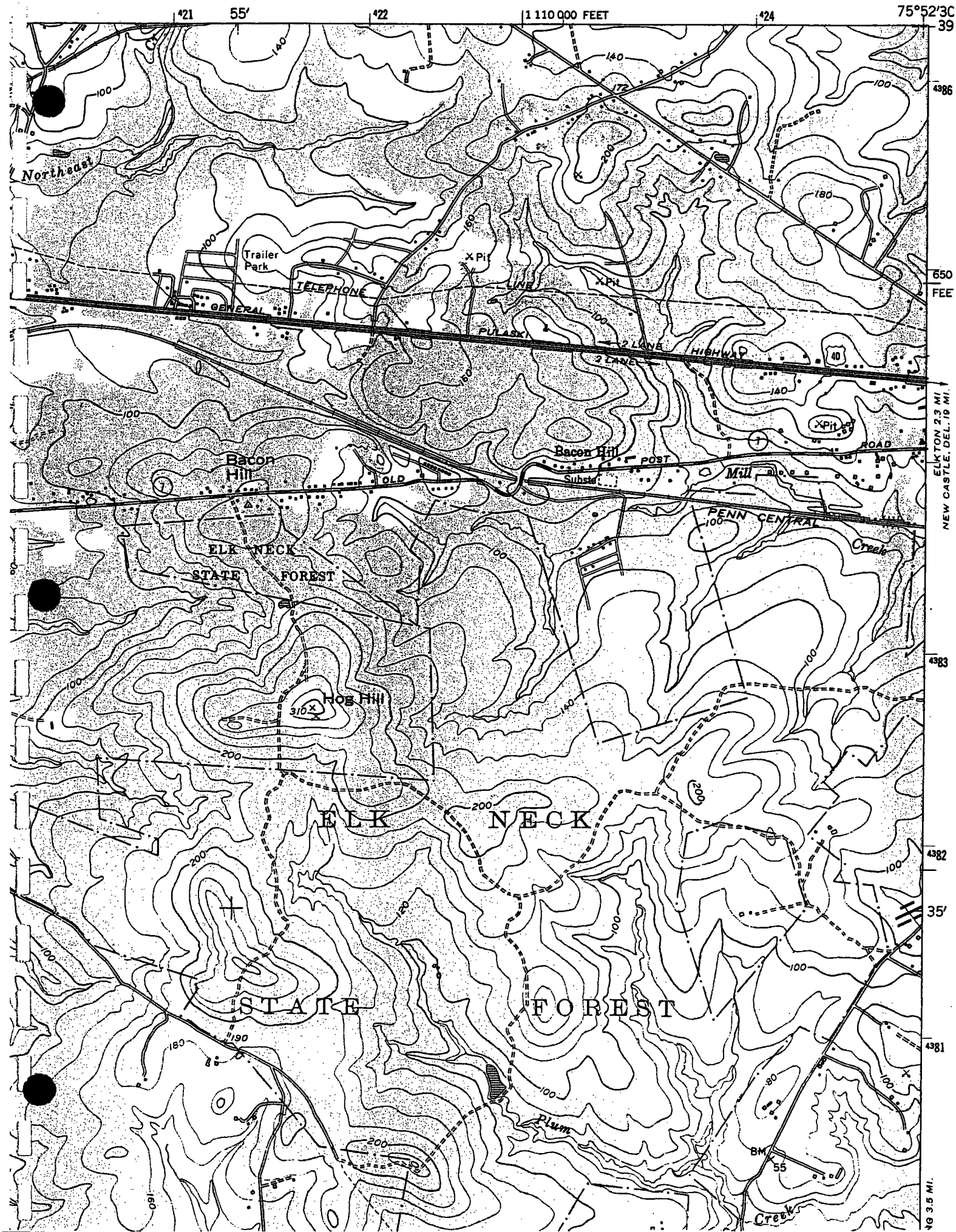
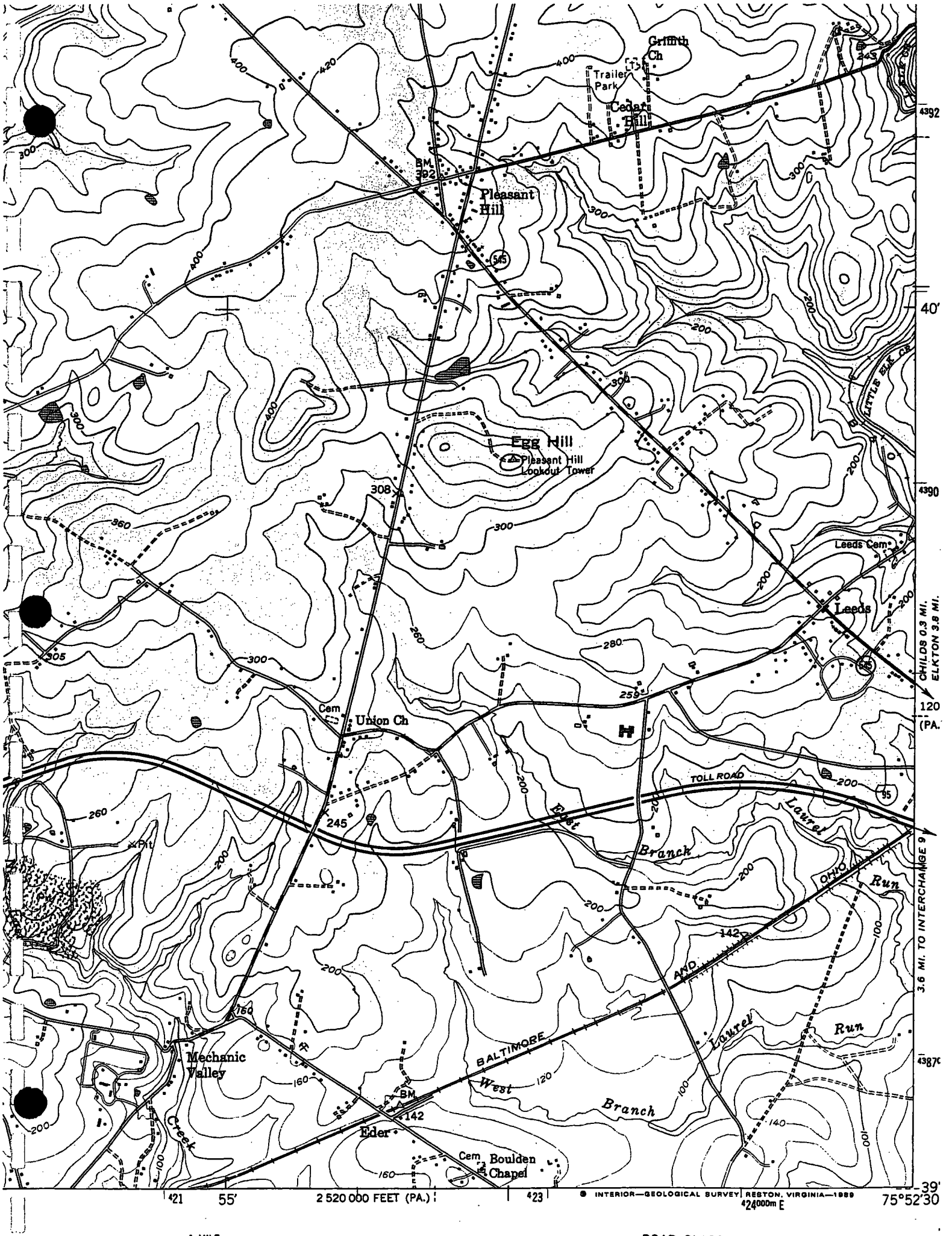
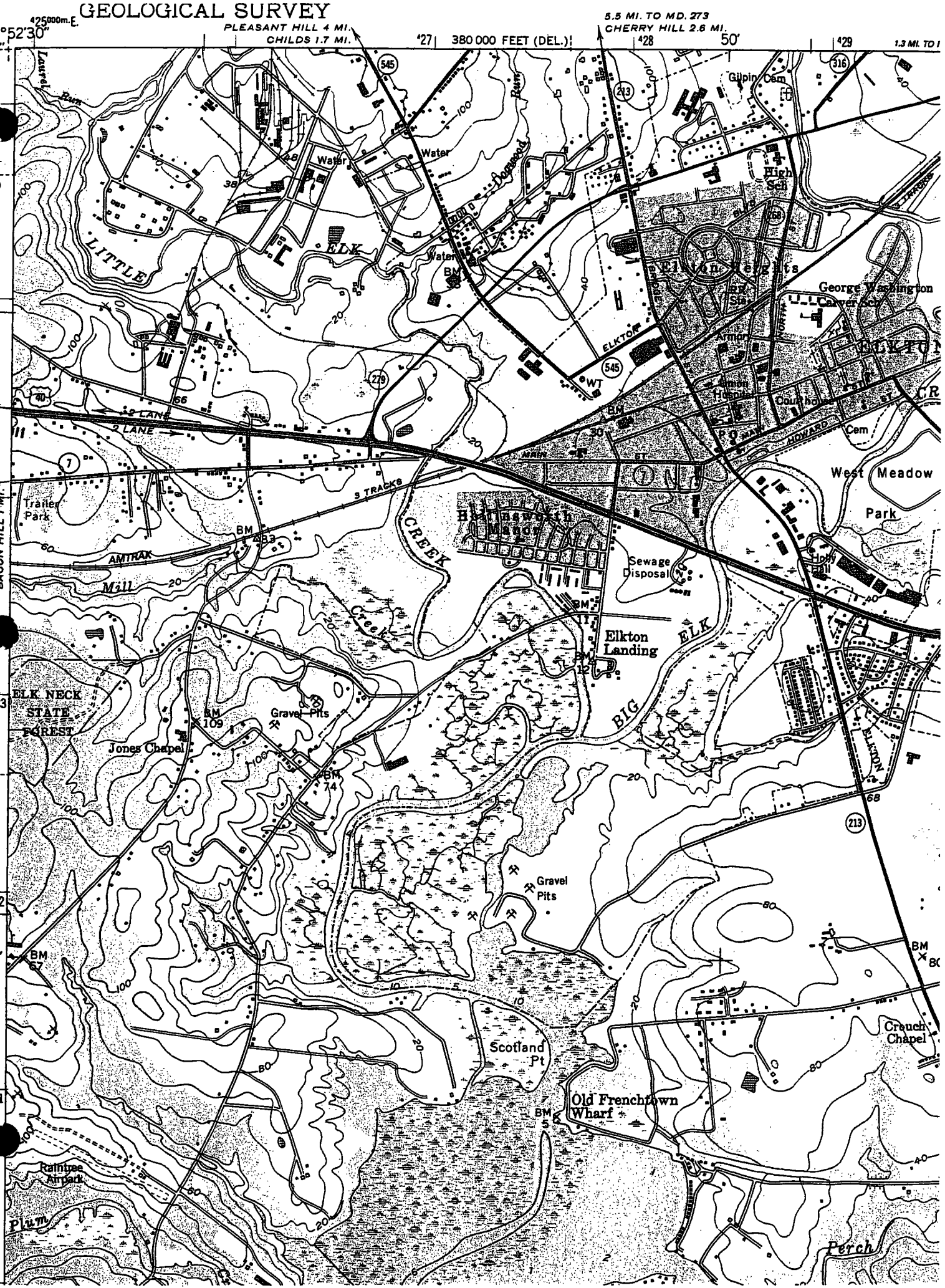
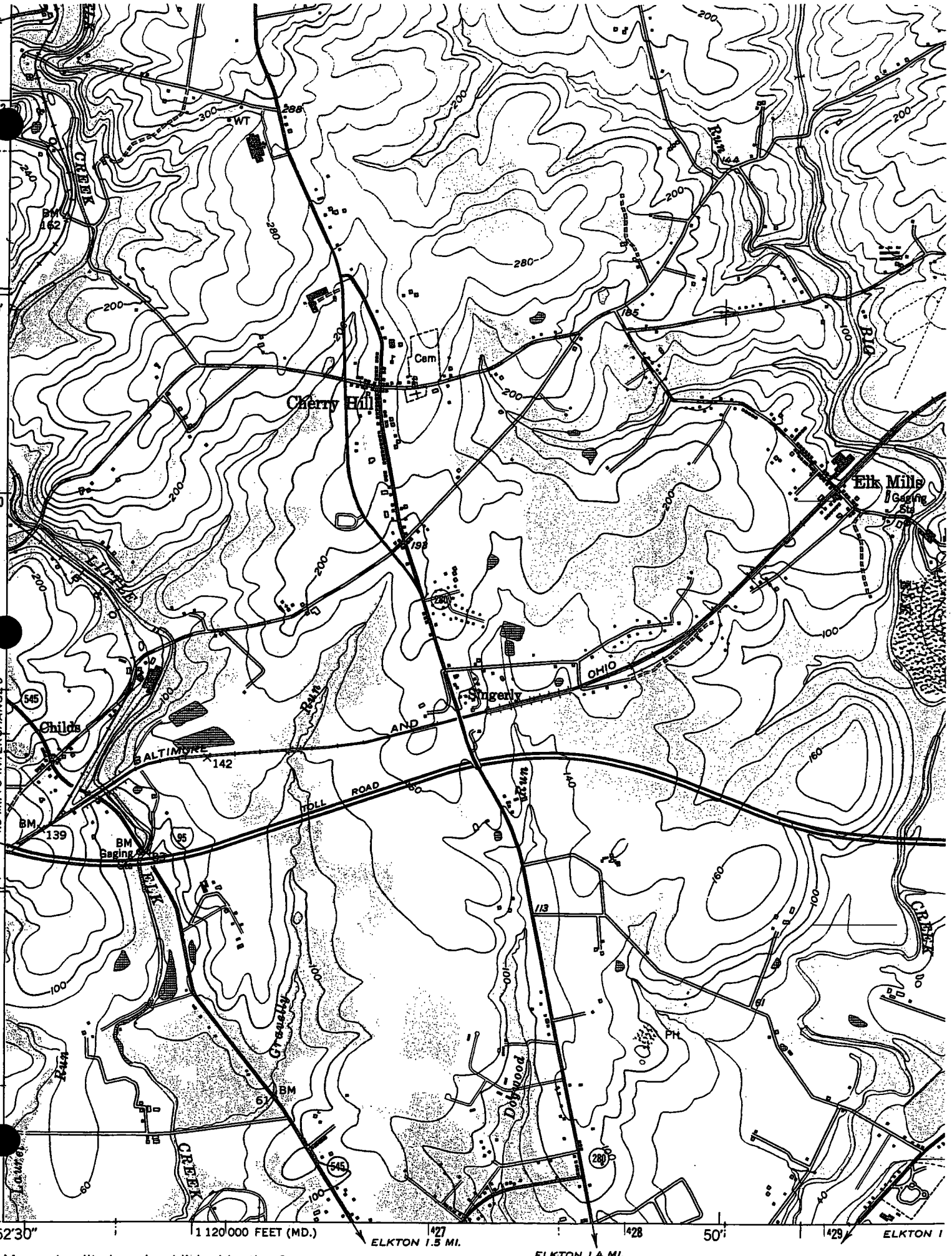
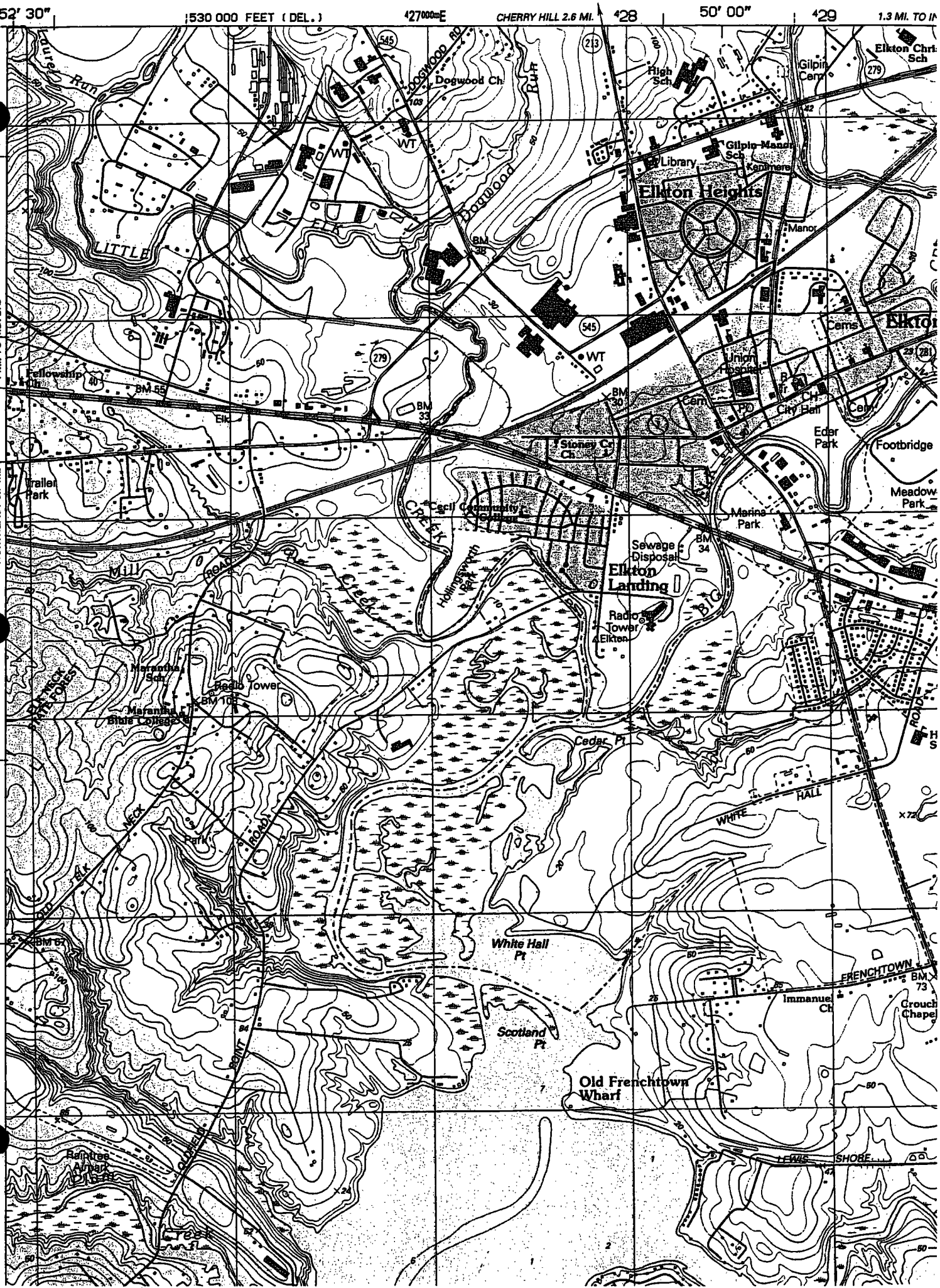

421
55'
422
1 110 000 FEET
424
75°52'30"
39
4386
650
FEET
Northeast
Trailer Park
TELEPHONE
LINE
GENERAL
PULASKI
2 LANE
2 LANE
HIGHWAY
40
Pit
Pit
Pit
Bacon Hill
Bacon Hill
OLD
POST
ROAD
Substa
Mill
PENN CENTRAL
Creek
ELK NECK
STATE FOREST
Hog Hill
310
ELK NECK
STATE FOREST
Plum
Creek
BM
55
ELKTON 2.3 MI.
NEW CASTLE, DEL. 19 MI.
4383
4382
35'
4381
NG 3.5 MI.


Griffith Ch
Trailer Park
Cedar Hill
BM 392
Pleasant Hill
545
Egg Hill
Pleasant Hill Lookout Tower
308
Leeds Cem
Leeds
525
CHILDS 0.3 MI.
ELKTON 3.8 MI.
Cem
Union Ch
TOLL ROAD
245
East Branch
Laurel Run
OHIO
142
AND
BALTIMORE
West Branch
Laurel Run
Mechanic Valley
Creek
BM 142
Eder
Cem
Boulden Chapel
3.6 MI. TO INTERCHANGE 9
4392
40'
4390
120
(PA.
4387
39'
421
55'
2 520 000 FEET (PA.)
423
424000m E
75°52'30
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1969
1 MILE
ROAD CLASSIFICATION

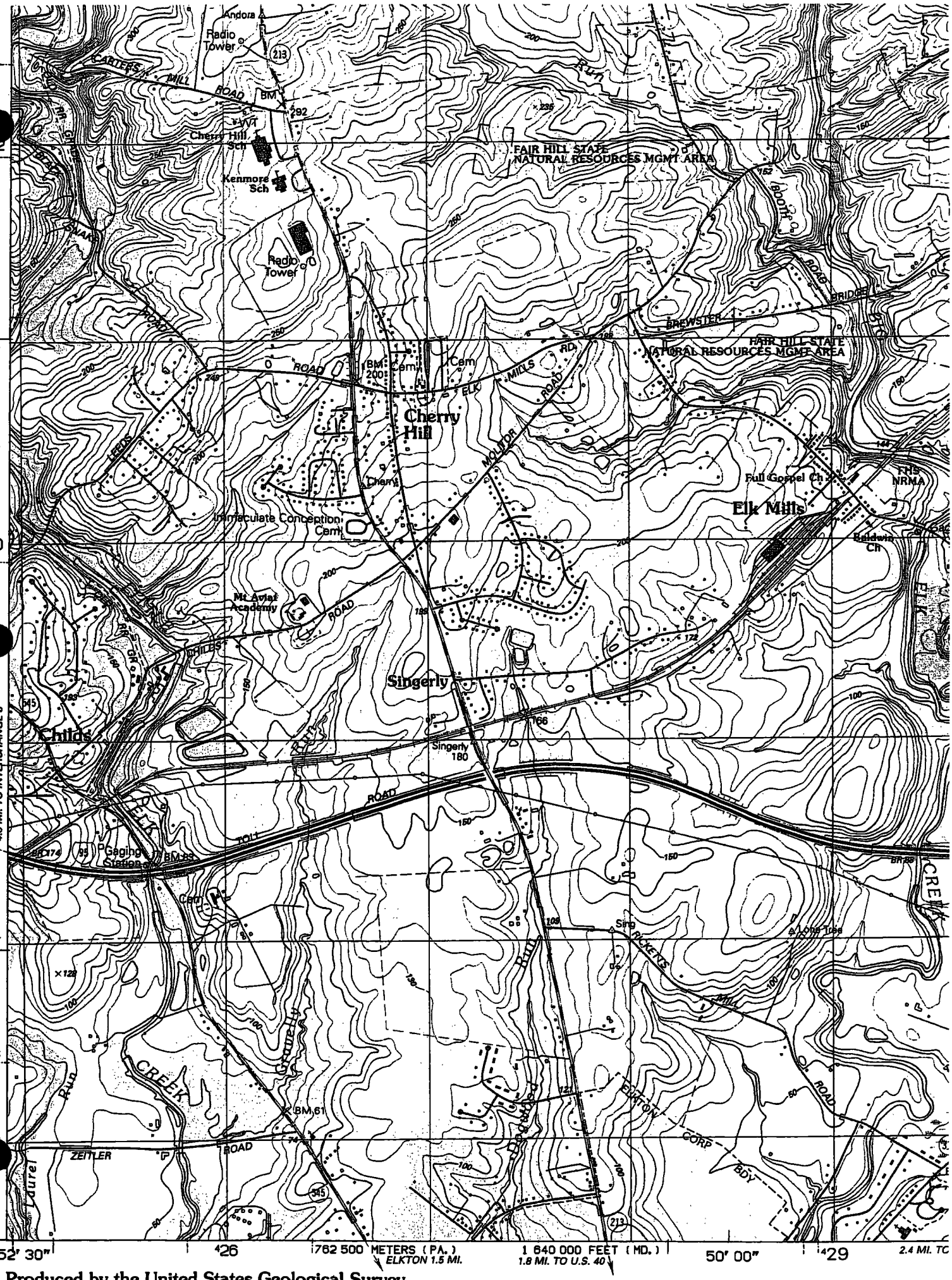

GEOLOGICAL SURVEY
425000m.E.
75°52'30"
30"
PLEASANT HILL 4 MI.
CHILDS 1.7 MI.
427
380 000 FEET (DEL.)
5.5 MI. TO MD. 273
CHERRY HILL 2.6 MI.
428
50'
429
1.3 MI. TO
4 MI. TO MD. 272
NORTH EAST 3.8 MI.
BACON HILL 1 MI.
Laurel Run
Water
Water
Water
Dogwood Run
LITTLE ELK
Gilpin Cem
High Sch
Elkton Heights
George Washington Carver Sch
ELKTON
Armory
Union Hospital
Courthouse
Cem
HOWARD
MAIN ST
ELKTON
WT
2 LANE
2 LANE
3 TRACKS
AMTRAK
Trailer Park
Hollinsworth Manor
CREEK
Sewage Disposal
West Meadow Park
Holly Hall
Mill Creek
Elkton Landing
BIG ELK
ELK NECK STATE FOREST
Jones Chapel
Gravel Pits
Gravel Pits
Scotland Pt
Old Frenchtown Wharf
Crouch Chapel
Raintree Airpark
Plum
Perch
BM 109
BM 74
BM 67
BM 5
BM 11
BM 12
BM 30
BM 83
4383
4382
4381
35'



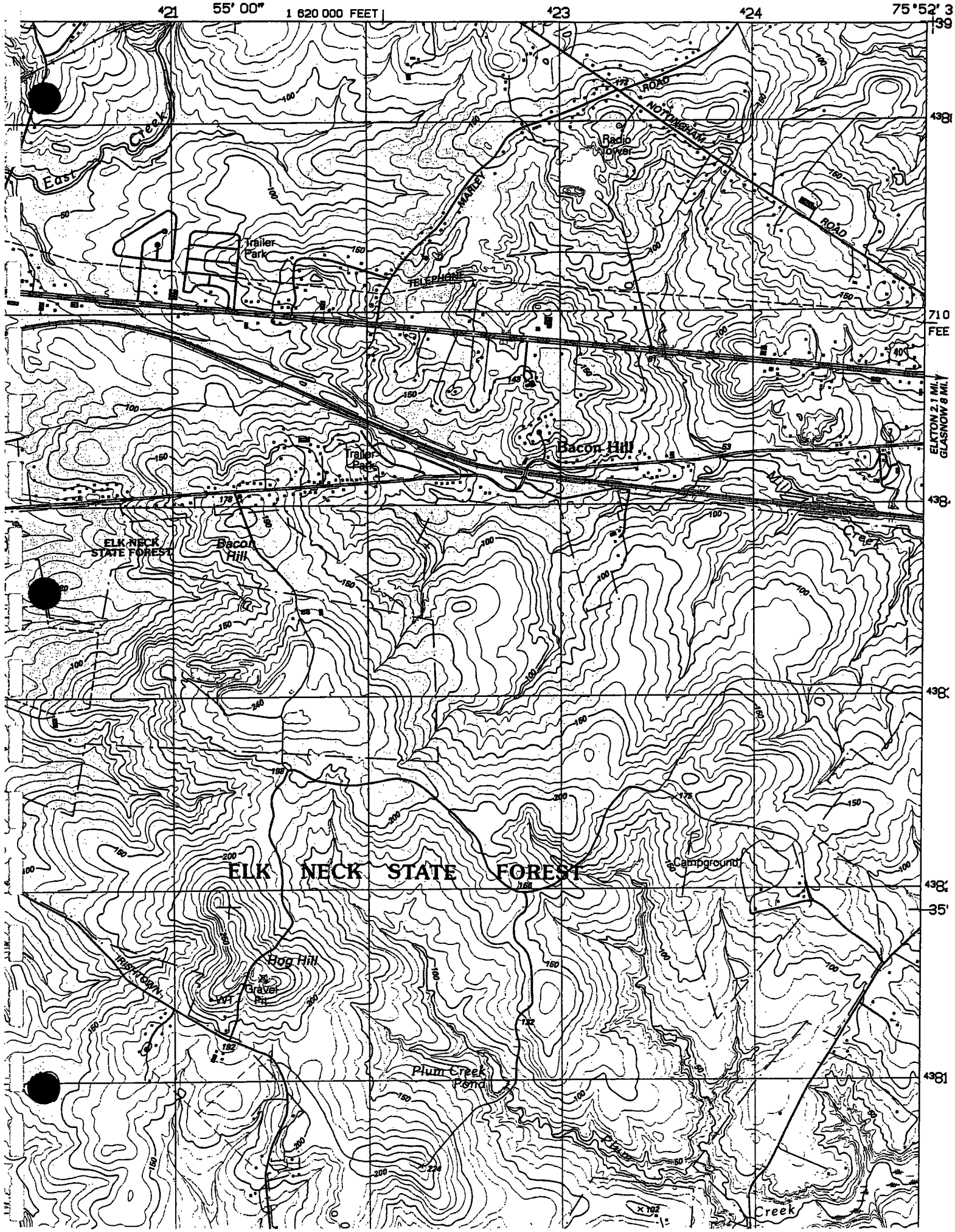
Mapped, edited, and published by the Geological Survey

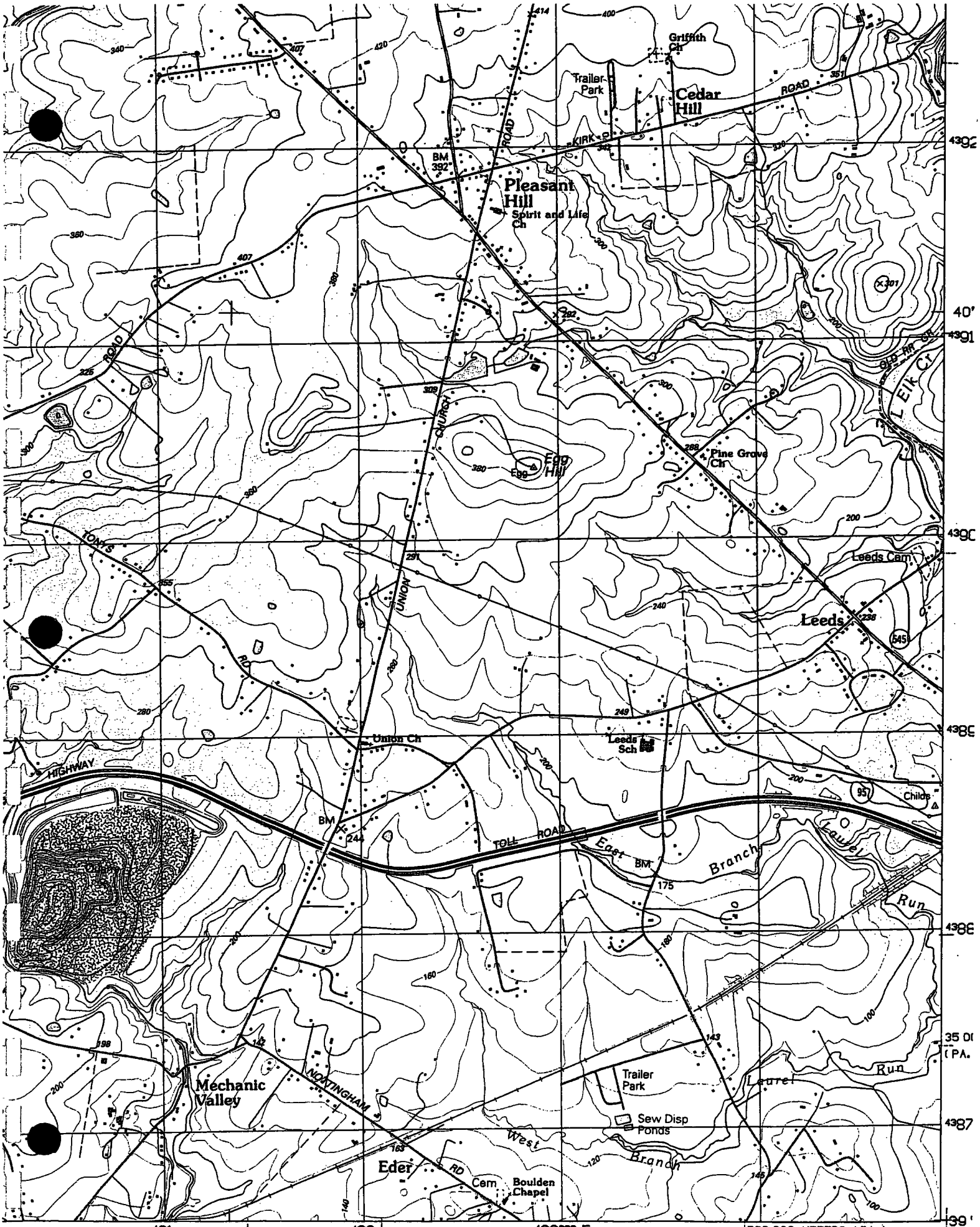


530 000 FEET (DEL.)
CHERRY HILL 2.6 MI.
50' 00"
1.3 MI. TO IN
BALTIMORE 49 MI.
4 MI. TO MD. 272
NORTHEAST 3.7 MI.
Elkton Heights
Elkton Landing
Elkton
Dogwood Ch
High Sch
Gilpin Cem
Elkton Chri Sch
Gilpin Manor Sch
Library
Kentmere
Manor
Union Hospital
City Hall
Cems
Eder Park
Footbridge
Meadow Park
Marina Park
Sewage Disposal
Radio Tower
Elkton
Stoney Cr Ch
Cecil Community College
Hollingsworth Park
Fellowship Ch
Trailer Park
Marantha Sch
Marantha Bible College
Radio Tower
Cedar Pt
White Hall Pt
Scotland Pt
Old Frenchtown Wharf
Immanuel Ch
Crouch Chapel
Raintree Airpark
Mill Creek
Dogwood Run
Little Elk Creek
Big Elk Creek
Old Elk Neck Road
Old Field Point
White Hall Road
Frenchtown Road
Lewis Shore
Elk Neck State Forest



Produced by the United States Geological Survey
in cooperation with Delaware Geological Survey


421
55' 00"
1 620 000 FEET
423
424
75°52' 3
39
438
East Creek
Radio Tower
NOTTINGHAM ROAD
MARLEY
Trailer Park
TELEPHONE
710
FEE
ELKTON 2.1 MI.
GLASNOW 8 MI.
Bacon Hill
Trailer Park
ELK NECK STATE FOREST
Bacon Hill
Creek
ELK NECK STATE FOREST
Campground
35'
Hog Hill
Gravel Pit
IRISH COURT
Plum Creek Pond
Creek



INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1999

ROAD CLASSIFICATION

Quadrangle Relation Chart

7.5 minute series
Scale = 1: 24,000

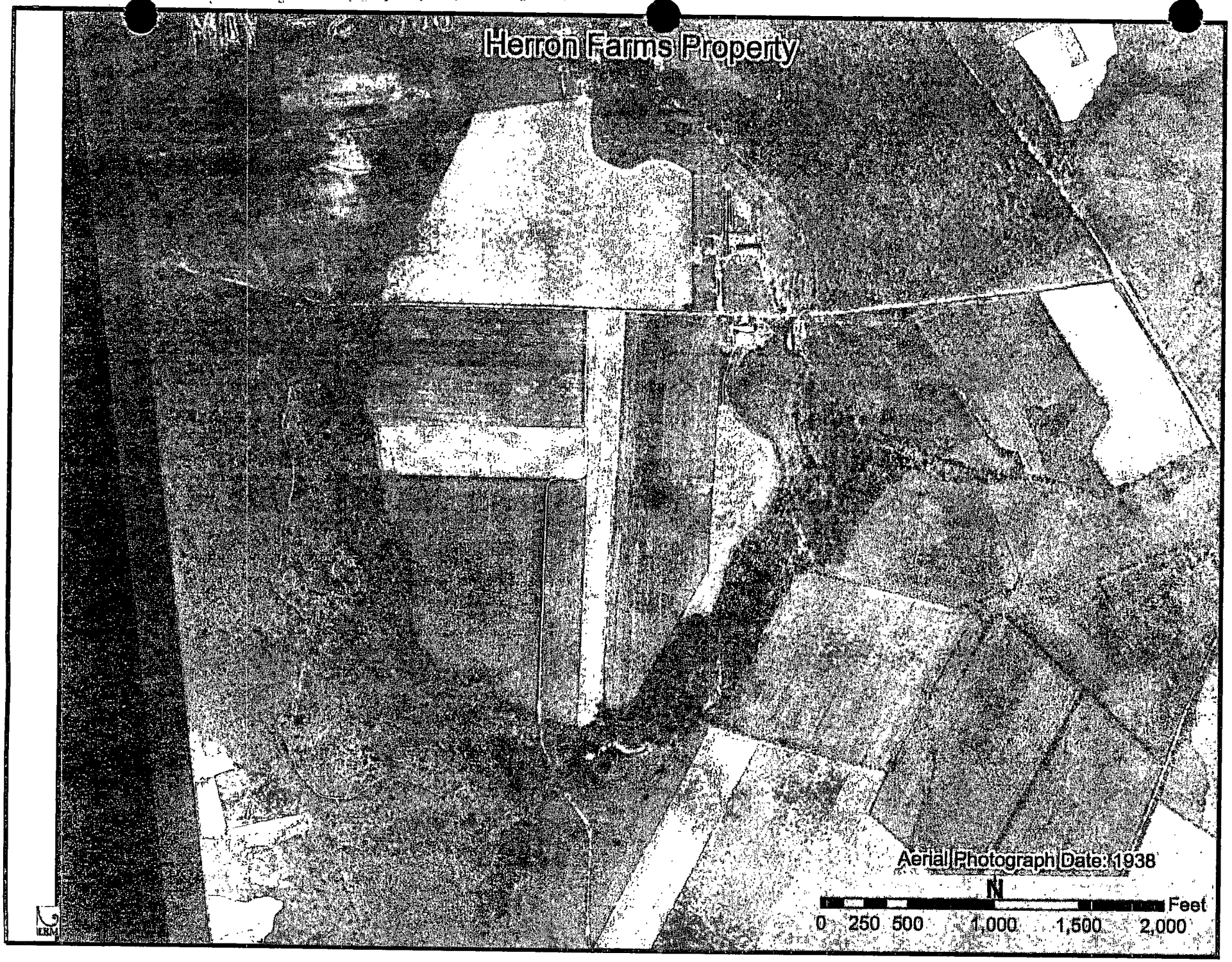
Inquiry # 1319583-S

Adjoining Quadrant	Target Quadrant
Bay View	Newark West
Adjoining Quadrant	**Adjoining Quadrant**
North East	Elkton

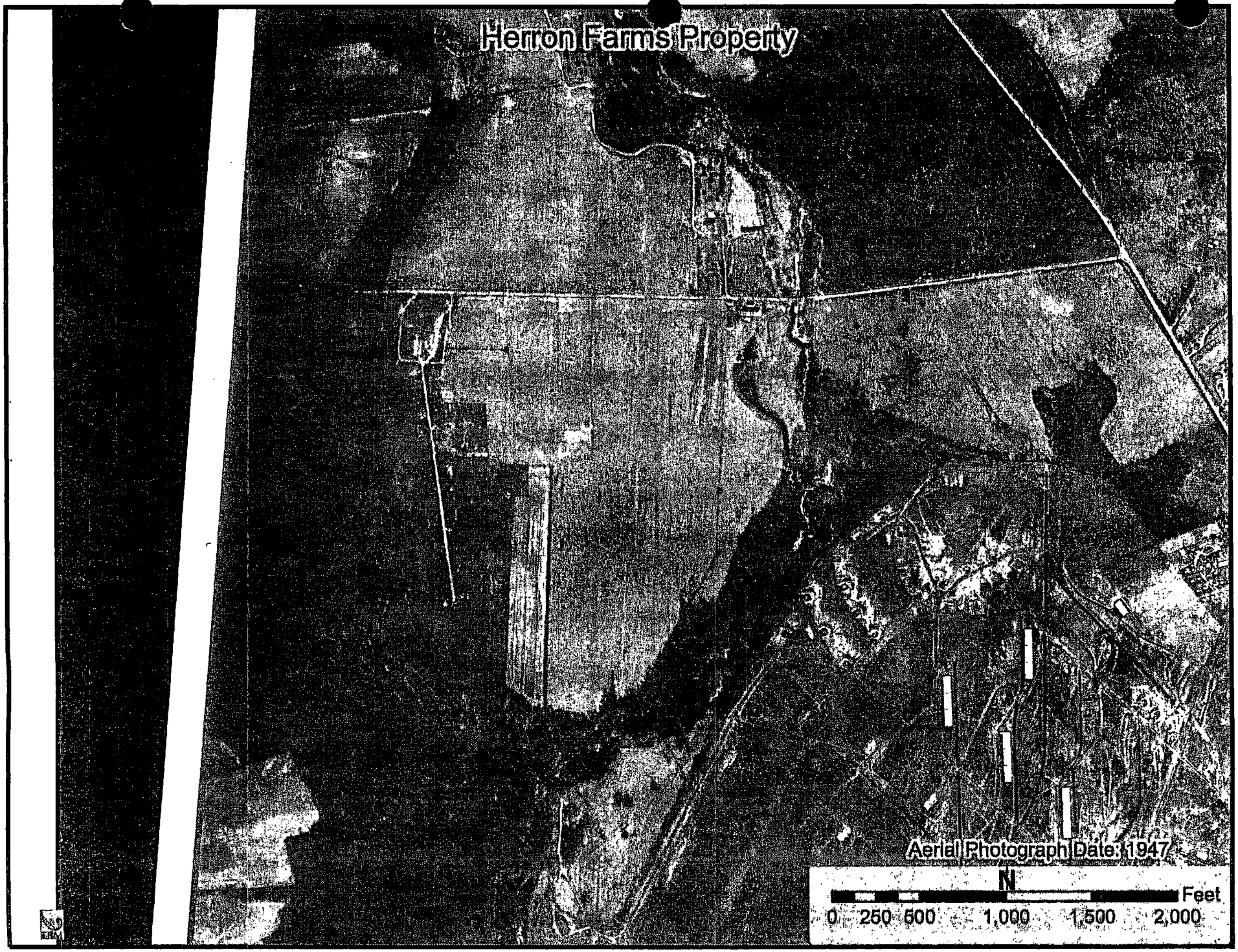
N

E

Appendix E
Historical Aerial Photographs


Herron Farms Property
Aerial Photograph Date: 1938
N
Feet
0 250 500 1,000 1,500 2,000

Herron Farms Property
Aerial Photograph Date: 1942
N
Feet
0 250 500 1,000 1,500 2,000

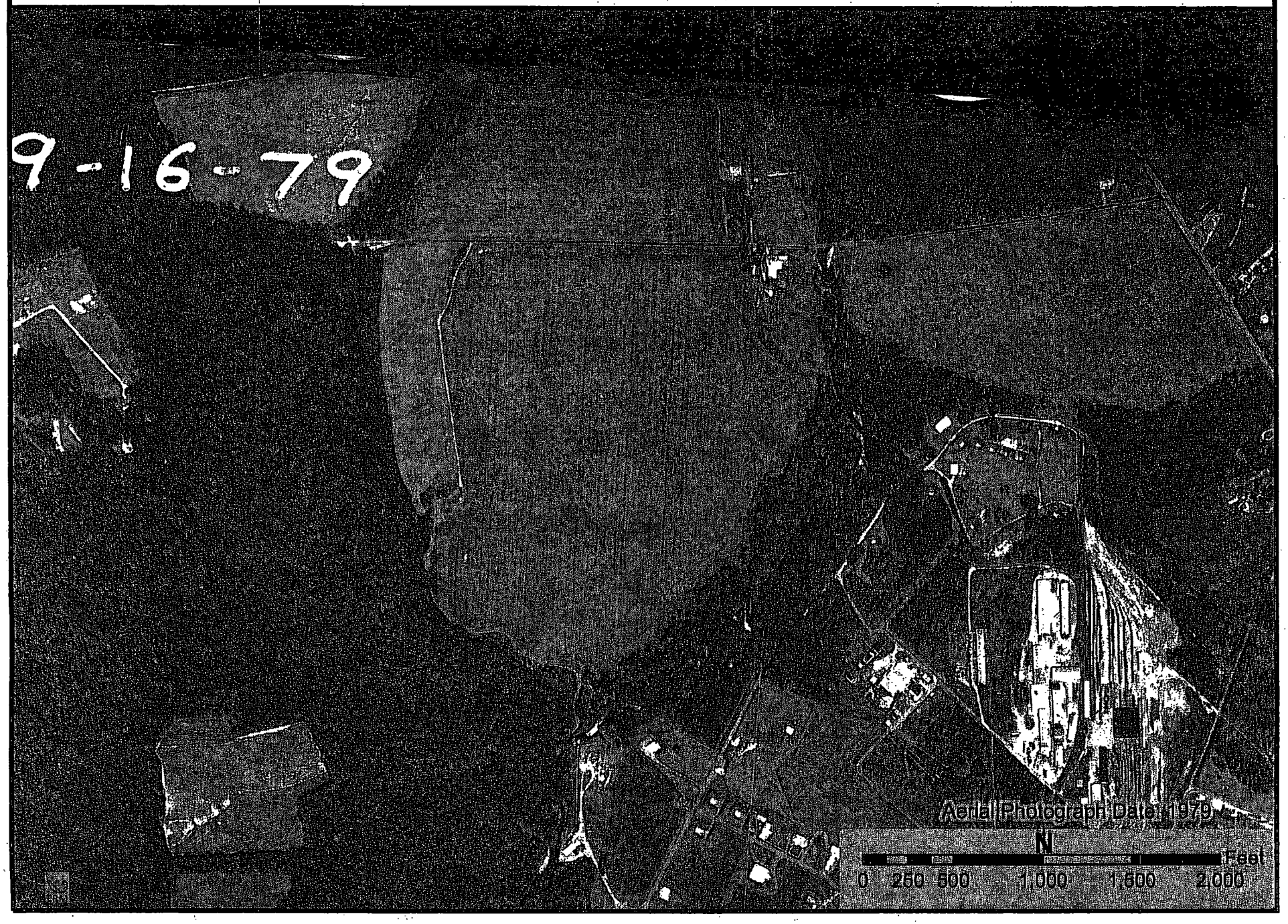

Herron Farms Property
Aerial Photograph Date: 1947
N
Feet
0 250 500 1,000 1,500 2,000

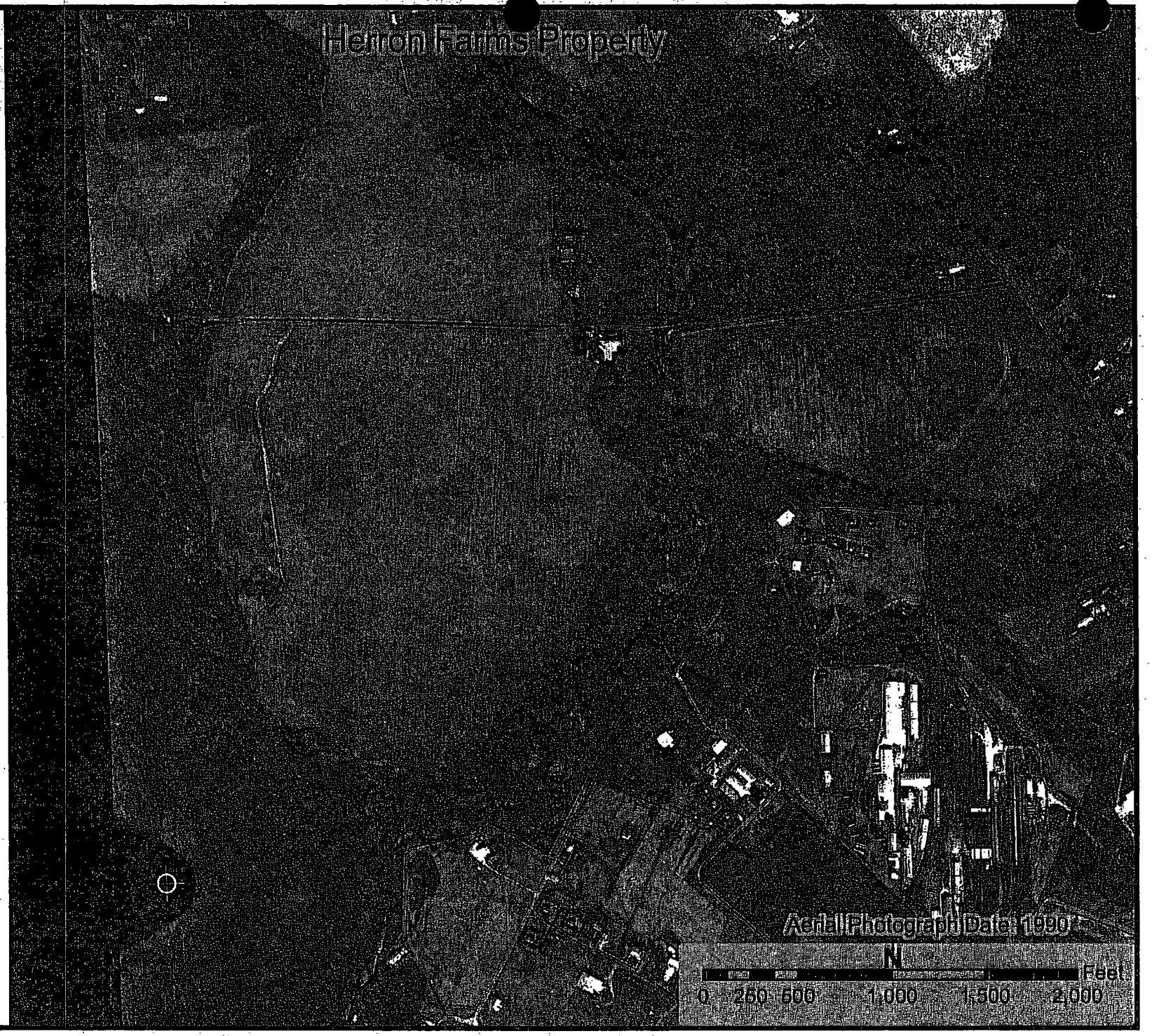
Herron Farms Property

Herron Farms Property
8-13-57
Aerial Photograph Date: 1957
N
Feet
0 250 500 1,000 1,500 2,000

Herron Farms Property
4-8-69
Aerial Photograph Date 1969
N
Feet
0 250 500 1,000 1,500 2,000

Herron Farms Property




Herron Farms Property
Aerial Photograph Date: 1990
N
Feet
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Herron Farms Property
Aerial Photograph Date: 1999
N
Feet
0 250 500 1,000 1,500 2,000

F

Appendix F
MDE FUDS Site Inspection Reports (Units Two, Three and Four)

FORMERLY USED DEFENSE SITE INSPECTION
OF THE
ELKTON FARM FIREHOLE SITE
(MD-433)

FINAL

September 15, 2004

Prepared by: Maryland Department of the Environment
Waste Management Administration
1800 Washington Blvd.
Baltimore, MD 21230

Prepared for: U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

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1.0 INTRODUCTION

1.1 Authorization

This Site Inspection was performed by the Maryland Department of the Environment, Waste Management Administration (MDE/WAS), Environmental Restoration and Redevelopment Program (ERRP), Site Assessment Division under the 2001 Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

1.2 Scope of Work

MDE was contracted to perform a Formerly Used Defense Site (FUDS) Inspection of the Elkton Farm Site (MD-433). The purpose of the FUDS Inspection is to assess the actual and potential release of hazardous substances from the site by way of groundwater, surface water, soil exposure and air pathways on sites that were owned and/or operated by the Federal Government. The scope of the FUDS Inspection included reviewing the available file information, site reconnaissance and sampling under the U.S. EPA Contract Laboratory Program (CLP).

1.3 Executive Summary and Conclusions

The Elkton Farm Firehole site is located two miles northwest of Elkton, Maryland near the intersection of Routes 40 and 279 (Figure 1). The Firehole property occupies approximately 32-acres of the 400-acre Elkton Farm and is located just south of Zeitler Road between Little Elk Creek and Laurel Run. The most recent use of the site has been as a working farm. During the decade before and during World War II, the parcel had been the site of activity related to the manufacture of fireworks and munitions.

After being identified as a potentially responsible party, the U.S. Army Corps of Engineers contracted an investigation of the site operations and ownership history of the Elkton, Maryland site of Triumph Explosives, Inc. (TEI). In February 1992, the final report for this project was prepared by TechLaw, Inc.[4] This report identified an area on the current Elkton Farm as the Firehole. The Firehole was documented as an area for the disposal of waste explosives material. This waste was reportedly collected in drums and kept wetted with alcohol or ether. This waste was then carried to a shallow pit off Zeitler Road, spread thinly and allowed to burn. Plant personnel monitored the burn until the waste explosive was ostensibly consumed. Photographs in the TEI newsletter from the period of concern show the operation of this Firehole burn pit.

The total quantity of hazardous waste disposed of in the Firehole is unknown. There is no estimate of fill thickness for the Firehole. A geophysical survey conducted for MDE by NAEVA Geophysics, Inc. (NAEVA) indicated several distinct anomalies on the portion of the

property east of Laurel Run and south of Zeitler Road. Observations indicate that the Firehole is not one discrete area but rather a series of burn pits located across the property in an approximate 32-acre area.

The Firehole was reportedly the subject of a cleanup that saw the removal of tens of tons of contaminated soil. According to two separate sources, Mr. Patrick Herron and Mr. Richard Herron, soil was removed from an area where crops would not grow, and clean soil was brought in to fill the excavation. The removed soil was said to have contained scraps of brass shell casing and metallic slag.

A sampling plan to characterize the 32-acre site was prepared by MDE after site reconnaissance and a review of available historic information of the area. On October 10 & 11, 2002, as part of the FUDS Inspection, MDE collected fourteen surface soil samples, ten subsurface soil samples, six surface water samples and six sediment samples. The samples were analyzed for the presence of metals and cyanide, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), pesticides and polychlorinated biphenyls (PCBs), perchlorates and nitroaromatic compounds. On May 21, 2003, to finalize data collection for the FUDS Inspection, MDE collected five groundwater samples and had them analyzed for the presence of total and dissolved metals, VOCs, SVOCs, pesticides and PCBs, nitroaromatic compounds, and perchlorates.

A Toxicological evaluation was prepared for the Firehole site, assuming residential future use scenario for the site. EPA recognizes an acceptable Hazard Index of values less than or equal to 1 (noncarcinogenic chemicals) and a lifetime cancer risk less than or equal to 10^{-6} to 10^{-4}. MDE recognizes threshold Hazard Index values equal to 1 and lifetime cancer risk threshold values less than or equal to 1×10^{-5}. Risk estimates exceeded EPA and MDE recommended levels for the child resident population for incidental ingestion of and dermal contact with surface soils, with the risk drivers of potential additive effects, chromium, and arsenic. Concentrations detected exceeded the EPA and MDE recommended levels for ingestion of and dermal contact with subsurface soil for the child resident, with the risk drivers of potential additive effects and chromium. Lead was detected in S14 at 1480 mg/kg, which may pose a threat to sensitive populations and the environment. Risk for the incidental ingestion of and dermal contact with groundwater exceeded MDE and EPA recommended levels for all residential populations, with trichloroethene (TCE) as the risk driver.

Samples S13 and S14 were collected in the area defined by the NAEVA geophysical survey as the most likely area of the Firehole. Sample analysis showed elevated concentrations of lead, mercury, and arsenic, as well as TCE and PCBs (Aroclor 1254), and the nitroaromatic compound Trinitrotoluene (TNT) and associated daughter products. The groundwater collected from monitoring well MW2, which is hydraulically downgradient of S13 and S14, was contaminated with TCE at 190 µg/L. Subsurface soil samples from the Firehole area were not collected because of refusal at less than 18 inches. Sample S/SS 6 obtained from the vicinity of the Thiokol Motor Recovery Area (TMRA) and sample S8 midway between the Firehole and TMRA also exhibited elevated levels of several explosive compounds.

The Elkton Farm property is listed for sale on the real estate market. It is currently leased to Spry Brothers Farming for seasonal crops; however, in all likelihood, the entire 300-acre farm will be developed for residential use in the future, rather than continued use for farming. The presence of TNT and daughter products, elevated concentrations of metals, highly volatile TCE detected in surface soils and groundwater, and the presence of ordinance-related debris easily observable on the ground surface all suggest that further investigation is necessary in order to fully identify any human health risks to future residential populations.

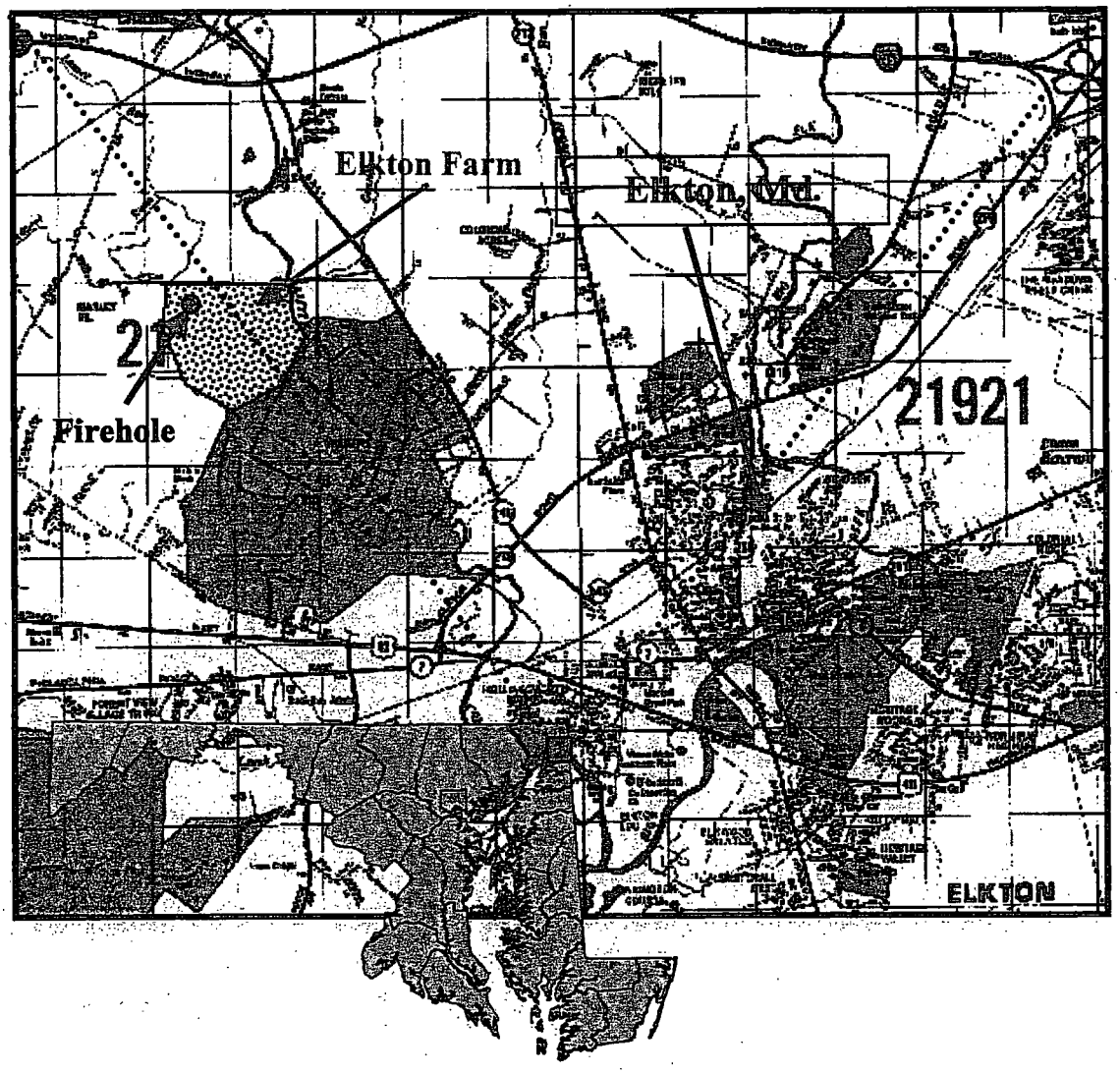
2.0 SITE DESCRIPTION

The Elkton Farm site is located at 183 Zeitler Road, Elkton, Maryland (Figure 1). The farm itself consists of approximately 400 acres and is situated in a rural setting just north of Triumph Industrial Park. The farm is currently owned by MARVA Limited Partnership. The property has historically been a working farm. For a brief period in the mid 1940s to early 1950s the property was impacted by military operations. MARVA Limited Partnership, the current owner, leases the property to a commercial farming operation that continues to rotate several seasonal crops through the Elkton Farm's fields. There are no access limitations to this property.

As a result of the military operations in the 1940s, four areas of concern were identified:

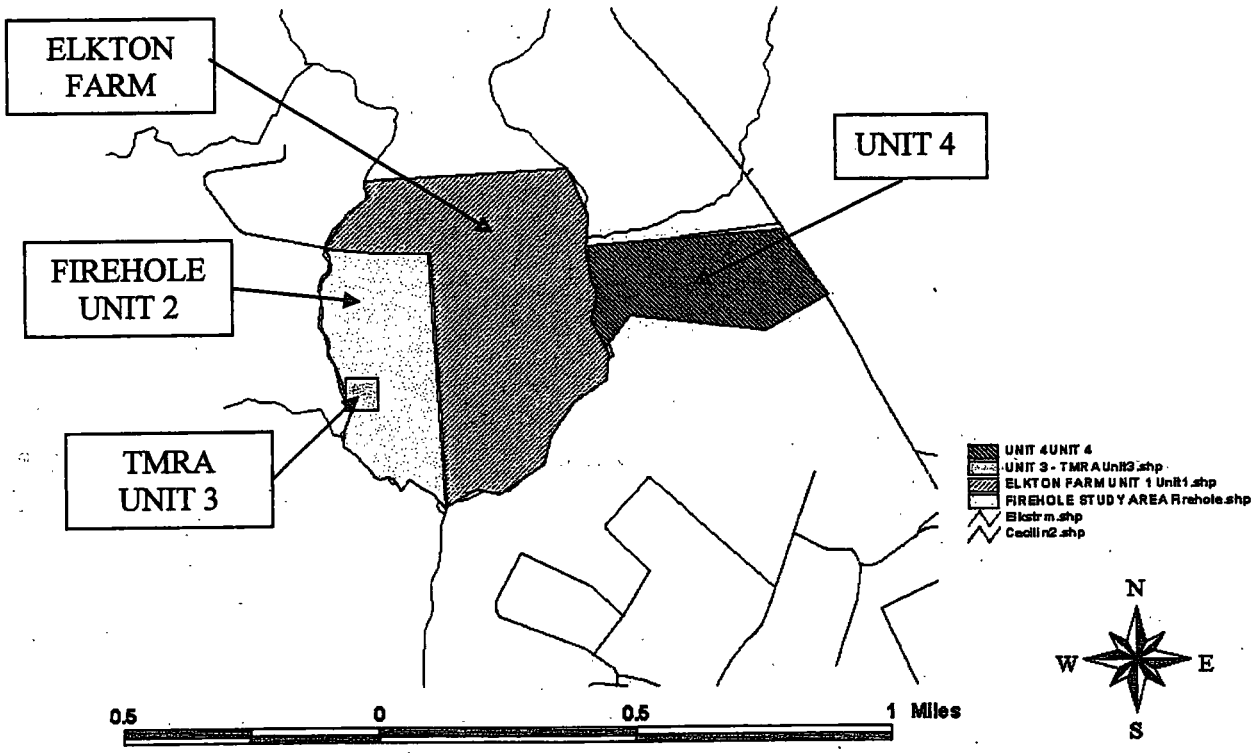
- Unit One was addressed by a CERCLA cleanup in the early 1990s.
- Unit Two, is the site of the historic "Firehole" where waste explosives were disposed through open burning.
- Unit Three, is the site of a Morton Thiokol rocket test/cleaning center and is addressed by a separate document.
- Unit Four is a parcel of property adjacent to the G. E. Railcar property and is the potential source of a chlorinated solvent plume. This has been addressed by a separate investigation.

Figure 1 - Regional and Local Map



This report addresses Unit Two, the Firehole portion of the property. The Firehole parcel is located on the USGS Bayview/Newark West quadrangles at approximately 39°38' north latitude and 75°53' west longitude and has a Maryland grid coordinate of 655,000 N and 1,117,500 E. The roughly triangular 32-acre site is bounded on the west by Laurel Run, to the north by Zeitler Road, and to the East by Little Elk Creek (Figure 3). A gravel access road bisects the western quadrant of the site. The Firehole is in this western quadrant west of the gravel road. Land use surrounding the site is primarily agricultural/residential, with an area of medium to heavy industry property to the southeast across Little Elk Creek.

ELKTON FARM OPERATIONAL UNITS



2.1 Site Ownership and Use

Throughout most of its history, Elkton Farm site has been used as a livestock farm with much of the surrounding fields under cultivation. During the early 1940s, Triumph Explosives Inc. acquired ownership of the Elkton Farm. During the period between the end of World War II and the 1970s, hazardous material was stored and/or disposed of on the farm. Four hazardous waste disposal areas have been identified:

<u>UNIT ONE</u>

- Unit One is an area of the farm that was used by a property owner for the storage of hazardous waste, including drums of ash produced from the Thiokol area (Unit 3), ordnance from the TEI operation and drums of waste from Galaxy Chemical. In the early 1980s, the owner of the farm attempted to dispose of 53 drums of hazardous waste from Galaxy Chemical, a nearby solvent recycler, at Norris Farm Landfill in Baltimore County, Maryland. Norris Farm Landfill refused to accept the waste and Galaxy refused to take the waste back. Consequently, the owner of Elkton Farm stored the drums in the two farm buildings until he reported them to

MDE almost ten years later. A Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal action was completed at Unit One in 1992, which resulted in the removal of drums containing flammable organic compounds, base neutral compounds, halogenated organic compounds, drums of solids, and 10 tons of contaminated soil.

UNIT TWO

- Unit Two, the subject of this report, is the World War II era waste ordnance combustion pit known as the "Firehole," which was used by TEI during the 1940s. The Firehole was defined as the area for the disposal of waste explosives materials generated by the operations at TEI. TEI reportedly collected waste material from the manufacture of explosive ordinance and placed it in drums. This accumulated waste was kept wetted with alcohol or ether to prevent spontaneous combustion, and then carried to a shallow pit off Zeitler Road, spread thinly, and allowed to burn. Plant personnel monitored the burn until the waste explosive was consumed. Photographs in the TEI newsletter from the 1940s show the operation of the Firehole burn pit. Ordinance-related debris was observed on the ground surface during the sampling event (See Photographs P-1).

UNIT THREE

- Unit 3 is a 1-acre plot of land leased by the Thiokol Corporation for the operation of a rocket motor cleaning and recovery area in the late 1950s and early 1960. (Unit Three overlays a component of Unit Two.) The abandoned structures for this test area are located on the west side of the property. MDE currently has little information regarding the operation of this "rocket test area."

UNIT FOUR

- Unit Four is an area on the farm reportedly used during this same era to dispose of waste organic solvents.

TEI purchased the Elkton Farm property in the early 1940s. The current owners, the Herron Family/MARVA Ltd. Partnership, acquired the property in 1948. In the late 1950s and early 1960s, the Thiokol Corporation leased a one-acre plot of the property. The farm property is currently leased to a commercial farming operation that rotates seasonal crops through the fields.

2.2 Permitting and Regulatory Actions

There are no permits on file with MDE for the disposal of waste material at the Elkton Farm site.

2.3 Remedial Actions

There have been no remedial actions conducted in the area of the Firehole.

3.0 ENVIRONMENTAL SETTING

3.1 Water Supply

Drinking water for the Elkton area is obtained from an intake on Big Elk Creek and two municipal production wells. The total amount of municipal water withdrawn from these three sources is estimated to be 1.7 million gallons per day. The estimated number of domestic wells and non-transient non-community wells and populations they serve is represented in the following table. The closest well to the site is located 300 feet northeast of the site at 183 Zeitler Road.

Table 1 – Domestic Water Sources within a Four-Mile Radius of Site.

RING DISTANCE FROM THE SITE	ESTIMATE NUMBER OF DOMESTIC WELLS	ESTIMATED POPULATION SERVED*	COMMUNITY AND NONTRANSIENT NONCOUMMUNITY SYSTEMS	ESTIMATED POPULATION SERVED
0 – ¼ mile	5	15	1	0
¼ – 1/2 mile	25	65		300
½ - 1 mile	70	183		500
1 – 2 miles	237	621	1	4300
2 – 3 miles	176	461	0	9100
3 – 4 miles	287	752	0	9300
Total	800	2096	2	23500

*According to 1998 U.S. Census data, the average population per household is 2.62.

3.2 Surface Waters

The Elkton Farm property lays at the confluence of Little Elk Creek with Laurel Run. Natural drainage on the site is in a generalized north to south direction. There is a slight drainage divide on the property which directs surface runoff to either Laurel Run or Little Elk Creek. Surface water infiltrates the soil to groundwater, or is discharged via overland flow to Laurel Run or Little Elk Creek. Laurel Run discharges into Little Elk Creek which flows southward into Big Elk Creek and eventually to the Chesapeake Bay.

The farthest upstream probable point of entry for the surface water route originates at the on-site drainage ditch on the Zeitler Road border of the site. The drainage ditch travels west for approximately 500 feet before emptying into Laurel Run, a perennial freshwater stream and a fishery. Laurel Run flows 0.625 miles to its confluence with Little Elk Creek. The area of the confluence of Laurel Run and Little Elk Creek is classified as Palustrine Aquatic Bed wetlands. Little Elk Creek flows south southeast for approximately 4.0 miles before emptying into the Big Elk Creek. Big Elk Creek flows approximately 2.25 miles to the point where it empties into Elk River. Elk River flows approximately 12.0 miles to its confluence with the Chesapeake Bay. The 15-mile surface migration pathway ends in the Elk River three miles from the confluence of Elk River with the Chesapeake Bay. The Elk River is classified as Estuarine intertidal wetlands and is a fishery.

3.3 Soils

Elkton Farm's soils are characterized as having been formed in the soft unconsolidated, water lain Cretaceous and Pleistocene sediment of the Atlantic Coastal Plain. The soil series found on the Elkton Farm are a combination of Elsinboro, Mattapex, and Othello silt loams all having slopes of less than 5 percent. Eisenboro series soils are deep, well drained soils found on terraces above the flood plains of major streams. Eisenboro soils are formed in old alluvium and contain considerable amounts of fine mica flakes. Mattapex soils consist of deep moderately well drained loamy soils that formed in silty material laid down on older, coarser sediment. Othello series soils are poorly drained loamy soils on upland flats. These soils were formed in silty material underlain by coarser sediment. Most of the hardwood vegetation native to these three soil series are noted to have been cleared for use as cropland.[i]

3.4 Geology and Groundwater

Elkton Farm lies in the errosional remnants of the Coastal Plain physiographic province, near the Fall Line. The unconsolidated sediments of the Coastal Plain extend eastward from the Fall Line, dipping eastward and becoming progressively thicker with distance, eventually reaching over 8,000 feet in thickness at Ocean City.

The quaternary strata at the Elkton Farm Firehole site (Figure 2) is classified as Uplands Deposits, which includes the Pamlico, Talbot, Wicomico and Sunderland Formations of earlier reports. The Uplands Deposits consists of a floodplain deposited formation comprising lenses of micaceous sand and gravel interbedded with thin layers of silt and fine sand. The coarse-grained sands and gravels at the base of the formation can range in size to boulders 8 foot in diameter.[ii]

Shallow groundwater was not encountered during the October 2002 sample program in any Elkton Farm Geoprobe borings. This fact was due primarily to the severe drought in the years prior to the sampling. A review of well logs for several test wells within 0.5 mile of the site indicates that shallow groundwater is anticipated at depths of 20 feet or less.

In order to define the groundwater component at the Firehole, MDE contracted Earth Matters, Inc., to drill several monitoring wells. Four 2 inch monitoring wells were installed in March 2003 to monitor groundwater at the site. Wells were set at between 20 to 30 feet below ground surface, with 15 feet of threaded PVC screen, a gravel-pack to one foot over the screened interval and a clay grout above the gravel-pack to less than one foot below ground surface.

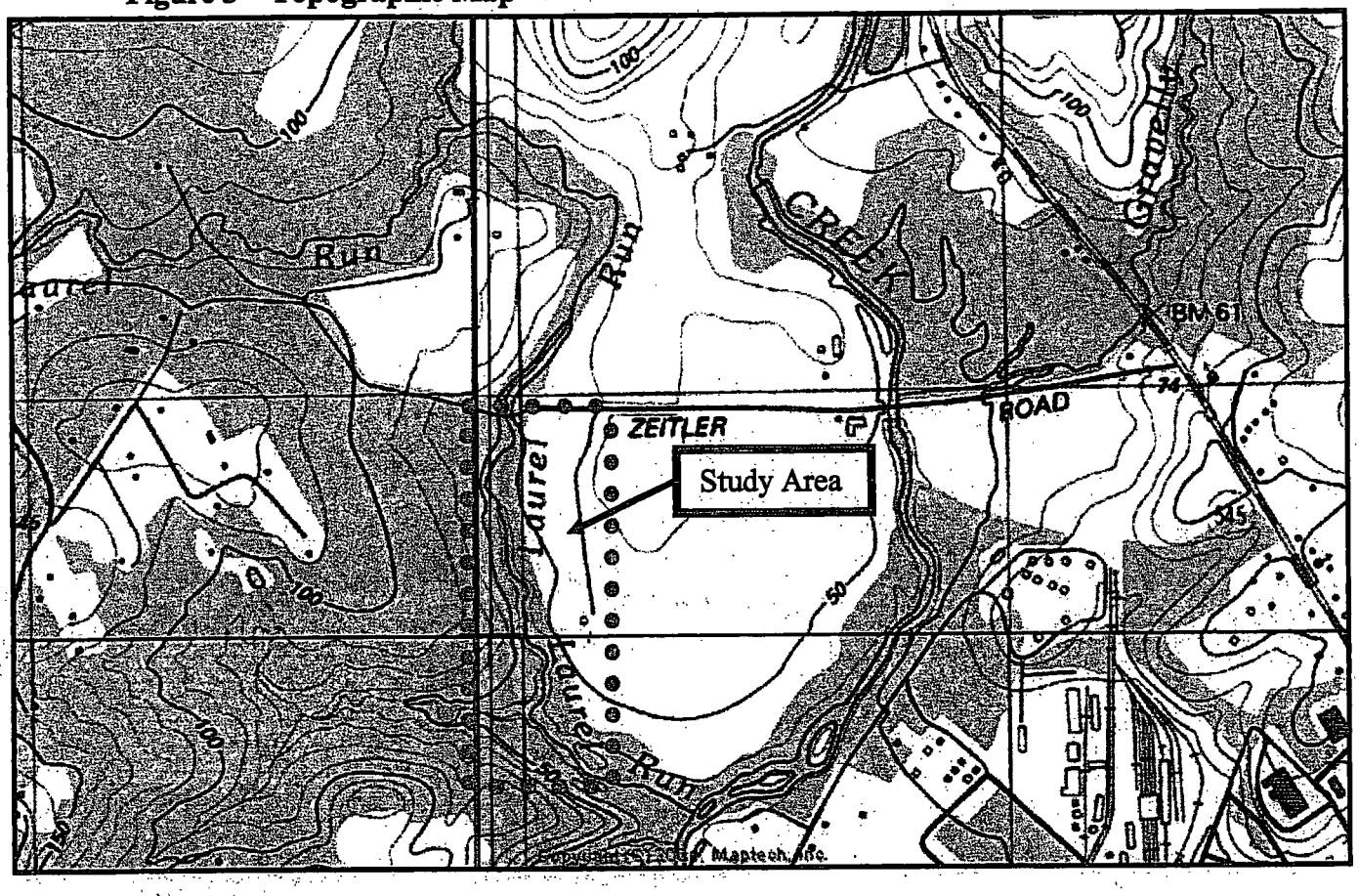
The well located at the Herron Farm farmhouse was used as a domestic groundwater sample for this FUDS Inspection. The depth and casing levels for the well located at the farmhouse is not recorded. The farmhouse well is estimated to approximate the lower range of the 99 foot average depth of the top of screen for domestic production wells in the Elkton area.

FIGURE 1 – Generalized Geological Map of the Elkton Area[iii]

Geologic Map of Maryland, 1968, Maryland Geological Survey

Ql	**Lowland Deposits** -Gravel, sand, silt and clay. Medium- to coarse-grained sand and gravel; cobbles and boulders near base; commonly contains reworked Eocene glauconite; varicolored silts and clays; brown to dark gray lignitic silty clay; contains estuarine to marine fauna in some areas (includes in part Pamlico, Talbot, Wicomico and Sunderland Formations of earlier reports); thickness 0 to 150 feet
Qu	**Upland Deposits (Eastern Shore)** - Gravel, sand, silt, and clay. Mostly cross-bedded, poorly sorted, medium- to coarse-grained white to red sand and gravel, boulders near base; minor pink and yellow silts and clays; (Wicomico Formation of earlier reports); thickness 0 to90 feet, locally thicker in paleochannels.
QTu	**Upland Deposits (Western Shore)** - Gravel and sand, commonly orange-brown, locally limonite-cemented; minor silt and red, white, or gray clay; (includes Brandywine, Bryn Mawr, and Sunderland Formations of earlier reports); lower gravel member and upper loam member in Southern Maryland; thickness 0 to 50 feet
Kp	**Potomac Group** - Interbedded quartzose gravels; protoquartzitic to orthoquartzitic argillaceous sands; and white, dark gray and multicolored silts and clays; thickness 0 to 800 feet.
	Port Deposit Gneiss - Moderately to strongly deformed intrusive complex composed of gneissic biotite quartz diorite, hornblende-biotite quartz diorite, and biotite granodiorite; all rocks foliated and some strongly sheared; age 550 +/- 50 m.y.* by radiogenic dating.

Figure 3 – Topographic Map



3.6 Meteorology

The climate is temperate and humid with an average of 180 freeze free days. The average temperatures range from 74.1 degrees Fahrenheit in the summer to 34.0 degrees Fahrenheit in the wintertime. The mean annual precipitation is about 45.3 inches with an average snowfall on the order of 18 inches per year.

3.7 Nearby Land Use and Population Distribution

Land use surrounding the site is primarily agricultural/residential, with an area of medium to light industry situated to the south across Little Elk Creek. There are four residences located along Zeitler road. The two closest to the study area, which were directly associated with the historic farming operation, are currently occupied. The Triumph Industrial Park is located a short distance south of the intersection of Zeitler Road and Blue Ball Road (MD-545). Triumph Industrial Park is located on the site of but is unrelated to former TEI operations. Several industrial and chemical operations, including GE Railcar, and Thiokol Corporation, now occupy space in the industrial park.

Table 2 – Population Distribution

Radius (miles)	Population
0 – 0.25	134
0.25 – 0.5	217
0.5 – 1.0	672
1.0-2.0	5001
2.0 – 3.0	9581
3.0 – 4.0	11,451
Total	**27,056**

The resident population distribution around the site was determined using Maryland census figures for the year 2000.

4.0 WASTE DESCRIPTION

After being identified as a potentially responsible party, the U.S. Army Corps of Engineers contracted an investigation of the site operations and ownership history of the Elkton, Maryland site of Triumph Explosives, Inc. In February 1992, the final report for this project was prepared by TechLaw, Inc.[4] This report identified an area on the current Herron Farm as the Firehole. This Firehole was documented as an area for the disposal of waste material from the manufacture of explosive ordinance. This waste material was reportedly collected in drums and kept wetted with alcohol or ether. The waste was then carried to a shallow pit off Zeitler Road, spread thinly and allowed to burn. Plant personnel monitored the burn until the waste explosive was ostensibly consumed. Photographs in the TEI newsletter from the period of concern show the operation of this Firehole burn pit.

The total quantity of hazardous waste disposed of in the Firehole is unknown. There is no estimate of fill thickness for the Firehole. A geotechnical survey conducted by NAEVA indicated several distinct anomalies on the portion of the property east of Laurel Run and south of Zeitler Road. Field observations indicate that the Firehole is not one discrete area but rather a series of burn pits located across the property in an approximate 32-acre area.

The Firehole was reportedly the subject of a cleanup that saw the removal of tens of tons of contaminated soil. According to two separate sources, Mr. Patrick Herron and Mr. Richard Herron, soil was removed from an area where crops would not grow, and clean soil was brought in to fill the excavation. The removed soil was said to have contained scraps of brass shell casing and metallic slag.

5.0 PREVIOUS STUDIES

In April 2001, MDE performed a Site Survey of the Elkton Farm site to determine whether further action was necessary. The survey recommended further action in order to document potential hazards associated with a release of site contaminants to the ground and surface waters of the State of Maryland.

In July of 2002, MDE contracted Environmental Science and Technology (ENSAT) to provide for a geophysical assessment of an area of the Elkton Farm to document the location of the Firehole. NAEVA was contracted to perform the analysis. ENSAT transmitted the NAEVA final report (Appendix C) to MDE on September 3, 2002. This report identified an area that is likely to be the location of the Firehole. All anomalies were delineated and tagged to a global positioning sensor (GPS) grid.

6.0 MDE Contract Laboratory Program (CLP) Sampling

MDE proposed an investigation of the Elkton Farm Firehole site in its cooperative agreement with EPA in Fiscal Year 2001. Accordingly, a sampling plan proposal was submitted to the EPA Region III office in May 2002 for the proposed collection of groundwater, surface water, sediment and soil at the site. The purpose of the sampling was to evaluate areas within and adjacent to the Firehole area for any potential contamination. EPA gave tentative approval to the sampling proposal in their letter dated June 21, 2002.

MDE personnel conducted the sampling according to procedures outlined in EPA's CLP Routine Analytic Services as Case Number R31295. Sampling began on October 8, 2002 with the collection of soil sediment and surface water and concluded on May 21, 2003 with the collection of Groundwater. All samples were analyzed for Target Analytic List inorganics, Target Compound List organics, and nitroaromatic compounds (Appendix D). Groundwater samples were further analyzed for perchlorate contamination. MDE collected the samples in five matrices: one organic aqueous, one organic solid, one inorganic aqueous, one dissolved inorganic aqueous and one inorganic solid. Sampling procedures for groundwater, surface water, sediment and soil are fully outlined in MDE's Standard Operating Procedures. Each matrix included the collection of a field duplicate sample and a matrix spike sample. A field blank consisting of deionized water prepared by MDE was provided for each aqueous matrix. MDE prepared trip blanks consisting of deionized water in 40 ml vials preserved with hydrochloric acid. These trip blanks were shipped and analyzed along with aqueous samples for volatile organic compounds. The sampling locations are shown on Figure 4 and the sampling summary table is shown in Table 3.

Table 2 - Sample Summary Table

Sample Identification	Sample Type	Sample Location	Rationale
DW-D1	Aqueous	Domestic well	Background.
MW-1	Aqueous	Zeitler Rd. West of Gravel Road.	Up gradient/Background.
MW-2	Aqueous	Western edge of property at tree line.	Characterize site groundwater.
MW-3	Aqueous	Southern edge of property at tree line	Characterize site groundwater.
MW-4	Aqueous	Eastern Edge of property at tree line	Characterize side gradient groundwater.
GW-5	Aqueous	Duplicate of GW-2	Duplicate of MW-2.
SW-1	Aqueous	Laurel Run upstream of Zeitler Road	Background.
SW-2	Aqueous	Laurel Run adjacent	Determine if waste source has traveled off site.
SW-3	Aqueous	Laurel Run midway	Determine if waste source has traveled off site.
SW-4	Aqueous	Little Elk Creek upstream	Determine if waste source has migrated to tributary.
SW-5	Aqueous	Laurel Run confluence	Determine if waste source has traveled off site.
SW-6	Aqueous	Laurel Run SW-2	Duplicate Sample of SW-2.
SED-1	Sediment	Laurel Run upstream of Zeitler Road	Background.
SED-2	Sediment	Laurel Run adjacent	Determine if waste source has traveled off site.
SED-3	Sediment	Laurel Run midway	Determine if waste source has traveled off site.
SED-4	Sediment	Little Elk Creek upstream	Determine if waste source has migrated to tributary.
SED-5	Sediment	Laurel Run confluence	Determine if waste source has traveled off site.
SED-6	Sediment	Laurel Run SED-2	Duplicate Sample of SED-2.

Table 2 (Cont.)

Sample Identification	Sample Type	Sample Location	Rationale
S/SS-1	Soil	Woods NW of Site Across Laurel Run	Area background.
S/SS-2	Soil	Along Zeitler Road East of Firehole	Characterize waste source.
S/SS-3	Soil	Along the wood line West of Firehole	Characterize waste source.
S/SS-4	Soil	Southernmost end of the field	Characterize waste source.
S/SS-5	Soil	S of Firehole Area	Characterize waste source.
S/SS-6	Soil	Motor Recovery Area structure	Characterize waste source.
S/SS-7	Soil	West of Motor Recovery Area structure	Characterize Waste Source
S/SS-8	Soil	NNE of Motor Recovery Area	Characterize waste source.
S/SS-9	Soil	SE of Motor Recovery Area	Characterize waste source.
S/SS-10	Soil	South of Motor Recovery Area	Characterize waste source.
S/SS-11	Soil	Center of Elkton Farm Field	Site Background
S/SS-12	Soil	N of Motor Recovery Area	Duplicate sample of S/SS-5
S/SS-13	Soil	N Center Firehole area	Characterize waste source.
S/SS-14	Soil	S Center Firehole Area	Characterize waste source.

Figure 4 – Sample Location Map Elkton Farm Firehole

6.1 Groundwater Sampling Results

MDE collected a total of five groundwater grab samples from monitoring wells located across the site. Groundwater samples were collected in borings sequentially labeled MW-1 through MW-4. The sample designated MW-1 was collected as the site up gradient background sample. Sample GW-5 was collected as the duplicate of sample MW-2. In addition to the standard field parameters collected for this assessment, samples were submitted to EPA for an analysis of nitroaromatic compounds and perchlorate. A filtered grab sample was also collected from each groundwater location for dissolved metals content analysis.

The laboratory data were screened against: 1) EPA Region III Risk Based Concentrations for Tap Water, and 2) MDE Cleanup Standards for Type I and II Aquifers.

No analysis exceeded 3X background for either total or dissolved metals. Iron concentrations exceeded MDE Cleanup Standards in all total metals analysis, and also exceeded EPA RBCs in MW-1, MW-4 and GW-5. Manganese exceeded MDE Cleanup Standards in all total metals analysis, and exceeded the EPA RBC in only the background sample (MW-1). Vanadium also exceeded MDE Cleanup Standards in MW-1. However, for dissolved metals analysis, only manganese exceeded MDE Cleanup Standards, and none exceeded EPA RBCs.

In MW-2 and GW-5, TCE was present at levels exceeding 3X background, MDE Cleanup Standards and EPA RBCs. 1,1,2-Trichloroethane was also present at levels exceeding EPA RBCs. Trace levels of cis-1,2-Dichloroethene was also present in MW-2 and GW-5. Trace levels of Bis(2-ethylhexyl)phthlate were detected in MW-1 and MW-2. No pesticides or PCBs were detected in groundwater samples.

No perchlorates were detected in any of the groundwater samples. Trace levels of 4-amino-2,6-dinitrotoluene was detected in GW-5, but not in MW-2. No nitroaromatics were detected in any of the other groundwater samples.

Table 4 –Total Metals Data for Groundwater Samples

Total Metals µg/l	MW1 Background	MW2 Dup GW5	MW3	MW4	GW5 Dup MW2	RBC[1]	MDE[3] Cleanup Std.
ALUMINUM	31,500 K	3,920	2,440 K	5,040 K	4,870 K	37,000	50
ARSENIC	8.6 B	<15	6.0 J	<15	<15	.045	50
BARIUM	609	188 J	120 J	122 J	205	2,600	2,000
BERYLLIUM	14.3	0.73 B	1.7 J	1.7 B	0.82 B	73	4
CALCIUM	41,600	31,800	15,800	16,600	32,700	---	---
CHROMIUM (total)	104	10.6	7.2 J	18.6	12.8	110 (Cr+6)	100 (Cr+6)
COBALT	54.9	6.5 J	14.9 J	20.1 J	7.7 J	730	73
COPPER	27.3	26.3	20.9 J	36.9	29.5	1,500	1,300
IRON	73,200	10,000	7,030	21,000	12,200	11,000	300
LEAD	28.5	11.7	4.9 B	<10	11.0	---	15
MAGNESIUM	28,600	19,800	8,480	12,500	20,500	---	---
MANGANESE	1,250	349	343	487	406	730	50
MERCURY	0.13 B	0.11 B	<0.2	<0.2	<0.2	---	2
NICKEL	57	7.9 J	25.5 J	60.9	9.0 J	730	73
POTASSIUM	7,630J	4,590 J	1,540 J	641 J	5,090 J	---	---
SODIUM	29,100	5,210	7,340	10,100	5,390	---	---
VANADIUM	113	8.9 J	11.8 J	27.5 J	11.2 J	260	50
ZINC	386 B	104 B	61.5 B	99.6 B	142 B	11,000	1,100

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; L=Analyte present, actual value is expected to be higher; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; K = analyte present, reported value may be biased high., actual value is expected to be lower; Yellow highlight indicates that levels exceeded MDE cleanup standard; Red highlight indicates that levels exceeded both MDE cleanup standard and EPA RBC

1 – EPA Region III Risk Based Concentration for Tap Water

2 – MDE Cleanup Standards for Type I and II Aquifers

Table 5 –Dissolved Metals Data for Groundwater Samples

Total Metals µg/l	MW1 Background	MW2 Dup GW5	MW3	MW4	GW5 Dup MW2	RBC[1]	MDE[2] Cleanup Std.
ALUMINUM	356 B	27.1 B	61.7 B	45.4 B	32.2 B	37,000	50
BARIUM	68.0 J	93.3 J	46.3 J	40.3 J	97.5 J	2,600	2,000
BERYLLIUM	0.72 J	<5	0.2 B	0.25 B	<5	73	4
CALCIUM	11,600	25,100	9,730	8,490	26,500	---	---
CHROMIUM	1.7 B	<10	0.90 J	<10	<10	110	100
COBALT	8.5 J	2.3 J	6.5 J	4.8 J	3.1 J	730	73
COPPER	9.5 J	<25	<25	<25	1.7 J	1,500	1,300
IRON	1220	765	1240	1580	890	11,000	300
LEAD	3.4 B	<10	<10	<10	<10	---	15
MAGNESIUM	6,000	15,000	5,930	7,080	15,700	---	---
MANGANESE	221	194	240	234	212	730	50
NICKEL	10.4 B	4.1 B	9.7 B	11.5 B	5.0 B	730	73
POTASSIUM	1,020 J	2,790 J	1,160 J	368 J	2,830 J	---	---
SODIUM	26,800	4,790 J	6,450	9,550	5,050	---	---
VANADIUM	1.5 J	<50	<50	<50	<50	260	50
ZINC	81.6 B	75.1 B	86.6 B	90.1 B	80.3 B	1,000	1,100

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; Yellow highlight indicates levels that exceed MDE cleanup standard

1 – EPA Region III Risk Based Concentration for Tap Water

2 – MDE Cleanup Standards for Type I and II Aquifers

Table 6 – VOC Data for Groundwater Samples

Analyte µg/l	MW1 Background	MW2 Dup of GW5	MW3	MW4	GW5 Dup of MW2	RBC[1]	MDE[2] Cleanup Std.
TRICHLOROETHENE	<10	190	<10	<10	170	.026	5
CIS-1,2-DICHLOROETHENE	<10	5 J	<10	<10	5 J	61	70
1,1,2-TRICHLOROETHANE	<10	2 J	<10	<10	1 J	.19	5

Qualifiers: J = analyte present, reported value may not be accurate or precise; Green box indicates levels that exceed 3X background; Blue highlight indicates levels exceed RBC; Red higlight indicates levels that exceed both RBC and cleanup standard
1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I and II Aquifers.

Table 7 - SVOC Data for Groundwater Samples

Analyte µg/l	MW1 Bkgrnd	MW2 DupGW5	MW3	MW4	GW5 Dup MW2	RBC[1]	MDE[2] Cleanup Std.
BIS(2-ETHYLHEXYL)PHTHALATE	1J	2J	<10	<10	<10	4.8	200

Qualifiers: J = analyte present, reported value may not be accurate or precise.
1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I and II Aquifers.

Table 8 – Nitroaromatic Data for Groundwater Samples

Analyte µg/l	MW1 bckgnd	MW2	MW3	MW4	GW5	RBC[1]	MDE Cleanup Stnd[2]
4-AMINO-2,6-DINITROTOLUENE	--	--	--	--	0.15	37	--

1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I and II Aquifers.

6.2 Surface Water Sampling Results

MDE collected three surface water and three sediment grab samples from Laurel Run and two surface water and two sediment samples from the Little Elk Creek. The sediment sample locations were coincident with the surface water sampling locations. The chemicals detected in the surface water and sediment samples were screened against Toxic Substance Criteria for Ambient Surface Water (Freshwater chronic) in the Code of Maryland Regulations, Volume XXIV, Subtitle 26.08.02.03-2 and National Ocean and Atmospheric Administration (NOAA) Screening Quick Reference Table for Inorganics in Water (Surface water freshwater CCC). In addition to the TAL and TCL, surface water samples were analyzed for perchlorates.

No analysis exceeded 3X background for any of the surface water samples. Aluminum exceeded the NOAA screening levels in all surface water samples. Iron exceeded the NOAA screening level in SW1, which was the background sample. A trace of acetone was detected in SW2. Trace levels of Bis(2-ethylhexyl)phthalate were detected in SW2 and SW4. No pesticides or PCBs were detected in any surface water samples. No perchlorates were detected in any surface water samples.

Table 9 –Total Metals Data For Surface Water Samples

Total Metals µg/l	SW1 Background	SW2 Dup SW6	SW3	SW4	SW5	SW6 Dup SW2	NOAA SQRT[1]	COMAR[2]
ALUMINUM	289	269L	324	380	407	261 L	87	–
BARIUM	[65.9]	[49.5]L	[74.1]	[38.9]	[35]	[50.3] L	–	–
BERYLLIUM	<5	<5	<5	[0.25]	<5	<5	5.3	–
CALCIUM	10,100	9,160 L	9,550	5,300	13,800	8,710 L	—	–
COBALT	[3.4]	<50	[3.4]	[4.2]	<50	<50	—	–
COPPER	[1.3]	[1.3]L	[1.9]	[1.3]	[1.8]	[1.8] L	9	9
IRON	1,960	941 L	2,510	3,570	365	936 L	1000	–
MAGNESIUM	[4,870]	[4,270] L	[4,800]	[2,800]	8,800	[4140] L	–	–
MANGANESE	481	161 L	749	384	43.1	184 L	—	–
NICKEL	[2.5]	<40	[3.3]	[3.6]	[1.9]	[2.6] L	52	52
POTASSIUM	[3,390] J	[3,760] J	[3,550] J	[1,940] J	5,020 J	[3,810] J	—	–
SODIUM	27000	20,300 L	19,800	6,670	16,700	20,200 L	—	–
ZINC	[6.3]	[2.9] L	[4.7]	[2.8]	<20	[2.7] L	110	120

Qualifiers: J = analyte present, reported value may not be accurate or precise; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; L = analyte present, reported value may be biased low; actual value is expected to be higher; Blue highlight indicates levels that exceed NOAA SQRT.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Tables for Inorganics in Water (Surface Water Freshwater CCC)
2-Code of Maryland Regulations, Sec. 26.08-Water Pollution, Table 1-Toxic Substances Criteria for Ambient Surface Waters (freshwater chronic)

Table 10 – VOC data for Surface Water Samples

Analyte µg/l	SW1 Bkgrnd	SW2 Dup of SW6	SW3	SW4	SW5	SW6 Dup of SW2	NOAA SQRT[1]	COMAR[2]
ACETONE	<10	<10	<10	2 J	<10	<10	—	—

Qualifiers: J = analyte present, reported value may not be accurate or precise.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Organics (Ambient Water Quality Criteria, Freshwater CCC)
2-Code of Maryland Regulations, Sec. 26.08-Water Pollution, Table 2-Toxic Substances Criteria for Ambient Surface Waters (freshwater chronic)

Table 11 – SVOC data for Surface Water Samples

Analyte µg/l	SW1 Background	SW2 Dup SW6	SW3	SW4	SW5	SW6 Dup SW2	NOAA SQRT[1]	COMAR[2]
BIS(2-ETHYLHEXYL)PHTHALATE	<10	3 J	<10	1 J	<10	<10	360	--

Qualifiers: J = analyte present, reported value may not be accurate or precise.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Organics (Ambient Water Quality Criteria, Freshwater CCC)
2-Code of Maryland Regulations, Sec. 26.08-Water Pollution, Table 3-Toxic Substances Criteria for Ambient Surface Waters (freshwater chronic)

6.3 Sediment Sampling Results

MDE collected five sediment samples (SED1 – SED5) plus one duplicate sample (SED6), coincident with the surface water sample locations. SED6 was a duplicate sample of SED2. The contaminants detected in the sediment samples were screened against the NOAA SQRT for Inorganics in Solids (Marine sediments, Threshold Effects Levels (TEL) and Effects Range Median (ERM)). In addition to the TAL and TCL, sediment samples were analyzed for perchlorates.

Sample SED5 exceeded 3X background for all inorganics, which indicates that this area of the stream has been impacted by former operations on Elkton Farm. However, only cadmium, copper, mercury and nickel concentrations exceeded the NOAA SQRT TEL. Trace levels of Caprolactam, Bis(2-ethylhexyl)phthalate, Acetone, Methylene chloride and alpha-BHC were also detected in various samples, but did not exceed the NOAA screening levels. No PCBs were detected in any sediment samples. No perchlorates were detected in any sediment samples.

Table 12 – Total Metals Data For Sediment Samples

Analyte mg/kg	SED1 Bkgrnd	SED2 (Dup SED6)	SED3	SED4	SED5	SED6 (Dup SED2)	NOAA[1] SQRT (TEL)	NOAA[1] SQRT (ERM)
ALUMINUM	1,760	373	2,050	1470	11,600	461	--	--
ARSENIC	[1.7] K	<2	<2	<2	[5.4] K	<2	7.24	70
BARIUM	[27.8]	[2.6]	[14.3]	[13.2]	[159]	[3.5]	--	--
BERYLLIUM	[0.39]	<1	[0.48]	[0.59]	[1.1] B	[0.10] B	--	--
CADMIUM	<1	<1	[0.56] B	[0.44] B	[0.96] B	[0.16] B	0.676	9.6
CALCIUM	[466]	[127] J	[616] J	[501] J	[2,150] J	[108] J	--	--
TOTAL CHROMIUM	3.8	[1.7]	13.4	8.7	26.4	[1.9]	52.3	370
COBALT	[5.6]	<10	[2.2]	[5.3]	[16.8]	[0.78]	--	--
COPPER	[3.5]	[0.7]	[4.9]	[6.9]	25.6	[1.1]	18.7	270
IRON	6,070	1,220	15,800	9,210	24,100	2,210	--	--
LEAD	2.7	<0.6	3.8	3.5	28.6	1.3	30.24	218
MAGNESIUM	[248]	[53.7] J	[414] J	[349] J	[2,590] J	[34.5] J	--	--
MANGANESE	421 J	25	46	200	1,710	52.8	--	--
MERCURY	<0.1	<0.1	<0.1	<0.1	[0.23]	<0.1	0.13	0.71
NICKEL	[3.2]	<8	[3.3]	[3.0]	46.4	<8	15.9	51.6
POTASSIUM	[188]	[90.9] J	[159] J	[148] J	[1,430] J	[85.6] J	--	--
SELENIUM	[1.3] B	<1	1.6 K	[1.1] K	[2.9] K	<1	--	--
SILVER	<2	<2	[0.38]	<2	<2	<2	0.73	3.7
SODIUM	[465] K	[263] K	[664] K	[518] K	[1,530] K	[267] K	--	--
VANADIUM	[5.6]	[1.3]	20.2	15.8	[29.1]	[3.0]	--	--
ZINC	24.6	6.8 K	11.4	24.1	105	6.7 K	124	410

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; K = analyte present, reported value may be biased high, actual value is expected to be lower; Green box indicates levels that exceed 3X background; Blue highlight indicates levels that exceed NOAA SQRT TEL.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Inorganics in Solids (Marine Sediments)

Table 13 – VOC data for Sediment Samples

Analyte mg/kg	SED1 Bkgrnd	SED2 (Dup SED6)	SED3	SED4	SED5	SED6 (Dup SED2)	NOAA[1] SQRT (TEL)	NOAA[1] SQRT (ERM)
ACETONE	29 J	2 B	4 B	4 B	<10	<10	--	--
METHYLENE CHLORIDE	61 B	15 B	11 B	6 B	35 B	20 B	--	--

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Inorganics in Solids (Marine Sediments)

Table 14 – SVOC data for Sediment Samples

Analyte µg/kg	SED1 Bkgrd	SED2 (Dup SED6)	SED3	SED4	SED5	SED6 (Dup SED2)	NOAA[1] SQRT (TEL)	NOAA[1] SQRT (ERM)
CAPROLACTAM	<330	<330	58 J	<330	<330	<330	--	--
BIS(2-ETHYLHEXYL)PHTHALATE	490 B	150 B	190 B	150 B	<330	180 B	--	--

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Inorganics in Solids (Marine Sediments)

Table 15 - Pesticide and PCB data for sediment samples

Analyte µg/kg	SED1 Background	SED2 Dup. SED6	SED3	SED4	SED5	SED6 Dup. SED2	NOAA SQRT (TEL)	NOAA SQRT (ERM)
ALPHA-BHC	4.5	*<1.7*	*<1.7*	*<1.7*	10 J	*<1.7*	--	--

Qualifiers: J = analyte present, reported value may not be accurate or precise.
1-National Oceanic and Atmospheric Administration Screening Quick Reference Table for Inorganics in Solids (Marine Sediments)

6.4 Soil Sampling Results

MDE collected fourteen surface soil samples (including one duplicate) and ten subsurface soil samples (including one duplicate) for a total of twenty-four soil samples in and around the Firehole. Samples SS-7, SS-10, SS-13 and SS-14 were also proposed for collection, but a layer of cobbles resulted in probe refusal at less than 18 inches and precluded collection of those samples. Contaminants detected were screened against MDE Cleanup Standards for Residential Soils and EPA Region III RBCs for Residential Soils. Additionally, all soil samples were analyzed for perchlorates and nitroaromatic compounds.

Barium, arsenic, cadmium, calcium, copper, lead, magnesium, manganese, mercury and zinc exceeded 3X background in the surface soils for the inorganics. Most of the exceedances, and the highest concentrations, were in samples S13 and S14, which were collected directly in the Firehole. Concentrations of aluminum, arsenic, barium, cadmium, total chromium, iron, lead, manganese, mercury, thallium and zinc exceeded screening levels. Tetrachloroethene was detected in S-13, and Tetrachloroethene and TCE were detected in S-14. Concentrations detected for these VOCs did not exceed the screening levels. Bis(2-ethylhexyl)phthalate, PCBs (Aroclor 1254), and a spectrum of pesticides were detected at concentrations greater than 3X background; however none of the concentrations exceeded the screening levels. There was one detection of Benzo(a)pyrene in S-13 slightly greater than the EPA RBC. The nitroaromatic compounds 1,3,5-Trinitrobenzene, 2,4,6-Trinitrotoluene, 4-amino 2,6-Dinitrotoluene, 2-amino 4,6-Dinitrotoluene and Dinitrotoluene mix were detected in S3, S6, S8, S13 and S14, although concentrations did not exceed screening levels. No perchlorates were detected in the surface soil samples.

In the subsurface soils samples, only barium, calcium, magnesium, selenium, thallium and zinc exceeded 3X background. Concentrations of aluminum, arsenic, iron, manganese, and thallium exceeded either one or both of the screening levels for inorganics. DDT and Heptachlor epoxide exceeded 3X background, but no concentrations of pesticides detected exceeded the screening levels. 2,4,6-Trinitrotoluene, 4-amino 2,6-Dinitrotoluene and 2-amino 4,6-Dinitrotoluene was detected only in SS6, but concentrations did not exceed the screening levels. No perchlorates were detected in any of the subsurface soil samples.

Table 16 - Inorganic Data for Surface Soils

Analyte mg/kg	S1 Bgrd	S2	S3	S4	S5 DUP S12	S6	S7	S8	S9	S10	S11	S12 Dup S5	S13	S14	EPA[1] RBC	MDE[2] Cleanup Stnd.
ALUMINUM	11,400	8,010	7,270	7,950	8,300	10,200	7,390	8,990	10,300	9,460	13,000	7,520	10,200	9,770	78,000	7,800
ANTIMONY	*<12*	*<12*	*<12*	*<12*	*<12*	[0.95] L	*<12*	*<12*	[2.5]	[0.97]L	*<12*	[2.9] L	[1.5] L	[4.1] L	31	12
ARSENIC	2.7K	2.7K	2.7 K	[2.3] K	2.6 K	4.8	[2.4] K	4.1 K	3.4 K	4.8	4.9	9.0	4.9	5.6	0.43	2
BARIUM	[26.7]	101	88.2	48.4	64.6	688	[47.3]	139	280	51.2	70.2	91.9	311	1,010	5,500	550
BERYLLIUM	[0.62]	[0.7]K	[0.75]	[0.71]	[0.88]	[0.67]	[0.71]	[0.5]	[0.88]	[0.68]	[0.81]	[0.91]	[1.1]	[0.54]	160	16
CADMIUM	[0.53]B	[0.56]K	[0.31] B	[0.37] B	[0.48] B	1.9 K	*<1*	2.2 K	[0.35]	[0.52] B	[0.69]B	1.5 K	3.3	12.5	39	3.9
CALCIUM	[367]J	1,580 J	[658] J	[488] J	[888] J	[1,070] J	[170]	[942] J	[534]	[565] J	[1,010] J	[915] J	1,610 J	2,070 J	--	--
TOTAL CHROMIUM	25.1	14.6	12.1	11.4	13.5	21.6	10.9	17.6	17.3	16.7	20.7	15.2	21.2	51.1	230 (Cr+6)	23 (Cr+6)
COBALT	12.9	[5.9]	[4.8]	[3.8]	[8.8]	[5.8]	[4.3]	[5.1]	[7.4]	[5.4]	[7.4]	[10.2]	[6.7]	[5.1]	1,600	160
COPPER	17	10.3	7.4	12.1	11.0	31.3	7.9	35.0	333	8.8	10.9	88.1	176	777	3,100	310
IRON	26,100	12,700	10,700	10,700	12,300	14,800	9,620	13,900	15,100	14,000	18,400	39,200	20,600	19,300	23,000	2,300
LEAD	12.3	18.2	11.2	13.3	15.3	49.4	17	142	20.6	15.3	14.1	22.9	305	1,480	--	400
MAGNESIUM	[1,040]J	1,370J	[843] J	[799] J	[1,100]J	3,340J	[821]	1,560 J	1,540	1,200 J	1,720 J	[1,080] J	1,360 J	1,380 J	--	--
MANGANESE	164	272	204	283	461	316	239 J	192	301J	210	273	899	485	673	1,600	160
MERCURY	*<0.1*	[0.06]	*<0.1*	*<0.1*	[0.10]	[0.09]	[0.08]	*<0.1*	0.16	*<0.1*	*<0.1*	0.15	3.5	0.18	--	0.1
NICKEL	[8.3]	[7.1]	[4.7]	[5.8]	[6.0]	9.6	[6.2]	[7.5]	11.3	[6.9]	9.7	12.7	11.4	17.5	1,600	160
POTASSIUM	[528]J	[482]J	[289] J	[322] J	[351] J	[518] J	[327]	[717] J	[759]	[464] J	[560] J	[313] J	[588] J	[546] J	--	--
SELENIUM	1.5K	*<1*	[0.90] K	*<1*	*<1*	2.0 K	<1	*<1*	1.4 B	1.4 K	1.5 K	2.4 K	1.8 K	[0.89] K	390	39
SILVER	[0.61]	[0.23]	*<2*	*<2*	[0.36]	[1.5]	[0.26]	[0.31]	*<2*	[0.25]	[0.28]	[1.1]	[0.91]	[1.0]	390	39
SODIUM	[900]K	[611]K	[601] K	[643] K	[636] K	[888] K	[563] K	2360 K	[724] K	[650] K	[838] K	1250 K	[1,010] K	1,300 K	--	--
THALLIUM	3.3L	*<2*	[2.2]	*<2*	[1.5]	*<2*	*<2*	*<2*	*<2*	*<2*	*<2*	2.8	[2.3]	[2.3]	5.5	2
VANADIUM	37.1	22.3	17.9	18.0	20.9	25.8	16.7	23.3	24.6	24.6	31.1	20.5	26.3	22.7	550	55
ZINC	19.2	27.7	25.1	28.2	28.4	335	25.1	4,010	184	29.8	28.4	41.5	495	1,250	23,000	2,300
CYANIDE	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	[0.31]	*<0.5*	*<0.5*	[0.16]	*<0.5*	*<0.5*	*<0.5*	*<0.5*	[0.11]	1600	160

Qualifiers: J = analyte present, reported value may not be accurate or precise; L=Analyte present, reported value may be biased low, actual value is expected to be higher; K = analyte present, reported value may be biased high., actual value is expected to be lower; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate. Green box indicates levels that exceed 3X background; Yellow highlight indicates levels that exceed MDE cleanup standards; Red highlight indicates levels that exceed both MDE cleanup standards and RBCs.

1 – EPA Region III Risk Based Concentrations for Residential Soils.

2 – MDE Cleanup Standards for Residential Soils.

Table 17 - Inorganic Data for Subsurface Soils*

Analyte mg/kg	SS1 Bgrd	SS2	SS3	SS4	SS5 DUP SS12	SS6	SS8	SS9	SS11	SS12 Dup SS5	EPA RBC[1]	MDE Cleanup Stnd[2]
ALUMINUM	9,520	12,700	9,630	1,680	4,560	3,890	6,880	9,290	12,700	4,000	78,000	7,800
ANTIMONY	<12	<12	<12	<12	[1.5] L	[0.93]	<12	<12	[1.0]	[1.5]	31	12
ARSENIC	[2.1] K	3.4 K	<2	[0.98] K	<2	[1.4] K	2.7 K	2.9 K	4.7	[1.4] K	0.43	2
BARIUM	[25.1]	55.6	96.4	[7.2]	[32.8]	[37.0]	[35.8]	[28.7]	[45.5]	[30.3]	5,500	550
BERYLLIUM	[1.0]	[0.61]	1.5	[0.2] B	[0.43]	[0.41]	[0.58]	[0.52]	[0.54]	[0.73]	160	16
CADMIUM	[0.47]	[0.16]	[0.22] B	<1	1.5 B	<1	[0.39] B	[0.14]	[0.16]	[0.82]	39	3.9
CALCIUM	[391]	[249]	[904] J	[128]	2400 J	[229]	[446] J	[363]	[314]	1960	---	---
TOTAL CHROMIUM	33.8	20.6	17	21.3	72.3	18.0	13.6	16.0	21.1	99.8	230 (Cr+6)	230 (Cr+6)
COBALT	23.3	[4.7]	[3.2]	[2.0]	[3.7]	[4.8]	[4.4]	[4.1]	[3.5]	[5.7]	1,600	160
COPPER	16.8	8.8	[4.6]	10.4	15.2	7.4	10.6	15.9	9.6	17.5	3,100	310
IRON	34,600	18,800	4,530	6,800	61,800	8,270	13,400	14,500	17,000	75,400	23,000	2,300
LEAD	12.6	9.2	9.0	4.4	3.8	8.2	11.7	6.0	7.8	3.7	---	400
MAGNESIUM	[550]	1850	[751] J	[117]	1860 J	[956]	1270 J	1280	[1020]	1440	---	---
MANGANESE	289 J	67.3 J	136	59.8 J	68.0	116 J	103	92.2 J	72.5 J	117 J	1,600	160
NICKEL	[8.7]	[9.2]	[5.3]	[1.3]	[4.6]	[5.8]	[5.5]	[6.6]	[8.2]	[4.4]	1,600	160
POTASSIUM	[353]	[575]	[319] J	[118]	[522] J	[267]	[562] J	[554]	[461]	[438]	---	---
SELENIUM	1.2 B	[0.95] B	[1.2] K	<1	2.1 K	[0.95] J	<1	[0.85] J	[1.1] B	1.5 J	390	39
SILVER	[0.75]	[0.22]	<2	[0.29]	[1.7]	[0.28]	[0.21]	<2	[0.26]	[1.5]	390	39
SODIUM	[969] K	[752] K	[618]K	[353] K	1710 K	[402] K	[714] K	[603] K	[613] K	1,780 K	---	---
THALLIUM	<2	<2	<2	<2	6.4	<2	<2	<2	<2	[2.5]	5.5	2
VANADIUM	31.4	30.0	[10.9]	[9.1]	[12.4]	12.4	21	24.5	25.6	19.5	550	55
ZINC	20.9	19.8	16.8	5.2	37.9	25.6	239	24.2	13.8	28.0	23,000	2,300

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate; L=Analyte present, reported value may be biased low, actual value is expected to be higher; K = analyte present, reported value may be biased high., actual value is expected to be lower.

Green box indicates levels that exceed 3X background; Blue highlight indicates levels that exceed RBCs; Yellow highlight indicates levels that exceed MDE cleanup standards; Red highlight indicates levels that exceed both.

1 – EPA Region III Risk Based Concentrations for Residential Soils.

2 – MDE Cleanup Standards for Residential Soils.

* - Samples SS-7, SS-10, SS-13 and SS-14 not collected due to refusal.

Table 18 – VOC Data for Surface Soil Samples

Analyte µg/kg	S1 Bkgd	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	EPA RBC[1]	MDE Cleanup Stnd[2]
METHYLENE CHLORIDE	12 B	11 B	9 B	9 B	9 B	40 B	39 B	19B	40 B	11 B	11 B	16 B	20 B	27 B	85,000	85,000
TETRACHLOROETHENE	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	21	32,000	12,000
TRICHLOROETHENE	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	37	160	1,600	58,000
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	2 J	<10	3 J	23,000,000	--

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks. Green box indicates levels that exceed 3X background.
1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils.

Table 19 – VOC Data for Subsurface Soil Samples*

Analyte µg/kg	SS1 Bkgrnd	SS2	SS3	SS4	SS5	SS6	SS8	SS9	SS11	SS12	EPA RBC[1]	MDE Cleanup Stnd.[2]
ACETONE	<10	<10	<10	<10	<10	6 J	2 B	<10	<10	3 B	7,800,000	780,000
METHYLENE CHLORIDE	25 B	32 B	11 B	25 B	10 B	17 B	12 B	14 B	28 B	15 B	85,000	85,000

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks.
1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils
* - Samples SS-7, SS-10, SS-13 and SS-14 not collected due to refusal.

Table 20 – SVOC Data for Surface Soil Samples

Analyte ug/kg	S1 Bgnd	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	EPA RBC[1]	MDE Cleanup Stnd.[2]
BENZO(A)ANTHRACENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**82 J**	870	870
BENZO(A)PYRENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**89 J**	87	330
BENZO(B)FLUORANTHENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**69 J**	870	870
BENZO(K)FLUORANTHENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**100 J**	8,700	8,700
BIS(2-ETHYLHEXYL) PHTHALATE	**180 B**	**240 B**	**220 B**	*<330*	**140 B**	*<330*	**380 B**	**200 B**	*<330*	*<330*	**1400**	*<330*	**290 B**	**170 B**	46,000	46,000
CAPROLACTAM	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**42 J**	39,000,000	--
CHRYSENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**94 J**	87,000	87,000
DI-N-BUTYLPHTHALATE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**83 J**	**250 J**	7,800,000	780,000
FLUORANTHENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**59 J**	3,100,000	310,000
INDENO(1,2,3-cd)PYRENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**54 J**	870	870
PYRENE	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	*<330*	**70 J**	2,300,000	230,000

Qualifiers: J = analyte present, reported value may not be accurate or precise; B = not detected substantially above the level reported in laboratory or field blanks; Green box indicates levels that exceed 3X background; blue highlight indicates levels that exceed RBCs.
1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils.

Table 21 – SVOC Data for Subsurface Soil Samples*

Analyte ug/kg	SS1 Bkgrnd	SS2	SS3	SS4	SS5	SS6	SS8	SS9	SS11	SS12	EPA RBC[1]	MDE Cleanup Stnd.[2]
BIS(2-ETHYLHEXYL)PHTHALATE	**200 B**	**480 B**	*<330*	**1000 B**	*<330*	**180 B**	*<330*	**530 B**	**220 B**	**230 B**	46,000	46,000

Qualifiers: B = not detected substantially above the level reported in laboratory or field blanks
1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils
* - Samples SS-7, SS-10, SS-13 and SS-14 not collected due to refusal.

Table 22 - Pesticide and PCB Data for Surface Soil Samples

Analyte ug/kg	S1 Bgrd	S2	S3	S4	S5 Dup S12	S6	S7	S8	S9	S10	S11	S12 Dup S5	S13	S14	EPA RBC[1]	MDE Cleanup Stnd.[2]
ALPHA-BHC	<1.7	<1.7	<1.7	3.6	<1.7	6.1 J	3.5	<1.7	3.1	<1.7	<1.7	<1.7	<1.7	<1.7	100	2,900
ENDOSULFAN I	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	2.1 J	<1.7	<1.7	--	47,000
DIELDRIN	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	7.65	<3.3	<3.3	<3.3	<3.3	<3.3	40	40
ENDRIN	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	4.1 J	<3.3	<3.3	23,000	2,300
ENDOSULFAN II	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	13	<3.3	<3.3	--	47,000
4,4'-DDD	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	8.5 J	<3.3	<3.3	8.9 J	<3.3	<3.3	2,700	2,700
4,4'-DDT	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	5.5 J	<3.3	<3.3	9.5 J	1400+	<3.3	1,900	1,900
ENDRINE KETONE	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	3.9 J	<3.3	<3.3	--	2,300
ENDRIN ALDEHYDE	<3.3	4.0 J	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	7.6	<3.3	<3.3	9.0 J	<3.3	<3.3	--	2,300
ALPHA-CHLORDANE	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	6.6	<1.7	<1.7	--	1,800
GAMMA-CHLORDANE	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	6.7	<1.7	4.6 J	--	1,800
TOXAPHENE	<170	160 J	<170	<170	<170	<170	<170	<170	470	86 J	<170	610	<170	<170	580	580
HEPTACHLOR EPOXIDE	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	4.2 J	<1.7	<1.7	<1.7	<1.7	<1.7	3.1 J	70	70
AROCHLOR-1254	<33	<33	<33	<33	<33	<33	<33	<33	<33	<33	<33	<33	<33	190	320	320

Qualifiers: J = analyte present, reported value may not be accurate or precise; + = 10X dilution; Green box indicates levels that exceed 3X background

1 – EPA Region III Risk Based Concentrations for Residential Soils.

2 – MDE Cleanup Standards for Residential Soils.

Table 23 - Pesticide and PCB Results for Subsurface soil samples*

Analyte µg/kg	SS1 Bgrd	SS2	SS3	SS4	SS5	SS6	SS8	SS9	SS11	SS12	EPA RBC[1]	MDE Cleanup Stnd[2]
ALPHA-BHC	**6.2**	**3.6 J**	*<1.7*	**12**	*<1.7*	**3.4**	**2.6**	**3.1**	**2.2**	*<1.7*	100	2,900
4,4'-DDT	*<3.3*	*<3.3*	*<3.3*	*<3.3*	*<3.3*	**12**	*<3.3*	*<3.3*	*<3.3*	*<3.3*	1,900	1,900
HEPTACHLOR EPOXIDE	*<1.7*	*<1.7*	**2.9 J**	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7*	*<1.7*	<1.7	70	70

Qualifiers: J = analyte present, reported value may not be accurate or precise; Green box indicates levels that exceed 3X background.
1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils
* - Samples SS-7, SS-10, SS-13 and SS-14 not collected due to refusal.

Table 24 – Nitroaromatic Compound Results for Soil Samples

Analyte µg/kg	S3	S6	SS6	S8	S13	S14	EPA RBC[1]	MDE Cleanup Stnd.[2]
1,3,5-TRINITROBENZENE	--	**90**	--	--	--	--	2,300,000	--
2,4,6-TRINITROTOLUENE	**40 J**	**963**	**124**	--	**40J**	**1,390**	21,000	--
4-AMINO 2,6-DINITROTOLUENE	--	**1,530**	**123**	**50 J**	**80J**	**580**	78,000	--
2-AMINO 4,6-DINITROTOLUENE	**10 J**	**1,260**	**98**	**10 J**	---	**470**	--	--
DINITROTOLUENE MIX	--	**110**	--	--	--	**90**	940	--

1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils.

7.0 FINDINGS AND CONCLUSIONS

A toxicological evaluation was prepared for the Firehole site, assuming a residential future use scenario for the site. Risk estimates exceeded EPA and MDE recommended levels for the child resident population for incidental ingestion of and dermal contact with surface soils, with the risk drivers of potential additive effects, chromium, and arsenic. Concentrations detected exceeded the EPA and MDE recommended levels for ingestion of and dermal contact with subsurface soil for the child resident, with the risk drivers of potential additive effects and chromium. Lead was detected in S14 at 1480 mg/kg, which may pose a threat to sensitive populations and the environment. Risk estimates for the incidental ingestion of and dermal contact with groundwater exceeded MDE and EPA recommended levels for all residential populations, with trichloroethene as the risk driver.

Samples S13 and S14 were collected in the area defined by MDE's geophysical survey (Appendix C) as the most likely area of the Firehole. Sample analysis showed elevated concentrations of lead, mercury, and arsenic as well as TCE and Aroclor 1254, and the nitroaromatic compound TNT and associated daughter products. The groundwater collected from monitoring well MW2, which is hydraulically downgradient of S13 and S14, was contaminated with significant concentrations of TCE. Subsurface soil samples from the Firehole area were not collected because of refusal at less than 18 inches. Sample S/SS 6 obtained from the vicinity of the TMRA and sample S8 midway between the Firehole and TMRA also exhibited elevated levels of several explosive compounds

According to the current owners of the property, the Elkton Farm property is for sale. It is currently leased to farmers in the area for crops; however, in all likelihood, the entire 300-acre farm will be developed for residential use in the future, rather than continued use for farming. The presence of TNT and daughter products, elevated concentrations of metals, highly volatile TCE detected in surface soils and groundwater and the presence of ordnance-related debris easily observable on the ground surface all suggest that further investigation is necessary in order to fully identify any human health risks to future residential populations.

Appendix A – Photographs

Appendix B - Toxicological Evaluation.

Appendix C – Geophysical Survey

Appendix D – Laboratory Data

8.0 - REFERENCES:

[i] Soil Survey of Cecil County, Maryland. United States Department of Agriculture; December 1973
[ii] The Geology of Cecil County, Maryland, Bulletin 37. Department of Natural Resources, Maryland Geological Survey; 1990.
[iii] Generalized Geological Map of Maryland, Maryland Geological Survey. 1967

Preliminary Assessment/Site Inspection
of the
Elkton Farm TMRA Site
(MD-433)

FINAL

September 15, 2004

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1.0 INTRODUCTION

1.1 Authorization

This Site Inspection was performed by the Maryland Department of the Environment, Waste Management Administration (MDE/WAS), Environmental Restoration and Redevelopment Program (ERRP), Site Assessment Division under the current Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

1.2 Scope of Work

MDE was contracted to perform a Preliminary Assessment/Site Inspection (PA/SI) of the Elkton Farm Site (MD-433). The purpose of the PA/SI is to assess the actual and potential release of hazardous waste from the site by way of groundwater, surface water, soil exposure and air pathways. The scope of the PA/SI included reviewing the available file information, site reconnaissance and sampling under the U.S. EPA Contract Laboratory Program (CLP).

1.3 Executive Summary and Conclusions

The Elkton Farm site is located two miles northwest of Elkton, Maryland near the intersection of Routes 40 and 279 (Figure 1). The Thiokol Motor Recovery Area (TMRA) occupies approximately 1-acre of the 400-acre Elkton Farm and is located just south of Zeitler Road between Little Elk Creek and Laurel Run. The most recent use of the site has been as a working farm. During the year before and throughout World War II, the parcel had been the site of activity related to the manufacture of fireworks and munitions. The TMRA has lain abandoned since 1962.

During the early 1940s, Triumph Explosives, Inc (TEI) owned Elkton Farm. The Herron family, the current owners, acquired the property in 1948. In the late 1950s and early 1960s, the Thiokol Corporation leased a one-acre plot of the farm property to combust and clean rocket motors. The structures remaining from the TMRA test area are located on the west side of the property along Laurel Run approximately 1400 feet south of Zeitler Road. Thiokol Corporation leased this property and constructed several small buildings, undefined underground structures, and a network of steel gantries. Thiokol Corporation used the facility to combust residual fuel and clean rocket motors for reuse until an explosion led to the sites abandonment.

The total quantity of hazardous waste disposed of in the TMRA is unknown. There is no estimate of fill thickness for the TMRA. A geophysical survey conducted for MDE by NAEVA Geophysics, Inc. (NAEVA) indicated several distinct anomalies on the 1-acre TMRA.

A sampling plan to characterize the 1-acre site was prepared by MDE after site reconnaissance and a review of available historic information of the area. On June 24 & 25, 2003, as part of the PA/SI, MDE collected fifteen surface soil samples, twelve subsurface soil

samples, five groundwater samples, five surface water samples, five sediment samples plus one field duplicate sample. The samples were analyzed for the presence of metals and cyanide, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), pesticides and polychlorinated biphenyls (PCBs), perchlorates and nitroaromatic compounds.

A Toxicological evaluation was prepared for the TMRA site, assuming a residential future use scenario for the site. EPA recognizes an acceptable Hazard Index of less than or equal to 1 (noncarcinogenic chemicals) and a lifetime cancer risk less than or equal to 10^{-6} to 10^{-4}. MDE recognizes threshold Hazard Index values equal to 1 and lifetime cancer risk threshold values less then or equal to 1×10^{-5}. Risk estimates exceeded EPA and MDE recommended levels for the child resident population for incidental ingestion of and dermal contact with surface soils, with the risk driver of cadmium. Risk estimates exceeded EPA and MDE recommended levels for the child resident population for incidental ingestion of surface soils, with the risk drivers of arsenic and 2,4,6-trinitrotoluene. Risk to construction workers exceeded MDE and EPA recommendations for ingestion of surface soil and dermal contact with groundwater, with the risk drivers being potential additive effects and chromium respectively. Concentrations detected exceeded the EPA and MDE recommended levels for ingestion of subsurface soil for the child resident, with the risk drivers of 2,4,6-trinitrotoluene. Risk for dermal contact with groundwater exceeded MDE and EPA recommended levels for child resident and construction worker populations, with chromium as the risk driver.

The Elkton Farm property is listed for sale on the real estate market. It is currently leased to Spry Brothers Farming for seasonal crops; however, the entire 400-acre farm may be developed for residential use in the future, rather than continued use for farming. The presence of trinitrotoluene (TNT) and daughter products, elevated concentrations of metals, highly volatile trichloroethylene (TCE) detected in surface soils and groundwater, and the presence of ordnance-related debris easily observable on the ground surface all suggest that further investigation is necessary in order to fully identify any human health risks to future residential populations.

2.0 SITE DESCRIPTION

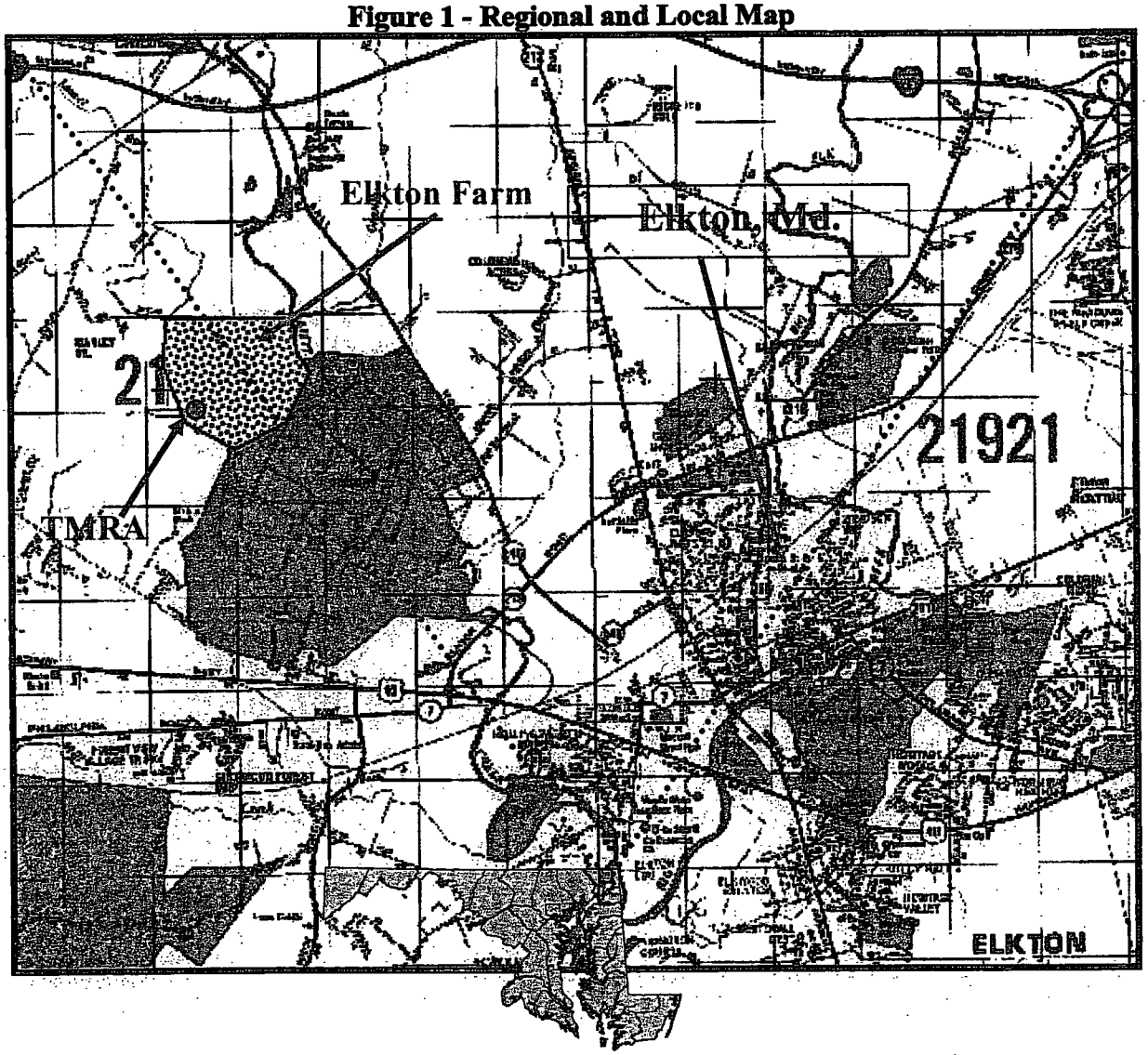
The Elkton Farm site is located at 183 Zeitler Road, Elkton, Maryland (Figure 1). The farm itself consists of approximately 400 acres and is situated in a rural setting just north of Triumph Industrial Park. The farm is currently owned by MARVA Limited Partnership. The property has historically been a working farm. For a brief period in the mid-1940s to early 1950s the property was impacted by military operations. MARVA Limited Partnership, the current owner, leases the property to a commercial farming operation that continues to rotate several seasonal crops through the Elkton Farm's fields. There are no access limitations to this property.

As a result of the military operations in the 1940s, four areas of concern were identified:

- Unit One was addressed by a CERCLA cleanup in the early 1990's.
- Unit Two, is the site of the historic "Firehole" where waste explosives were disposed through open burning. This site has been addressed by a separate document.
- Unit Three, the site of a Morton Thiokol rocket test/cleaning center, is the subject of this report.

- Unit Four is a parcel of property adjacent to the G. E. Railcar property and is the potential source of a chlorinated solvent plume. This has been addressed by a separate investigation.

Figure 1 - Regional and Local Map



This report addresses the TMRA portion of the site. The TMRA portion of the property is a 1-acre parcel located on the USGS Bayview/Newark West quadrangles at approximately 39°37' north latitude and 75°52' west longitude and has a Maryland grid coordinate of 654,600 N and 1,117,200E. The rectangular 1-acre site is bounded on the west by Laurel Run, to the north by Zeitler Road, and to the south by Little Elk Creek (Figure 3). Land use surrounding the site is primarily agricultural/residential, with an area of medium to heavy industry property to the southeast across Little Elk Creek. The TMRA is situated in coastal plain alluvium, and is found at the end of and west of the farm's gravel access road south of Zeitler Road.

2.1 Site Ownership and Use

Throughout most of its history, Elkton Farm site has been used as a livestock farm with much of the surrounding fields under cultivation. In 1941, TEI acquired ownership of the Elkton Farm. During the period between the end of World War II and the 1970s, hazardous material was stored and/or disposed of on the farm. Four hazardous waste disposal areas have been identified:

UNIT ONE

- Unit One is an area of the farm that was used by a property owner for the storage of hazardous waste, including drums of ash produced from the Thiokol area (Unit 3), ordnance from the Triumph Explosives Inc. (TEI) operation and drums of waste from Galaxy Chemical. In the early 1980s, the owner of the farm attempted to dispose of 53 drums of hazardous waste from Galaxy Chemical, a nearby solvent recycler, at Norris Farm Landfill in Baltimore County, Maryland. Norris Farm Landfill refused to accept the waste and Galaxy refused to take the waste back. Consequently the owner of Elkton Farm stored the drums in the two farm buildings until he reported them to MDE almost ten years later. A Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal action was completed at Unit One in 1992, which resulted in the removal of drums containing flammable organic compounds, base neutral compounds, halogenated organic compounds, drums of solids, and 10 tons of contaminated soil.

UNIT TWO

- Unit Two is the World War II era waste ordnance combustion pit know as the "Firehole," which was used by TEI during the 1940s. The Firehole was defined as the area for the disposal of waste explosives materials generated by the operations at TEI. TEI reportedly collected waste material from the manufacture of explosive ordnance and placed it in drums. This accumulated waste was kept wetted with alcohol or ether to prevent spontaneous combustion, and then carried to a shallow pit off Zeitler Road, spread thinly, and allowed to burn. Plant personnel monitored the burn until the waste explosive was consumed. Photographs in the TEI newsletter from the 1940s show the operation of the Firehole burn pit. Ordnance-related debris was observed on the ground surface during the sampling event.

UNIT THREE

- Unit 3, the subject of this report, is a 1-acre plot of land leased by the Thiokol Corporation for the operation of a rocket motor cleaning and recovery area in the late 1950s and early 1960. (Unit Three overlays a component of Unit Two.) The abandoned structures for this test area are located on the west side of the property. MDE currently has little information regarding the operation of this "rocket test area."

UNIT FOUR

- Unit Four is an area on the farm reportedly used during this same era to dispose of waste organic solvents.

TEI aquired the Elkton Farm property in 1941. The current owners, the Herron Family/MARVA Ltd. Partnership, acquired the property in 1948. In the late 1950s and early 1960s, the Thiokol Corporation leased a one-acre plot of the property. The farm property is currently leased to a commercial farming operation that rotates seasonal crops through the fields.

2.2 Permitting and Regulatory Actions

There are no permits on file with MDE for the disposal of waste material at the Elkton Farm site.

2.3 Remedial Actions

There have been no remedial actions conducted in the area of the TMRA.

3.0 ENVIRONMENTAL SETTING

3.1 Water Supply

Drinking water for the Elkton area is obtained from an intake on Big Elk Creek and two municipal production wells. The total amount of municipal water withdrawn from these three sources is estimated to be 1.7 million gallons per day. The estimated number of domestic wells and non-transient non-community wells and populations they serve is represented in the following table.

Table 1 – Domestic Water Sources within a Four-Mile Radius of Site.

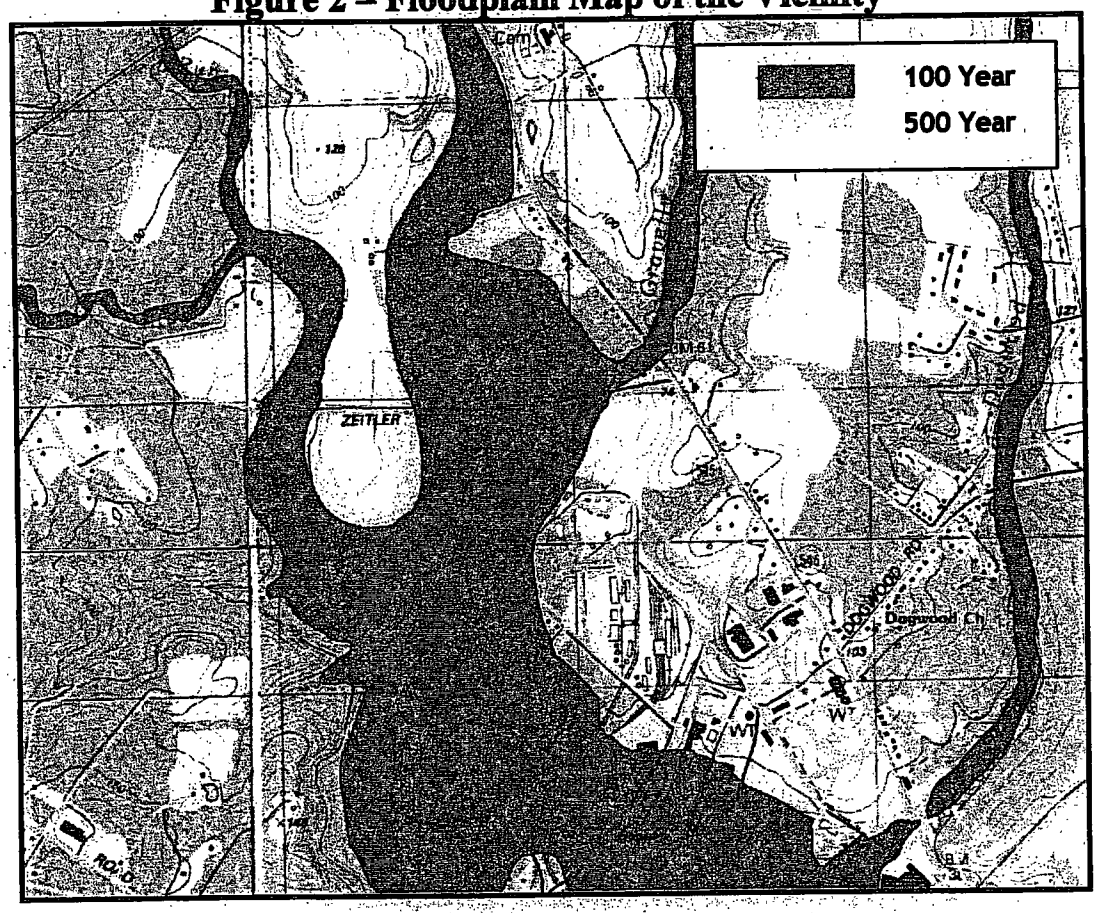
RING DISTANCE FROM THE SITE	TOTAL POPULATION SERVED BY WELLS	ESTIMATE NUMBER OF DOMESTIC WELLS	ESTIMATED POPULATION SERVED*	COMMUNITY AND NONTRANSIENT NONCOUMMUNITY WELL SYSTEMS	ESTIMATED POPULATION SERVED
0 – ¼ mile	0	0	0	0	0
1/4 – 1/2 mile	380	30	80	1	300
½ - 1 mile	683	70	183		500
1 – 2 miles	4921	237	621	1	4300
2 – 3 miles	9561	176	461		9100
3 – 4 miles	10052	287	752		9300
Total	25596	800	2096	2	23500

*According to 1998 U.S. Census data, the average population per household is 2.62.

3.2 Surface Waters

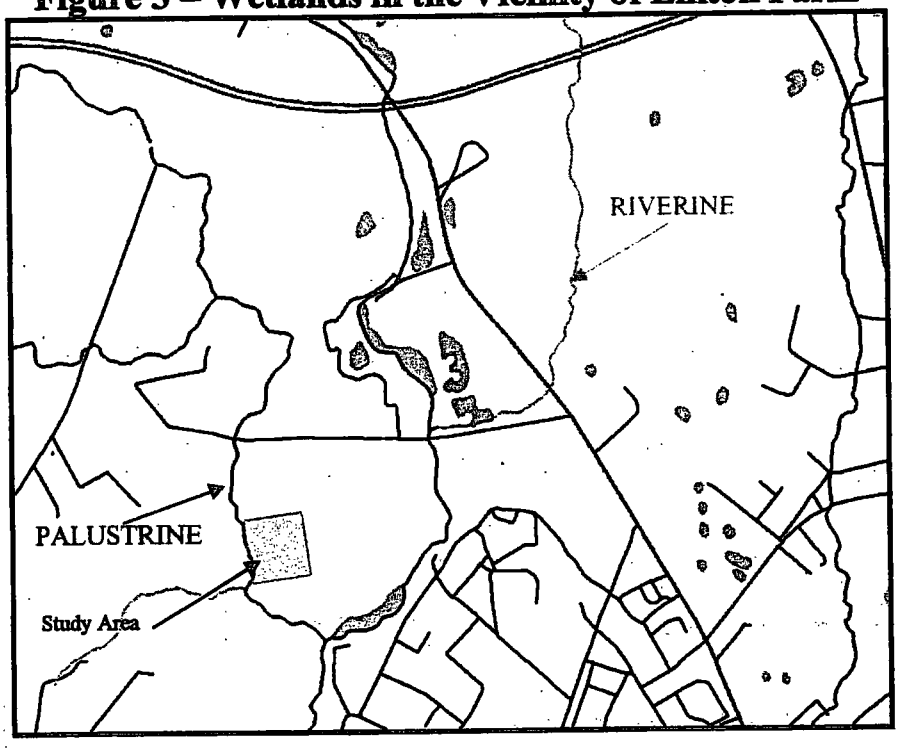
The Site lays at the confluence of Little Elk Creek with Laurel Run. Natural drainage on the site is in a generalized north to south direction. There is a slight drainage divide on the property which directs surface runoff to either Laurel Run or Little Elk Creek. Surface water infiltrates the soil to groundwater, or is discharged via overland flow to Laurel Run or Little Elk Creek. Laurel Run is a perennial freshwater stream which discharges into Little Elk Creek which flows southward into Big Elk Creek and eventually to the Chesapeake Bay.

Figure 2 – Floodplain Map of the Vicinity



The farthest upstream probable point of entry for the surface water route originates at a drainage ditch on the southwest corner of the site. The drainage ditch travels west for approximately 200 feet before emptying into Laurel Run. Laurel Run flows 0.41 miles to its confluence with Little Elk Creek. The area of the confluence of Laurel Run and Little Elk Creek is classified as Palustrine Aquatic Bed wetlands. Little Elk Creek flows south southeast for approximately 5.0 miles before emptying into the Big Elk Creek. Big Elk Creek flows approximately 2.4 miles to the point where it empties into Elk River. Elk River flows approximately 17.0 miles to its confluence with the Chesapeake Bay. The 15-mile surface migration pathway ends in the tidal portion of the Elk River three miles from its confluence with the Chesapeake Bay. The tidal portion of the Elk River is classified as Estuarine intertidal wetlands and is a fishery.

Figure 3 – Wetlands in the Vicinity of Elkton Farm



3.3 Soils

Elkton Farm's soils are characterized as having been formed in the soft unconsolidated, water lain Cretaceous and Pleistocene sediment of the Atlantic Coastal Plain. The soil series found on the Elkton Farm are a combination of Elsinboro, Mattapex, and Othello silt loams all having slopes of less than 5 percent. Eisenboro series soils are deep, well drained soils found on terraces above the flood plains of major streams. Eisenboro soils are formed in old alluvium and contain considerable amounts of fine mica flakes. Mattapex soils consist of deep moderately well drained loamy soils that formed in silty material laid down on older, coarser sediment. Othello series soils are poorly drained loamy soils on upland flats. These soils were formed in silty material underlain by coarser sediment. Most of the hardwood vegetation native to these three soil series are noted to have been cleared for use as cropland.[i]

3.4 Geology and Groundwater

Elkton Farm lies in the errosional remnants of the Coastal Plain physiographic province, near the Fall Line. The unconsolidated sediments of the Coastal Plain extend eastward from the Fall Line, dipping eastward and becoming progressively thicker with distance, eventually reaching over 8,000 feet in thickness at Ocean City.

The quaternary strata at the Elkton Farm TMRA site (Figure 2) is classified as Uplands Deposits, which includes the Pamlico, Talbot, Wicomico and Sunderland Formations of earlier

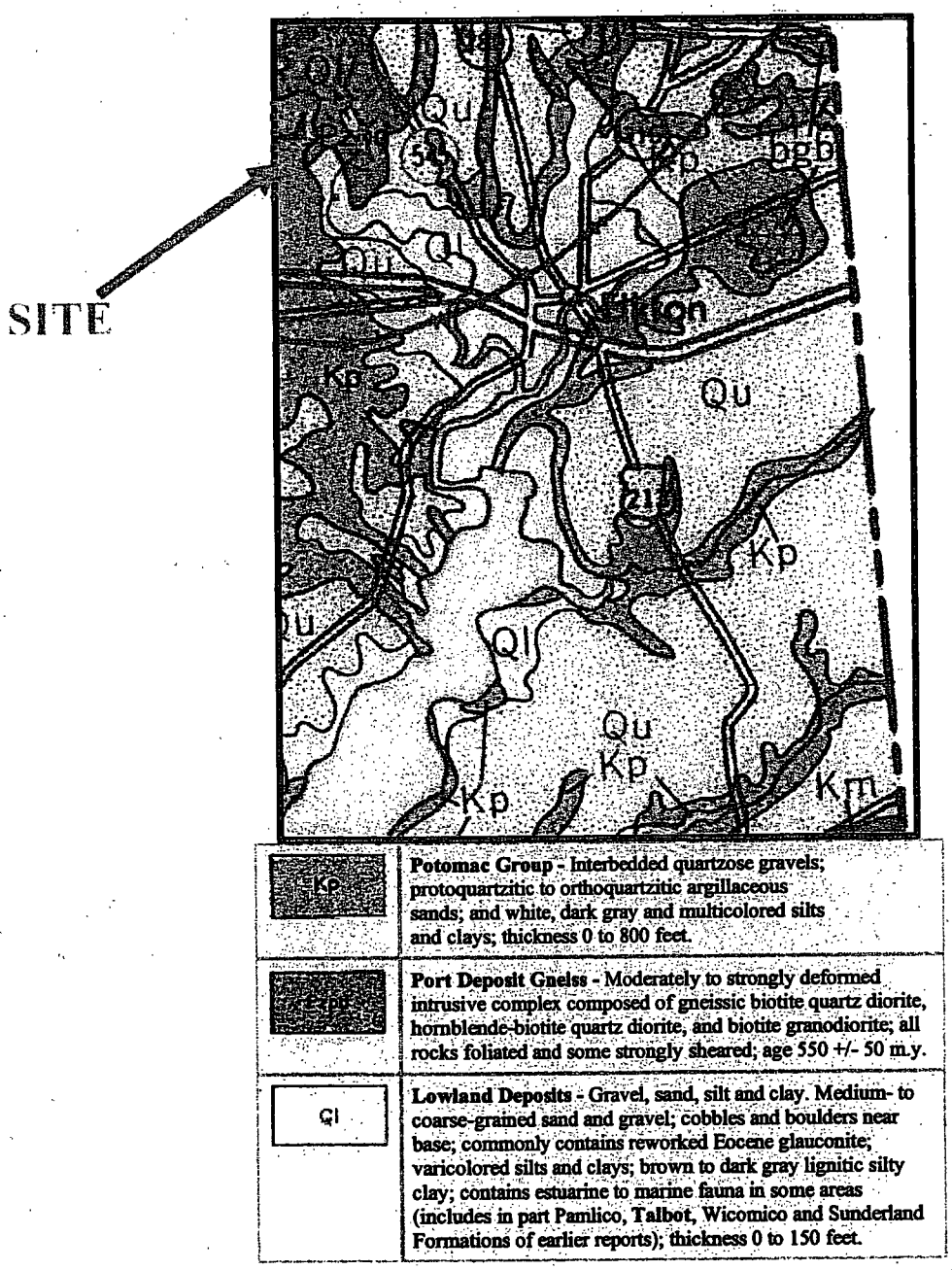
reports. The Uplands Deposits consists of a floodplain deposited formation comprising lenses of micaceous sand and gravel interbedded with thin layers of silt and fine sand. The coarse-grained sands and gravels at the base of the formation can range in size to boulders 8 foot in diameter.[ii]

Shallow groundwater was not encountered during the October 2002 sample program, in any Elkton Farm Geoprobe borings. This fact was due primarily to the severe drought in the years prior to the sampling. A review of well logs for several test wells within 0.5 mile of the site indicates that shallow groundwater is anticipated at depths of 20 feet or less.

In order to define the groundwater component at the TMRA, MDE contracted Earth Matters, Inc., to drill several monitoring wells. Four 2-inch monitoring wells were installed in March 2003 to monitor groundwater at the site. Wells were set at between 20 to 30 feet below ground surface, with 15 feet of threaded PVC screen, a gravel-pack to one foot over the screened interval and a clay grout above the gravel-pack to less than one foot below ground surface.

The well located at the Herron Farm farmhouse (DW-D1) was used as a domestic groundwater sample for this PA/SI . The depth and casing levels for the well located at the farmhouse is not recorded. The farmhouse well is estimated to approximate the lower range of the 99 foot average depth of the top of screen for domestic production wells in the Elkton area.

FIGURE 4 – Generalized Geological Map of the Elkton Area[iii]



3.5 Groundwater

A review of well logs for several test wells within 0.5 mile of the site indicates that shallow groundwater is anticipated at depths of 20 feet or less. However, during the October 2002 sample program sample-able shallow groundwater was not encountered in any Elkton Farm Geoprobe borings. This fact is attributed to the severe drought in the years prior to the sampling. Therefore in order to define the groundwater component at the TMRA, MDE contracted Earth Matters, Inc., to drill several monitoring wells. Four 2-inch monitoring wells were installed in March 2003 to collect groundwater at the site. Wells were set at between 20 to 30 feet below

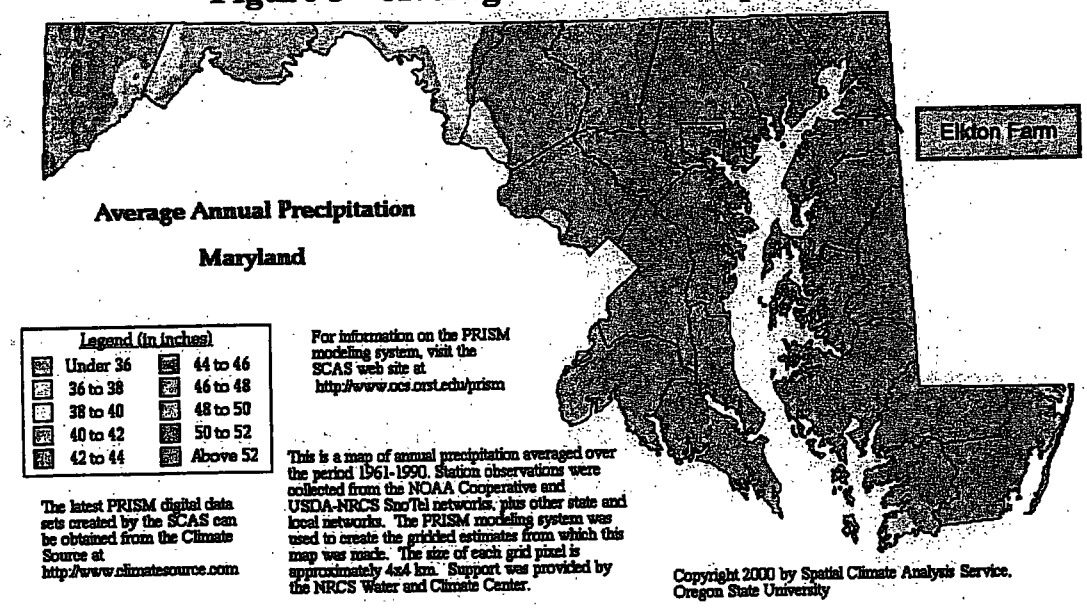
ground surface, with 15 feet of threaded PVC screen, a gravel-pack to one foot over the screened interval and a clay grout above the gravel-pack to less than one foot below ground surface.

The domestic well located at the Herron Farm farmhouse (183 Zeitler Road) was used as a baseline groundwater sample for this PA/SI. The depth and casing levels for the well located at the farmhouse is not recorded. The farmhouse well is estimated to approximate the lower range of the 99 foot average depth of the top of screen for domestic production wells in the Elkton area.

3.6 Meteorology

The climate is temperate and humid with an average of 180 freeze free days. The average temperatures range from 74.1 degrees Fahrenheit in the summer to 34.0 degrees Fahrenheit in the wintertime. The mean annual precipitation is about 45.3 inches with an average snowfall on the order of 18 inches per year.

Figure 5 – Average Annual Precipitation



3.7 Nearby Land Use and Population Distribution

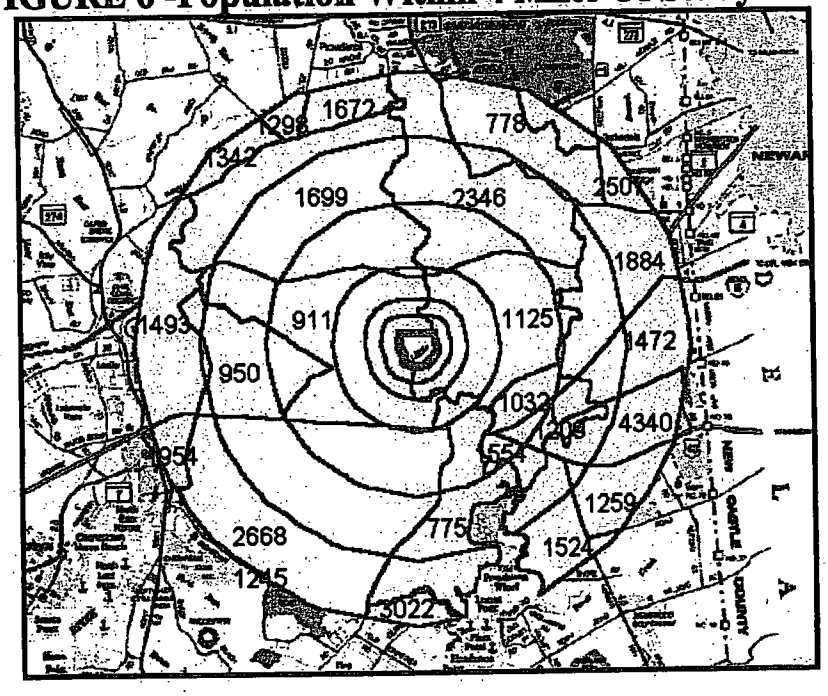
Land use surrounding the site is primarily agricultural/residential, with an area of medium to light industry situated to the south across Little Elk Creek. There are four residences located along Zeitler road. The two closest to the study area, which were directly associated with the historic farming operation, are currently occupied. The Triumph Industrial Park is located a short distance south of the intersection of Zeitler Road and Blue Ball Road (MD-545). Triumph Industrial Park is located on the site of but is unrelated to former TEI operations. Several industrial and chemical operations, including GE Railcar, and Thiokol Corporation, now occupy space in the industrial park.

Table 2 – Population Distribution

Radius (miles)	Population
0 – 0.25	0
0.25 – 0.5	217
0.5 – 1.0	672
1.0-2.0	5001
2.0 – 3.0	9581
3.0 – 4.0	11,451
Total	**27,056**

The resident population distribution around the site was determined using Maryland census figures for the year 2000.

FIGURE 6 -Population Within 4 Miles Of Study Area



4.0 WASTE DESCRIPTION

After being identified as a potentially responsible party for the operation, the U.S. Army Corps of Engineers contracted an investigation of the site operations and ownership history of the Elkton, Maryland Triumph Explosives, Inc. In February 1992, the final report for this project was prepared by TechLaw, Inc.[iv] This report documented as an area for the disposal of waste explosives material. According to the record waste explosive material from the manufacture of military ordinance was collected in drums and kept wetted with alcohol or ether. This waste was accumulated and than carried to the fields off Zeitler Road, spread thinly and allowed to burn. Plant personnel monitored the burn until the waste explosive was ostensibly consumed. Photographs in the TEI newsletter from the period of concern show the operation of this burn pit.

Waste associated with the TEI operation include alcohol, ether, carbon tetrachloride, trichlorethylene, perchlorates, nitro-aromatic compounds, metals and metallic oxides and salts.

In the late 1950s the Thiokol Corporation, now ATK, leased a one acre parcel in the area of the Firehole. Thiokol constructed a facility for testing and recovering rocket motors. This facility consisted of underground silos, aboveground test racks, and an extensive gantry network. In 1962 a explosion at the facility led to its abandonment. Rocket motors are packed with a solid fuel material high in perchlorates and nitroaromatic compounds. Wastes associated with the operation include perchlorates, nitroaromatic compounds, degreasers, and lubricants.

The total quantity of hazardous waste disposed of in the TMRA is unknown. There are no estimates as to the quantity of waste generated from the cleaning and combustion of rocket motors; however, a number of drums of ash from the Thiokol operation were identified during the Emergency Removal Phase of the Elkton Farm Assessment. A geotechnical survey conducted by MDE indicated several distinct anomalies on the 1 acre parcel. Observations indicate that the Firehole was not one discrete area but rather a series of burn pits located across the property. It is likely that the Thiokol facility is sited on a portion of the Firehole and samples of the soil and groundwater may exhibit characteristics of ordnance disposal in addition to those of the waste from Thiokol's operation.

5.0 PREVIOUS STUDIES

In April 2001, MDE performed a Site Survey of the Elkton Farm site to determine whether further action was necessary. The finding of this survey was that further action was required in order to document potential hazards associated with a release of site contaminants to the ground and surface waters of the State of Maryland.

In July of 2002, MDE contracted ENSAT to provide for a geophysical assessment of an area of the Elkton Farm to document the location of the Firehole. NAEVA. was contracted to perform the analysis. ENSAT transmitted the NAEVA final report to MDE on September 3, 2002. This report identified and delineated anomalies in the TMRA area and tagged them to a GPS grid (Figure 8).

6.0 MDE CLP SAMPLING

MDE proposed an investigation of the Elkton Farm TMRA site in its cooperative agreement with EPA. Accordingly, a sampling plan proposal was submitted to the EPA Region III office in May 2002 for the proposed collection of groundwater, surface water, sediment and soil at the site. The purpose of the sampling was to evaluate areas within and adjacent to the TMRA area for any potential contamination. EPA gave tentative approval to the sampling proposal in their letter dated June 21, 2002.

MDE personnel conducted the sampling according to procedures outlined in EPA's CLP Routine Analytic Services as Case Number R31878. Sampling began on May 21, 2003 with the collection of groundwater, sediment and surface water and concluded on June 21, 2003 with the

collection of surface and subsurface soils. All samples were analyzed for Target Analyte List inorganics, Target Compound List organics, and nitroaromatic compounds (Appendix D). Groundwater samples were further analyzed for perchlorate contamination. MDE collected the samples in five matrices: one organic aqueous, one organic solid, one inorganic aqueous, one dissolved inorganic aqueous and one inorganic solid. Sampling procedures for groundwater, surface water, sediment and soil are fully outlined in MDE's Standard Operating Procedures. Each matrix included the collection of a field duplicate sample and a matrix spike sample. A field blank consisting of deionized water prepared by MDE was provided for each aqueous matrix. MDE prepared trip blanks consisting of deionized water in 40 ml vials preserved with hydrochloric acid. These trip blanks were shipped and analyzed along with aqueous samples for volatile organic compounds. The sampling locations are shown on Figures 7, 8 & 9 and on the sampling summary in Table 3.

Figure 7 – Topographic Map With Site Sample Locations

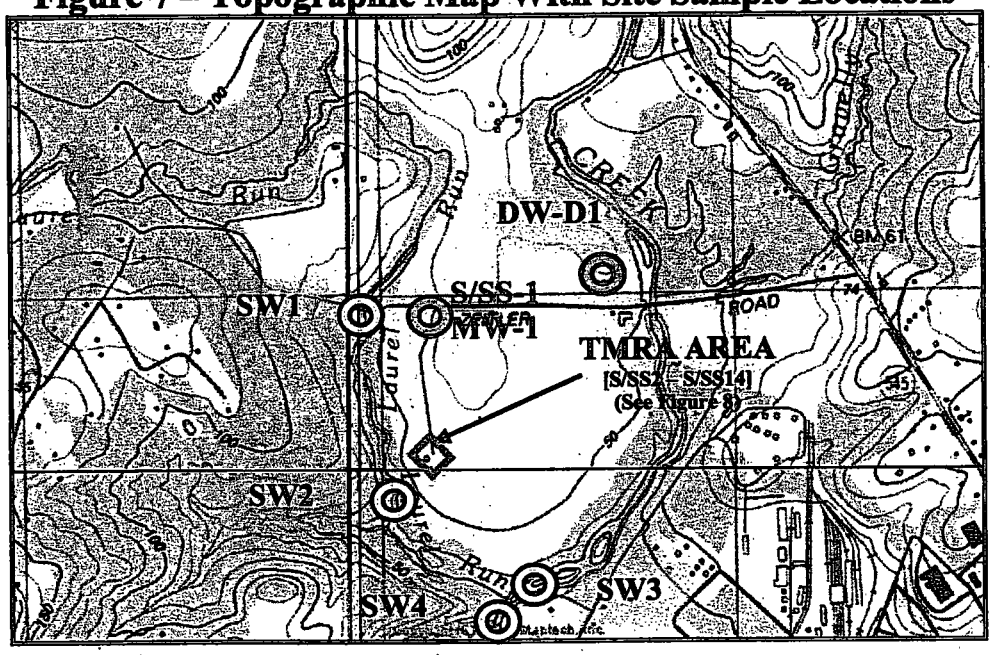


Figure 8 - Site Sketch and Sample Locations.

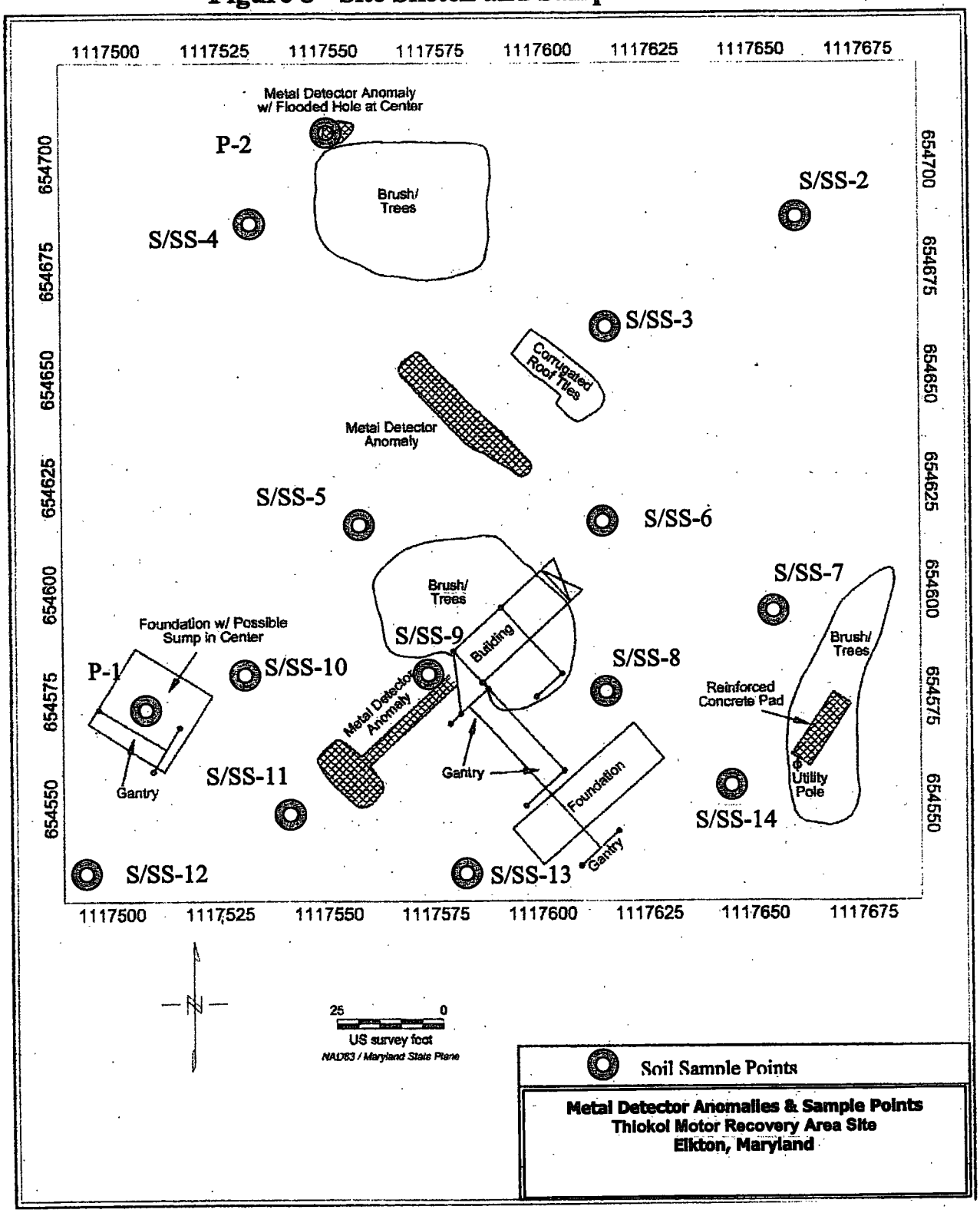


TABLE 3 - SAMPLE SUMMARY TABLE

Sample Identification	Sample Type	Sample Location	Rationale
DW-D1	Aqueous	Farm Domestic Well	Deep Background.
MW-1	Aqueous	Firehole up gradient well	Characterize off-site groundwater.
GW-T1	Aqueous	TMRA – Center	Characterize site groundwater.
GW-T2	Aqueous	TMRA – SW	Characterize on-site groundwater.
GW-T3	Aqueous	TMRA - NE	Characterize on-site groundwater.
SW-T1	Aqueous	Laurel Run at Zeitler Road	Background.
SW-T2	Aqueous	Laurel Run adjacent	Determine if waste source has traveled off site.
SW-T3	Aqueous	Little Elk Creek upstream	Determine if waste source has traveled off site.
SW-T4	Aqueous	Little Elk Creek downstream	Determine if waste source has migrated to tributary.
SW-T5	Aqueous	Laurel Run adjacent	Duplicate Sample of SW-2.
SED-T1	Sediment	Laurel Run at Zeitler Road	Background.
SED-T2	Sediment	Laurel Run adjacent	Determine if waste source has traveled off site.
SED-T3	Sediment	Little Elk Creek upstream	Determine if waste source has traveled off site.
SED-T4	Sediment	Little Elk Creek downstream	Determine if waste source has migrated to tributary.
SED-T5	Sediment	Laurel Run confluence	Duplicate Sample of SED 2.
S/SS-T1	Soil	Woods NW of Site	Background.
S/SS-T2	Soil	Select Grid	Characterize waste source.
S/SS-T3	Soil	Select Grid	Characterize waste source.
S/SS-T4	Soil	Select Grid	Characterize waste source.
S/SS-T5	Soil	Select Grid	Characterize waste source.
S/SS-T6	Soil	Select Grid	Characterize waste source.
S/SS-T7	Soil	Select Grid	Characterize waste source.
S/SS-T8	Soil	Select Grid	Characterize waste source.
S/SS-T9	Soil	Select Grid	Characterize waste source.
S/SS-T10	Soil	Select Grid	Characterize waste source.
S/SS-T11	Soil	Select Grid	Characterize waste source.
S/SS-T12	Soil	Select Grid	Characterize waste source.
S/SS-T13	Soil	Select Grid	Characterize waste source.
S/SS-T14	Soil	Select Grid	Characterize waste source.
S/SS-T15	Soil	Duplicate	Duplicate sample of S/SS-5
P-1	Aqueous	TMRA Sump	Characterize ponded water in TMRA
P-2	Aqueous	TMRA Manhole Sump	Characterize ponded water in TMRA

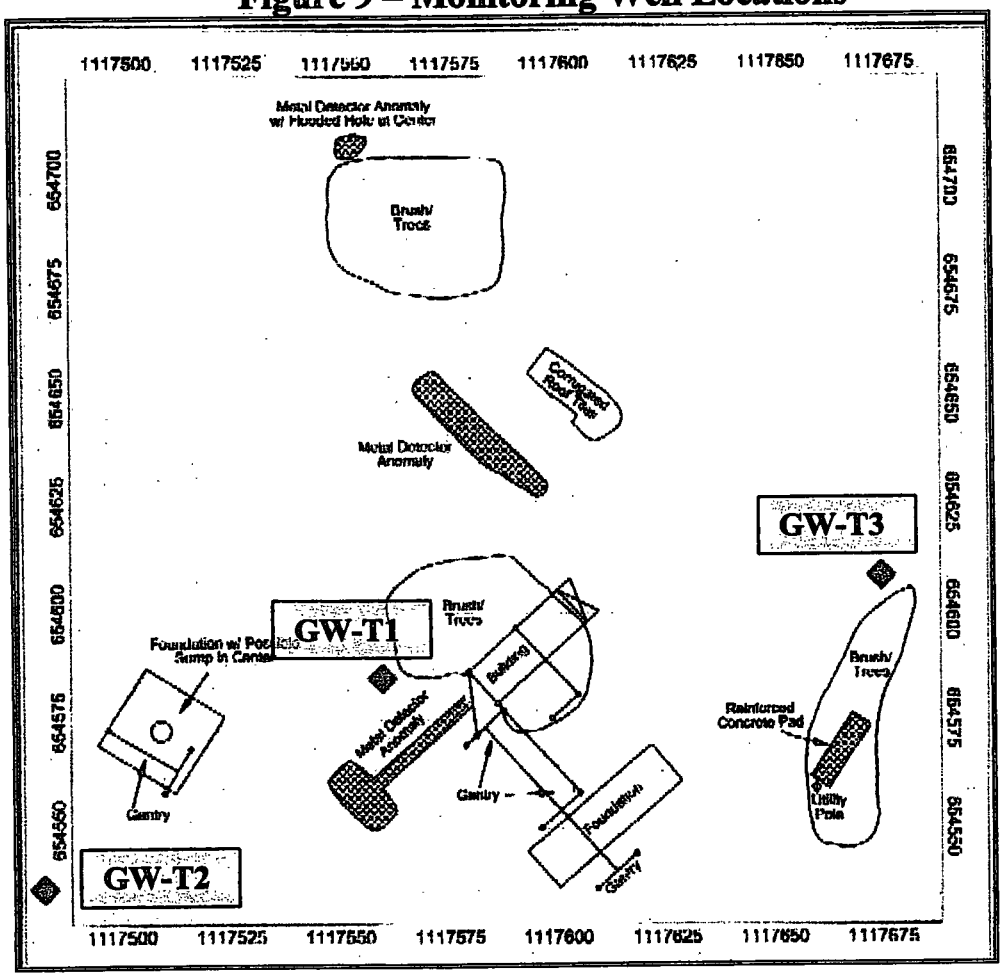
6.0 SAMPLING RESULTS

6.1 Groundwater Sampling Results

MDE collected a total of five groundwater grab samples from monitoring wells located across the site. Groundwater samples were collected in borings sequentially labeled GWT-1

through GWT-3. The sample designated MW-1 was collected as the site up gradient background sample. Sample DW-D1 was collected from the domestic well at the Elkton Farm Farmhouse. In addition to the standard field parameters collected for this assessment, samples were submitted to EPA for an analysis of nitroaromatic compounds and perchlorate. A filtered grab sample was also collected from each groundwater location for dissolved metals content analysis.

Figure 9 – Monitoring Well Locations



All groundwater samples were analyzed for total and dissolved metals. No metals results exceeded 3X background.

The contaminants detected in the Elkton Farm TMRA ground water samples were screened against EPA Region III Risk Based Concentration (RBC) Table, and MDE's Soil and Groundwater Clean up Standards for Controlled Hazardous Substances.

The analysis of samples collected from wells GW-T1 through GW-T3 showed no elevations above MDE's standards for type I and II aquifers. There were no significant detections of VOCs, SVOCs or pesticides in samples collected from wells set at the Elkton Farm TMRA site. However, trace amounts of nitroaromatic compounds were detected in groundwater samples collected from GWT-1, GWT-2 and GWT-4. These detections indicate an onsite source of the contaminants listed in Table 9.

Table 4 –Total Metals Data for Ground Water Samples:

Total Metals ug/l	MW-1 Background	GWT-1	GWT-2	GWT-3	DW-D1	RBC[1]	MDE[2] Cleanup Std.
ALUMINUM	31500 K	14900 K	43900 K	1550 K	199 B	3.7E+04	50
ARSENIC	8.6 B	7.7 B	9.6 B	<15	<15	4.5E-02	50
BARIUM	609	417	751	90.3 J	<200	2.6E+03	2000
BERYLLIUM	14.3	7.7	12.4	1.1 B	<5	7.3E+01	4
CALCIUM	41600	32300	38900	16000	230 B	–	–
CHROMIUM	104	49.4	134	4.7 J	1.1 B	1.1E+02	5,500,000
COBALT	54.9	25.2	42.3 J	6.6 J	<50	7.3E+02	73
COPPER	27.3	49.6	41.7	15.7 J	4.2 B	1.5E+03	1,300
IRON	73200	32900	72900	4800	139 B	1.1E+04	300
LEAD	28.5	11.6	26	<10	<10	–	15
MAGNESIUM	28600	23100	73300	11500	58.9 B	–	–
MANGANESE	1250	448	1310	113	12.5 J	7.3E+02	50
MERCURY	0.13 B	0.12 B	0.06 B	<0.2	<0.2	–	2
NICKEL	57.0	36.1 J	64.4	8.4 J	<40	7.3E+02	73
POTASSIUM	7630 J	2920 J	24400 J	1360 J	478 J	–	–
SODIUM	29100	4990 J	4290 J	3030 J	47400	–	–
VANADIUM	113	78.6	192	7.8 J	2.4 B	2.6E+02	50
ZINC	387 B	205 B	287 B	120 B	27.6 J	1.1E+04	1,100

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
L=Analyte present, actual value is expected to be higher
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
+=10X Dilution
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds MDE cleanup standard
Green Highlighted = value exceeds RBC
Pink Highlighted = level exceeds both MDE & RBC

1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I & II Aquifers.

Table 5 –Dissolved Metals Data for Ground Water Samples:

Total Metals ug/l	MW-1 Background	GWT-1	GWT-2	GWT-3	RBC[1]	MDE[2] NRCS
ALUMINUM	356	32.4 B	88.4	43.1	3.7E+04	50
BARIUM	68.0 J	100 J	74.7 J	71.6 J	2.6E+03	2000
BERYLLIUM	0.72 J	<5	<5	<5	7.3E+01	4
CALCIUM	11600	14200	17300	14100	–	–
CHROMIUM	1.7 B	<10	1.6 B	<10	1.1E+02	5.5E+06
COBALT	8.5 J	1.8 J	3.7 J	2.7 J	7.3E+02	73
COPPER	9.5 J	1.4 J	2.2 J	1.8 J	1.5E+03	1,300
IRON	1220	47.9 B	52.2 B	17.1 B	1.1E+04	300
LEAD	3.4 B	<10	<10	<10	–	15
MAGNESIUM	6000	9800	24000	10200	–	–
MANGANESE	221	85.2	75.0	121	7.3E+02	50
NICKEL	10.4 B	6.8 B	7.6 B	4.1 B	7.3E+02	73
POTASSIUM	1020 J	1280 J	4110 J	1040 J	–	–
SILVER	<10	<10	1.4 J	<10	–	18
SODIUM	26800	4380 J	288000	2780 J	–	–
VANADIUM	1.5 J	<50	1.4 J	<50	2.6E+02	50
ZINC	81.6 B	114 B	102 B	73.5 B	1.1E+04	1,100

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
L=Analyte present, reported value may be biased low, actual value is expected to be higher
K = analyte present, reported value may be biased high., actual value is expected to be lower.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
+=10X Dilution
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds MDE cleanup standard
Green Highlighted = value exceeds RBC
Pink Highlighted = level exceeds both MDE & RBC
1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I & II Aquifers.

Table 6 – VOC data for Groundwater Samples:

Analyte µg/l	MW-1 Background	GWT-1	GWT-2	GWT-3	RBC[1]	MDE[2] Cleanup Std.
4-METHYL-2-PENTONE	<10	<10	1 J	<10	2.0E+03	5.0E+01

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds MDE cleanup standard
Green Highlighted = value exceeds RBC
Pink Highlighted = level exceeds both MDE & RBC
1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I & II Aquifers.

Table 7 - SVOC data for Groundwater Samples:

Analyte ug/L	MW-1 Background	GWT-1	GWT-2	GWT-3	RBC[1]	MDE[2] Cleanup Std.
BIS(2-ETHYLHEXYL)PHTHALATE	1 J	3 J	1 J	1 J	4.8E+00	20

1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I & II Aquifers.
Qualifiers: J = analyte present, reported value may not be accurate or precise.

Table 8 - Pesticide data for Groundwater Samples:

Analyte µg/L	MW-1 Background	GWT-1	GWT-2	GWT-3	RBC[1]	MDE[2] Cleanup Std.
BETA-BHC	*<0.05*	0.071 J	0.044 J	*<0.05*	3.7E-02	8.0E-02

1 – EPA Region III Risk Based Concentration for Tap Water
2 – MDE Cleanup Standards for Type I & II Aquifers.
Qualifiers: J = analyte present, reported value may not be accurate or precise.

Table 9 – Nitroaromatic Compound Results for Groundwater Samples

Analyte µg/L	GWT-1	GWT-2	GWT-3	EPA RBC[1]	MDE Cleanup Stnd.[2]
1,3,5-TRINITROBENZENE	0.59	–	–	–	–
2,4,6-TRINITROTOLUENE	5.0	0.32	–	–	–
4-AMINO 2,6-DINITROTOLUENE	4.4	2.8	0.21	–	–
2-AMINO 4,6-DINITROTOLUENE	5.1	2.4	0.08	–	–
HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE (RDX)	0.32	–	–	–	–

1 – EPA Region III Risk Based Concentrations for Residential Soils.
2 – MDE Cleanup Standards for Residential Soils.

6.2 Surface Water Sampling

MDE collected three surface water and three sediment grab samples from Laurel Run (SW/SED T1, SW/SED T-2, and its duplicate SW/SED T-5) and two surface water and two sediment samples from the Little Elk Creek (SW/SED T-3 upstream of the confluence of little Elk and Laurel Run and SW/SED T-4 downstream of the confluence.). The sediment sample locations were coincident with the surface water sampling locations. Two planned samples of ponded water were deleted from the program due to lack of water at the sample points during sample collection. The chemicals detected in the surface water and sediment samples were screened against Code of Maryland Regulations(COMAR), Volume XXIV, Subtitle 26.08.02.03-2 Toxic Substance Criteria for Ambient Surface Water and National Ocean and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQRT) for marine sediment, respectively. Total copper levels detected in the surface water samples exceeded NOAA chronic marine benchmark levels. The pesticides heptachlor and gamma-chlordane were detected in all surface water samples except SW-T3 at levels above NOAA SQRTs. These levels are below human health risk benchmarks.

Table 10 –Total Metals Data For Surface Water Samples:

Total Metals ug/l	SWT-1 Background	SWT-2 Dup SWT5	SWT-3	SWT-4	SWT-5 Dup SWT2	COMAR[1] Freshwater Chronic	NOAA[2] SQRT CCC
ALUMINUM	168 B	476 B	126 B	231 B	128 B	–	–
BARIUM	41.2 J	38.1 J	30.3 J	37.9 J	39.1 J	–	–
BERYLLIUM	0.35 J	<5	<5	<5	<5	–	–
CALCIUM	6700	6060	11800	8200	6250	–	–
CHROMIUM	1.5 B	1.7 B	0.91 B	0.81 B	0.76 B	11 (CR+6)	
COBALT	1.5 B	1.2 B	<50	1.2 B	1.1 B	–	–
COPPER	3.3 B	3.3 B	4.7 J	3.2 B	4.5 B	9	3.1
IRON	466	770	336 B	474	428	–	–
MAGNESIUM	3540 J	3180 J	8070	4980 J	3330 J	–	–
MANGANESE	63.8	55.4	34.3	82.6	54.6	–	–
NICKEL	4.5 J	4.0 J	5.0 J	4.9 J	4.1 J	52	8.2
POTASSIUM	1150 J	1130 J	2310 J	1590 J	1120 J	–	–
SILVER	0.6 J	<10	<10	<10	<10	–	–
SODIUM	14800	12700	10300	11800	13200	–	–
VANADIUM	2.2 B	2.5 B	2.6 B	2.1 B	2.2 B	–	–

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
1 – Code of Maryland Regulations Toxic Substances Criteria for Ambient Surface Waters
2 – NOAA Screening Quick Reference Tables (SQRT)

Table 11 – VOC data for Surface Water Samples:

Analyte ug/l	SWT-1 Background	SWT-2 Dup SWT-5	SWT-3	SWT-4	SWT-5 Dup SWT-2
	No VOC Detections				

Table 12 – SVOC data for Surface Water Samples:

Analyte ug/l	SWT-1 Background	SWT-2 Dup SW5	SWT-3	SWT-4	SW5 Dup SW2	COMAR1 Freshwater Chronic	NOAA2 SQRT (CCC)
CAPROLACTAM	<10	0.8 J	0.7 J	<10	<10	–	–
DIETHYLPHTHALATE	0.6 B	2 B	0.6 B	<10	1 B	–	3.4
DI-N-BUTYLPHTHALATE	0.8 B	0.6 B	<10	0.9 B	1 B	–	3.4
BIS(2-ETHYLHEXYL)PHTHALATE	1 B	0.9 B	2 B	0.6 B	1 B	–	360

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted exceeds NOAA-SQRT levels for chronic marine acceptable inorganics levels (CCC)
Highlighted = greater than 3X background
1 – Code of Maryland Regulations Toxic Substances Criteria for Ambient Surface Waters
2 – NOAA Screening Quick Reference Tables (SQRT)

Table 13 – Pesticide and PCB data for Surface Water Samples:

Analyte µg/L	SWT-1 Background	SWT-2 Dup SWT5	SWT-3	SWT-4	SWT-5 Dup SWT2	NOAA SQRT (CCC)
HEPTACHLOR	**0.035 B**	**0.033 B**	*<0.05*	**0.025 B**	**0.026 B**	0.0018
γ-CHLORDANE	**0.013 B**	**0.012 B**	*<0.05*	*<0.05*	*<0.05*	0.002

Qualifiers: B = not detected substantially above the level reported in laboratory or field blanks.

6.3 Sediment Sampling

MDE collected four sediment samples (SED1 – SED4) plus one duplicate sample (SED5). Sediment samples SED1, SED2, and SED5 were collected from the Laurel Run, which flows along the eastern edge of the TMRA parcel.

- SEDT-1 is an upstream background sample collected at a point uninfluenced by runoff from the Elkton Farm site.
- SEDT-2 is collected from the Laurel Run downstream of the TMRA.
- SEDT-3 was collected in Little Elk Creek at a point upstream of the confluence of Laurel Run with Little Elk Creek.
- SEDT-4 was collected in Little Elk Creek downstream of the confluence of Laurel Run and Little Elk Creek.
- SEDT-5 was a duplicate of SEDT-2.

Samples of Elkton Farm sediments revealed contaminants at levels that were below regulatory limits for the protection of human health and the environment. All detections were below NOAA Effects Range Median (ERM) and Threshold Effects Level (TEL) for marine sediment.[v] The sediment samples did not reveal significant levels of metals, VOCs, SVOCs, pesticides or PCBs. The highest levels of VOCs were detected in the upstream background sample. The highest levels of inorganic constituents were found in sample SED3, which was collected from Laurel Run downstream of the site at a point above the confluence of Laurel Run with Little Elk Creek. These levels were uniformly 3X background but below any risk based concentration levels.

The toxicological evaluation of the contaminants detected in the surface water and sediment samples did not reveal an unacceptable risk to human health. The results of the toxicological evaluation are found in Appendix B of this report.

Table 14 – Total Metals Data For Sediment Samples:

Analyte Mg/kg	SED T-1 Background	SED T-2 Dup Sed T5	SED T-3	SED T-4	SED T-5 Dup Sed T2	NOAA[1] SQRT (TEL)	NOAA[1] SQRT (ERM)
ALUMINUM	768	796	8420	581	668	–	–
ANTIMONY	0.23 B	R	R	R	R	–	–
ARSENIC	1 J	0.98 J	4.2 L	0.62 J	0.81 J	5.9	70
BARIUM	4.3 J	6.7 J	67.8	4.1 J	4.7 J	–	–
BERYLLIUM	0.11 J	0.21 J	0.79 J	0.13 J	0.21 J	–	–
CADMIUM	0.082 J	0.17 J	0.52 J	0.31 J	0.15 J	0.596	9.6
CALCIUM	155 J	328 J	604 J	107 B	163 J	–	–
CHROMIUM	2.9	3.2	18.3	2.9	3.6	37.3	370
COBALT	0.97 J	1.4 J	8.3 J	1.2 J	1.2 J	–	–
COPPER	3.8 J	2.0 J	11.6 J	1.3 J	1.4 J	35.7	270
IRON	1920	3890	11400	2050	3970	–	–
LEAD	1.9 J	2.3 B	19.9 L	1.5 J	2.0 L	35	218
MAGNESIUM	142 J	250 J	1980	120 J	136 J	–	–
MANGANESE	28.8	46.6	364	41.4	37	–	–
MERCURY	*<0.1*	*<0.1*	0.26	*<0.1*	*<0.1*	0.174	0.71
NICKEL	0.95 J	1.9 B	25.0 J	1.2 J	1.3 J	18	51.6
POTASSIUM	57.4 B	62.2 J	781 J	42.3 B	33.3 B	–	–
SODIUM	55.8 B	52.3 B	86.1 B	41.0 B	25.0 B	–	–
VANADIUM	2.7 J	4.1 J	17.6	3.1 J	4.9 J	–	–
ZINC	6.2 J	10.7 J	48.4	16.0	11.5	123.1	410

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R = Unusable result
Yellow Highlighted = greater than 3X background
1= NOAA-Screening Quick Reference Table

Table 15 – VOC data for Sediment Samples:

Analyte	SED T-1 Bkgmd	SED T-2 (Dup SED T-5)	SED T-3	SED T-4	SED T-5 (Dup SED T-5)	NOAA SQRT (TEL)	NOAA[1] SQRT (ERM)
ACETONE	*<10*	9.0 J	*<10*	*<10*	*<10*	—	–
METHYLENE CHLORIDE	3 B	4 B	4 B	4 B	4 B	—	–

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R= unusable result, analyte may or may not be present.
Yellow Highlighted = greater than 3X background
— = No NOAA SQRT
1= NOAA-Screening Quick Reference Table

Table 16 – SVOC data for Sediment Samples:

Analyte ug/kg	SED T-1 Bkgrnd	SED T-2 (Dup SED T-5)	SED T-3	SED T-4	SED T-5 (Dup SED T-5)	NOAA[1] SQRT (ERM)	NOAA[2] SQRT (TEL)
PHENANTHRENE	<330	<330	37 J	<330	<330	1500	86.68
DI-N-BUTYLPHTHALATE	29 B	28 B	37 B	39 B	25 B	—	–
FLUORANTHENE	<330	<330	65 J	<330	<330	5100	112.82
PYRENE	<330	<330	41 J	<330	<330	2600	152.66
BENZO[A]ANTHRACENE	<330	<330	32 J	<330	<330	1600	74.83
CHRYSENE	<330	<330	31 J	<330	<330	2800	107.77
BIS(2-ETHYLHEXYL)PHTHALATE	36 B	31 B	33 B	41 B	25 B	—	–
BENZO[B]FLUORANTHENE	<330	<330	24 J	<330	<330	—	–
BENZO[A]PYRENE	<330	<330	23 J	<330	<330	1600	88.81

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
1 – NOAA Screening Quick Reference Table Effects Range Median
2 – NOAA Screening Quick Reference Table Threshold Effects Limit

Table 17 - Pesticide and PCB data for sediment samples:

Analyte	SED T-1 Bkgrnd	SED T-2 (Dup SED T-5)	SED T-3	SED T-4	SED T-5 (Dup SED T-5)	NOAA[1] SQRT (ERM)	NOAA[2] SQRT (TEL)
METHOXYCHLOR	<17	<17	<17	9.6 B	<17	–	–
HEPTACHLOR	1.7 B	1.7 B	2.2 B	1.9 B	1.7 B	—	–
ALDRIN	0.35 J	<1.7	<1.7	1.7 J	<1.7	—	–

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
1 – NOAA Screening Quick Reference Table Effects Range Median
2 – NOAA Screening Quick Reference Table Threshold Effects Limit

Table 18 – Nitroaromatic Compound data for sediment samples:

Analyte mg/kg	SED T-1 Bkgrnd	SED T-2 (Dup SED T-5)	SED T-3	SED T-4	SED T-5 (Dup SED T-5)	EPA RBC
1,3,5-TRINITROBENZENE	<0.05	<0.05	<0.05	<0.05	0.038	2,300

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.

6.4 Soil Sampling

MDE collected twenty-eight soil samples that were screened against MDE Cleanup Standards for Residential Soils and EPA RBC's for Residential Soils. Elevated levels of arsenic were detected across much of the site at levels above MDEs soil removal guidelines. Cadmium, copper, lead, magnesium, nickel and zinc were detected at greater than three times background in soil samples collected in the center of the TMRA. All soil samples were analyzed for perchlorate content; perchlorates were not detected at levels above the method detection limit of 0.02 mg/kg.

The levels of inorganic and organic contaminants detected in the soil samples exceeded screening values for several surface and subsurface samples. There were also significant elevations in nitro-aromatic compounds including Trinitrotoluene (TNT) and several of its daughter compounds in samples collected from the TMRA. This factored into the toxicological evaluation which revealed an unacceptable risk to human health under a residential use scenario due to cadmium, 2,4,6-trinitrotoluene and the potential additive effects of the contaminants detected in the soil samples. A detailed explanation of the inorganic and organic compounds detected in the on-site soil samples is outlined in the toxicology report found in Appendix B of this document.

Table 19 - Inorganic data for Surface Soils

Analyte mg/kg	MDE[1] Cleanup Standard mg/kg*	S-T1 Bgrd	S-T2	S-T3	S-T4	S-T5 DUP S-T12	S-T6	S-T7	S-T8	S-T9	S-T10	S-T11	S-T12	S-T13	S-T14	S-T15 Dup S-T5	EPA[2] RBC
ALUMINUM	7800	14400	11900	19300	15500	14700	16900	18400	16400	9690	14200	18600	14700	14400	12700	15500	78000
ANTIMONY	12	*R*	8.1 J	*R*	*R*	*R*	R	*R*	*R*	*R*	*R*	*R*	*R*	*R*	*R*	*R*	31
ARSENIC	2	5.8	7.61	6.93	5.81	4.11	6.2	5.1	5.7	2.5 B	5.91	7.61	5.9	5.9	6.8	7.41	0.43
BARIUM	550	85.5	502	55.2	60.4	318	63.2	58.3	54.4	50.7	67.0	60.7	79.1	61.5	42.2 J	165	5500
BERYLLIUM	16	0.88 J	0.76 J	0.82 J	0.73 J	0.76 J	0.72 J	0.69 J	0.73 J	0.53 J	0.88 J	0.97 J	0.93 J	0.72 J	0.90J	0.81 J	160
CADMIUM	3.9	0.71 J	120	0.83 J	0.65 J	1.2	0.82 J	*0.76 J*	0.67 J	0.34 J	0.74 J	0.86 J	1.6	0.63 J	0.72 J	1.0	3.9
CALCIUM	–	695 J	582 J	570 J	658 J	559 J	908 J	516 J	3020	870 J	862 J	698 J	442 J	1110	1520	455 J	6.1E+03
CHROMIUM (TOTAL)	230 (Cr+6)	20.2	37.0	28.8	22.2	23.3	28.2	22.6	25.7	19.5	22.1	27.3	19.5	26.5	20.3	26.8	230 (Cr+6)
COBALT	160	7.5 J	10.4	6.1 J	6.2 J	5.7 J	6.2 J	8.5 J	5.5 J	3.9 J	6.4 J	6.8 J	7.9 J	4.7 J	5.6 J	5.6 J	1600
COPPER	310	5.3	102	8.5	6.7	13.3	6.5	5.6	7.3	11.5	7.0	7.4	9.7	7.5	7.1	11.5	3100
IRON	2300	18800	22000	21500	18400	16700	22600	20900	18100	8870	19100	23400	22700	17400	18800	21300	23000
LEAD	400	9.5 J	144 L	10.1 L	10.6 L	17.5 L	9.3 J	10.3 J	7.6 J	5.8 J	11.8 L	12.3 L	29.1 J	8.7 J	7.1 J	12.7 L	–
MAGNESIUM	–	1840	7560	2730	2080	2600	3050	2670	3370	1840	2390	2510	1480	2550	2920	2740	–
MANGANESE	160	231	380	76.4	110	127	133	158	198	51.9	151	135	488	75.4	112	96.9	1600
MERCURY	0.1	*<0.1*	0.59	0.071 J	*<0.1*	<0.1	<0.1	<0.1	*<0.1*	*<0.1*	*<0.1*	*<0.1*	0.084 J	*<0.1*	*<0.1*	*<0.1*	–
NICKEL	160	9.8	75.3 J	12.0 J	10.9 J	9.9 J	13.8	11.2	10.8	7.5 J	13.5 J	13.0 J	11.0	9.5	11.8	10.9 J	1600
POTASSIUM	–	395 J	470 J	827 J	543 J	720 J	596 J	534 J	692 J	335 J	507 J	744 J	378 J	545 J	562 J	733 J	–
SELENIUM	39	*<7*	*<7*	*<7*	*<7*	*<7*	*<7*	*<7*	*<7*	1.3 J	*<7*	*<7*	*<7*	*<7*	*<7*	*<7*	390
SODIUM	–	60.4 B	89.1 B	84.4 B	50.1 B	123 B	59.9 B	68.6 B	91.1 B	51.5 B	74.9 B	61.6 B	29.9 B	60.7 B	69.3 B	89.4 B	–
THALLIUM	2	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	0.48 B	*<5*	*<5*	*<5*	*<5*	*<5*	*<5*	5.5
VANADIUM	55	28.1	27.3	37.7	30.0	31.8	35.3	32.7	37.2	16.3	30.3	36.7	23.8	33.0	39.8	36.9	550
ZINC	2300	29.1	7280	51.6	38.2	132	66.2	95.9	28.9	24.0	37.0	36.0	53.4	39.4	26.7	72.5	23000
CYANIDE	160	*<1*	0.50 J	*<1*	*<1*	0.21 J	*<1*	*<1*	*<1 L*	*<1*	*<1*	*<1*	*<1*	*<1*	*<1*	0.30 J	1600

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks. L=Analyte present, reported value may be biased low, actual value is expected to be higher. K = analyte present, reported value may be biased high., actual value is expected to be lower. [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate. +=10X Dilution. Red Highlighted values exceed MDE Residential Clean-up Standard (NRCS) Yellow Highlighted = greater than 3X background.

1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.

2 – EPA Region III Risk Based Concentration for ResidentialSoils

Table 20 - Inorganic data for Subsurface Soils

Analyte mg/kg	MDE[1] Cleanup Standards mg/kg*	SS-T1 Bgrd	SS-T2	SS-T3	SS-T4	SS-T5 DUP SS-T15	SS-T6	SS-T7	SS-T8	SS-T9	SS-T10	SS-T11	SS-T12	SS-T13	SS-T14	SS-T15 Dup S5	EPA[2] RBC
ALUMINUM	7800	6060	8090	7260	1820	9960	2190	11600	9720	7610	13900	6600	2700	5410	6470	7050	78000
ARSENIC	2	2.8 B	4.0 L	3.6 L	2.1 J	5.9 L	1.7 B	5.2	2.2 B	4.1 L	6.6 L	3.5 L	2.9 B	2.3 B	2.1 B	5.1 L	0.43
BARIUM	550	16.8 J	24.8 J	31.5 J	5.0 J	41.1	9.8 J	26.8 J	45.7	49.8	42.3	18.4 J	11.2 J	35.7 J	54.4	45.9	5500
BERYLLIUM	16	0.36 J	0.63 J	0.54 J	0.39 J	0.64 J	0.24 J	0.69 J	0.70 J	0.67 J	0.75 J	0.4 J	0.33 J	0.52 J	0.72 J	0.71 J	160
CADMIUM	3.9	0.54 J	0.45 J	0.70 J	0.45 J	0.54 J	0.26 J	0.58 J	0.45 J	*0.34 J*	0.84 J	0.4 J	0.36 J	0.37 J	0.39 J	0.58 J	3.9
CALCIUM	--	246 J	216 J	216 J	83.6 B	307 J	607 J	325 J	6690	556 J	536 J	234 J	83.1 B	4760	10500	325 J	--
CHROMIUM	230	13.2	14.9	18.0	15.0	20.6	10.7	19.1	32.5	15.4	27.9	19.1	17.8	15.1	13.8	24.4	2300
COBALT	160	3.3 J	5.1 J	5.3 J	2.5 J	4.3 J	4.1 J	9.2 J	4.3 J	3.6 J	5.6 J	4.4 J	3.3 J	2.5 J	7.0 J	4.3 J	1600
COPPER	310	2.2 B	5.7	6.6	3.2 J	7.4	5.4	6.8	5.4	5.9	7.6	4.0 J	3.1 B	4.4 J	5.2	8.0	3100
IRON	2300	14800	13000	13400	13200	15600	5910	16400	13100	10400	22500	11700	9780	9570	10700	15200	23000
LEAD	400	3.1 J	4.3 L	6.8 L	2.2 L	7.7 L	1.8 B	4.4 J	5.1 J	5.0 L	9.1 L	7.4 L	2.8 J	2.8 J	3.2 J	8.6 L	--
MAGNESIUM	--	541 J	1360	1010	163 J	1880	598 J	1760	3260	2090	1970	705 J	294 J	2120	4830	1550	--
MANGANESE	160	69.7	122	121	42.2	64.5	131	175	308	57.2	115	102	80.4	126	522	83.0	1600
MERCURY	0.1	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	*<0.1*	0.061 J	*<0.1*	<0.1	<0.1	<0.1	0.071 J	--
NICKEL	160	3.1 J	6.4	5.8 J	2.3 J	7.9 J	2.3 J	7.8 J	7.5 J	6.6 J	9.8 J	4.3 J	2.5 J	4.4 J	23.1	7.2 J	1600
POTASSIUM	--	172 B	529 J	378 J	84.4 J	459 J	125 B	659 J	444 J	418 J	594 J	284 J	119 B	247 J	279 J	366 J	--
SODIUM	--	65.3 B	53.6 B	35.6 B	23.4 B	70.1 B	34.7 B	58.4 B	126 B	45.8 B	64.4 B	39.8 B	21.1 B	104 B	163 B	70.4 B	--
THALLIUM	2	0.36 B	*<5*	*<5*	*<5*	*<5*	0.36 B	*<5*	*<5*	*<5*	*<5*	*<5*	1.2 B	*<5*	0.26 B	*<5*	5.5
VANADIUM	55	16.0	22.4	20.4	10.8	31.7	9.1 J	25.7	28.5	22.9	33.9	19.6	12.3	17.8	21.9	28.6	550
ZINC	2300	10.6 J	18.3	56.5	15.9	24.1	8.2 J	22.0	18.0	19.9	28.0	11.4	9.8 J	12.3	13.7	34.5	23000

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks. L=Analyte present, reported value may be biased low, actual value is expected to be higher. K = analyte present, reported value may be biased high., actual value is expected to be lower. [ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate. +=10X Dilution. Red Highlighted values exceed MDE Residential Clean-up Standard. Green Highlighted values exceed both MDE & RBC Yellow Highlighted = greater than 3X background.

1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances - Residential.

2 – EPA Region III Risk Based Concentration for Residential Soils

Table 21 – VOC data for Soil Samples:

Analyte µg/kg	MDE[1] Cleanup Standard	EPA[2] RBC Residential	SS-T1 Bkgrnd	SS-T2	SS-T3	SS-T4	SS-T5	SS-T6	SS-T7	SS-T8	SS-T9	SS-T10	SS-T11	SS-T12	SS-T13	SS-T14	SS-T15
BROMOMETHANE	2.9E+05	1.1E+05	<10	<10	<10	<10	5 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
ACETONE	2.0E+07	7.8E+06	32 J	33 J	19 J	20	40	29 J	20 J	33 J	15	51 J	22 J	38 J	23 J	29 J	22 J
CARBON DISULFIDE	2.0 E+07	7.8E+06	<10	<10	4 J	<10	<10	31	1 J	<10	3 J	2 J	<10	<10	<10	<10	<10
METHYL ACETATE	—	7.8E+07	<10	<10	<10	<10	10 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
METHYLENE CHLORIDE	7.6E+05	8.5E+04	15	9 B	3 B	2 B	3 B	14	15 B	23 B	3 B	5 B	3 B	14	14	12 B	3 B
2-BUTANONE	1.2E+08	—	<10	<10	<10	<10	3J	<10	<10	4 J	<10	11 J	<10	<10	<10	<10	<10
BENZENE	1.0E+05	1.2E+04	<10	<10	<10	<10	1 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TRICHLOROETHENE	5.2E+05	1.6E+03	<10	<10	<10	<10	4 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
TOLUENE	4.1E+07	1.6E+07	<10	<10	<10	<10	1 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential Soil.
2 – EPA Risk Based Concentrations for Residential Soils.
Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Red Highlighted values exceed MDE Non-Residential Clean-up Standard (NRCS)
Yellow Highlighted = greater than 3X background

Table 22 – SVOC data for Surface Soil Samples:

Analyte ug/kg	MDE[1] Cleanup Standard	EPA[2] RBC	S-T1 Bkgrnd	S-T2	S-T3	S-T4	S-T5	S-T6	S-T7	S-T8	S-T9	S-T10	S-T11	S-T12	S-T13	S-T14	S-T15
BENZALDEHYDE	–	7.8E+06	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	30 J	<330	<330	<330
PHENOL	4.7E+06	2.3E+07	<330	1000	520	73 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
CAPROLACTAM	–	3.9E+07	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	30 J	<330	37 J	<330
DI-N-BUTYLPHTHALATE	7.8E+05	7.8E+06	42 B	22 B	21 B	30 B	<330	23 B	40 B	76 B	35 B	28 B	<330	29 B	48 B	38 B	<330
N-NITROSODIPHENYLAMINE	1.3E+05	1.3E+05	<330	<330	<330	<330	43 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	33 J
CHRYSENE	8.7E+04	8.7E+04	<330	<330	<330	<330	<330	<330	<330	33 J	<330	<330	<330	<330	<330	<330	<330
BIS(2-ETHYLHEXYL)PHTHALATE	4.6E+04	4.6E+04	95 B	220 B	980 J	2600 J	490 J	50 B	50 B	110 B	670	1000 J	580 J	2800	290 B	95 B	200 B
BENZO(B)FLUORANTHENE	8.7E+02	8.7E+02	22 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,4-DINITROTOLUENE	1.6E+04	1.6E+05	<330	42 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
2,6-DINITROTOLUENE	7.8E+03	7.8E+04	<330	58 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = greater than 3X background. Red Highlighted values exceed MDE Residential Clean-up Standard
1 – MDE Soil and Groundwater Cleanup Standards –Residential.
2 – EPA Region III Risk Based Concentrations for Residential Soil

Table 23 – SVOC data for Sub-Surface Soil Samples:

Analyte ug/kg	MDE[1] Cleanup Standard	EPA[2] RBC	SS-T1 Bkgrnd	SS-T2	SS-T3	SS-T4	SS-T5	SS-T6	SS-T7	SS-T8	SS-T9	SS-T10	SS-T11	SS-T12	SS-T13	SS-T14	SS-T15
CAPROLACTAM	–	3.9E+07	<330	<330	<330	<330	<330	<330	27 J	<330	<330	<330	<330	<330	<330	<330	<330
PHENOL	4.7E+06	2.3E+07	<330	<330	1000	65 J	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330
DI-N-BUTYLPHTHALATE	7.8E+05	7.8E+06	25 B	21 B	21 B	21 B	22 B	<330	<330	26 B	21 B	29 B	21 B	21 B	24 B	38 B	<330
BIS(2-ETHYLHEXYL)PHTHALATE	4.6E+04	4.6E+04	240 B	3300 J	1600 J	580 J	370 J	590 B	790	240 B	960 J	2400 J	210 B	240 B	230 B	500 B	240 B

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = greater than 3X background. Red Highlighted values exceed MDE Residential Clean-up Standard
1 – MDE Soil and Groundwater Cleanup Standards –Residential.
2 – EPA Region III Risk Based Concentrations for Residential Soil

Table 24 - Pesticide and PCB data for surface soil samples:

Analyte µg/kg	MDE[1] Cleanup Standard	EPA[2] RBC	ST-1 Bgrd	ST-2	ST-3	ST-4	ST-5 Dup ST-15	ST-6	ST-7	ST-8	ST-9	ST-10	ST-11	ST-12	ST-13	ST-14	ST-15 Dup ST-5
HEPTACHLOR	140	140	1.5 B	<1.7	1.6 B	<1.7	1.8 B	2.7 B	1.6 B	<1.7	1.6 B	1.4 B	1.9 B	2.9 B	2.4 B	1.7 B	<1.7
METHOXYCHLOR	39000	3.9E+05	3.7 J	<17	<17	<17	<17	3.0 J	7.4 J	<17	7.6 J	<17	<17	<17	4.2 J	<17	<17
4,4'-DDE	1900	1.9E+03	2.5 J	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	1.3 J	<3.3	<3.3	<3.3
ENDOSULFAN SULFATE	47000	4.7E+05	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	2.6 J	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3
4,4'-DDT	17,000	1.9E+03	1.8 J	16 J	6.9 J	<3.3	<3.3	<3.3	1.6 J	5.0	<3.3	<3.3	<3.3	0.62 J	<3.3	<3.3	<3.3
GAMMA-CHLORDANE	1800	1.8E+03	0.61 B	<1.7	<1.7	<1.7	<1.7	<1.7	0.61 B	0.52 B	<1.7	<1.7	<1.7	0.79 B	0.65 B	<1.7	<1.7

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = greater than 3X background. Red Highlighted values exceed MDE Residential Clean-up Standard
1 – MDE Soil and Groundwater Cleanup Standards –Residential.
2 – EPA Region III Risk Based Concentrations for Residential Soil

Table 25 - Pesticide and PCB Results for Subsurface Soil Samples:

Analyte µg/Kg	MDE[1] Cleanup Standard	EPA[2] RBC	SST-1 Bgrd	SST-2	SST-3	SST-4	SST-5 Dup of SST15	SST-6	SST-7	SST-8	SST-9	SST-10	SST-11	SST-12	SST-13	SST-14	SST-15 Dup of SST5
HEPTACHLOR	140	140	1.3 B	<1.7	<1.7	1.6 B	2.4 B	1.8 B	2.0 B	1.8 B	1.3 B	2.0 B	1.7 B	1.4 B	1.9 B	1.9 B	1.5 B
METHOXYCHLOR	39000	3.9E+05	4.4 J	<17	<17	8.5 B	<17	3.9 J	<17	<17	<17	<17	9.7 B	3.0 J	<17	<17	<17
4,4'-DDE	1900	1.9E+03	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	1.3 J	<3.3	<3.3	<3.3	<3.3	0.39 J	<3.3	<3.3
ENDOSULFAN SULFATE	47000	4.7E+05	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	0.2 J	<3.3	<3.3
ALPHA CHLORDANE	1800	1.8E+03	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	0.18 B	<1.7	<1.7	<1.7
GAMMA CHLORDANE	1800	1.8E+03	0.49 B	<1.7	<1.7	<1.7	<1.7	0.71 B	0.74 B	0.65 B	<1.7	<1.7	<1.7	0.54 B	0.47 B	0.47 B	<1.7

Qualifiers: J = analyte present, reported value may not be accurate or precise. B = not detected substantially above the level reported in laboratory or field blanks.
1 – MDE Soil and Groundwater Cleanup Standards –Residential.
2 – EPA Region III Risk Based Concentrations for Residential Soil

Table 26 – Nitro-Aromatic Compound Results for Surface Soil Samples:

Analyte ug/kg	RBC[1] Residential Soil	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-8	ST-9	ST-10	ST-11	ST-12	ST-13	ST-14	ST-15
4-AMINO 2,6-DINITROTOLUENE	78	<0.05	6.36	0.379	<0.05	1.62	0.0424	0.233	0.345	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	2.44
2-AMINO 4,6-DINITROTOLUENE	–	<0.05	7.78	0.246	<0.05	1.64	0.0385	0.237	0.518	<0.05	<0.05	<0.05	<0.05	<0.05	0.347 J	2.36
1,3-DINITROBENZENE	7.8	<0.05	0.0783	<0.05	<0.05	0.0245 J	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0218 J
DINITROTOLUENE ISOMERS	0.940	<0.05	0.429	<0.05	<0.05	0.118	<0.05	<0.05	0.0763	<0.05	<0.05	<0.05	<0.05	<0.05	0.0503	0.146
1,3,5-TRINITROBENZENE	2300	<0.05	2.32	0.019	<0.05	0.189	<0.05	<0.05	0.049	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.292
2,4,6-TRINITROTOLUENE	21	<0.05	95.4	0.154	<0.05	3.90	0.0503	0.478	0.619	0.251 J	<0.05	<0.05	<0.05	<0.05	0.0796	5.8

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = >3X Background. Green Highlighted values exceed both 3X Background & RBC
1 – EPA Region III Risk Based Concentrations for Residential Soil

Table 27 – Nitro-Aromatic Compound Results for Sub-surface Soil Samples:

Analyte mg/kg	RBC Residential Soil	SST-1	SST-2	SST-3	SST-4	SST-5	SST-6	SST-7	SST-8	SST-9	SST-10	SST-11	SST-12	SST-13	SST-14	SST-15
4-AMINO 2,6-DINITROTOLUENE	78	<0.05	1.05	0.0713	<0.05	0.0744	<0.05	0.0579	0.0583	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0566
2-AMINO 4,6-DINITROTOLUENE	--	<0.05	1.58	0.0539	<0.05	0.118	<0.05	0.147	0.0881	<0.05	<0.05	<0.05	<0.05	<0.05	0.0477	0.0892
1,3-DINITROBENZENE	7.8	<0.05	0.0204 J	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
DINITROTOLUENE ISOMERS	940	<0.05	0.114	<0.05	<0.05	<0.05	<0.05	<0.05	0.0318 J	<0.05	<0.05	<0.05	<0.05	<0.05	0.111	<0.05
RDX	5.8	<0.05	0.107 N	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,3,5-TRINITROBENZENE	2300	<0.05	0.323	0.0189 J	<0.05	0.0282 J	<0.05	0.118	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.046	0.0230 J
2,4,6-TRINITROTOLUENE	21	<0.05	46.6	0.0813	<0.05	0.141	0.0507	0.432	0.229	0.0370 J	<0.05	<0.05	<0.05	<0.05	0.106	0.198

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted = >3X Background Green Highlighted values exceed both 3X Background & RBC
1 – EPA Region III Risk Based Concentrations for Residential Soil

Table 28 – Perchlorate Content Of Surface Soils.

Analyte mg/kg	ST-1	ST-2	ST-3	ST-4	ST-5	ST-6	ST-7	ST-8	ST-9	ST-10	ST-11	ST-12	ST-13	ST-14	ST-15
PERCHLORATE	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Table 29 – Perchlorate Content Of Sub-surface Soils.

Analyte mg/kg	SST-1	SST-2	SST-3	SST-4	SST-5	SST-6	SST-7	SST-8	SST-9	SST-10	SST-11	SST-12	SST-13	SST-14	SST-15
PERCHLORATE	<0.02	<0.02	0.046	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.369

SUMMARY

An issue of primary concern in the Elkton area is the contamination of ground and surface water by perchlorate. While perchlorates do not have an established regulatory limit at this time they are acknowledged to have significant health effects at low limits. (<4 ppb) Perchlorate (ClO_4^-) is an anion that originates as a contaminant in ground water and surface water when the salts ammonium, potassium, magnesium, or sodium perchlorate dissolve in water. Ammonium perchlorate is used as the primary component in solid propellant for rockets, missiles, and fireworks. Because of its short shelf life, ammonium perchlorate must periodically be replaced within rocket inventories resulting in large volumes of the compound having been disposed of since the 1950's. It has been found that detonation of missiles, rockets and fireworks also result in residual ammonium perchlorate in affected areas. Additional sources of perchlorate salts include: air bag inflators, manufacture of matches, analytical chemistry ingredients, nuclear reactors, electronic tubes, lubricating oils, leather tanning and finishing activities, fabrics and dye fixers, electroplating, aluminum refining, rubber manufacture, paint and enamel production.

Due to historical activity, both perchlorates and explosive compounds were anticipated at the TMRA site. Perchlorate was detected in the soil at the TMRA site, but not detected in TMRA groundwater. Specifically, sample S/SS 3 obtained from the central area of the TMRA and S/SS15 the duplicate sample for S/SS5 exhibited perchlorate (46 and 369 µg/kg respectively).

Explosive compounds are associated with the munitions industry that occupied portions of the Elkton Farm during the middle decades of the twentieth century. Explosive/Nitro-aromatic compounds detected by EPA Method 314.1 include TNT and its daughter compounds. These compounds were found in all samples collected across the northern three-quarters of the TMRA site.

Sample analysis detailed elevations in levels of a number of other contaminants including, arsenic, and bis-2-ethylhexylphthlate however not at levels of concern. Groundwater samples documented no significant levels of contamination.

Surface water and sediment samples, including the site background, documented levels of the inorganic metal copper and two pesticides, heptachlor and gamma-chlordane, above NOAA SQRT guidelines. The levels of contamination were not above those established for protection of human health.

There are a number of issues concerning this site which need to be resolved including underground anomalies, asbestos contamination and the documented nitro-aromatic compound contamination. A more detailed investigation of the parcel with test pitting is called for to further document the nature and extent of the underground anomalies and the explosive residue on the property. A pile of corrugated asbestos building panels is staged on the TMRA property. The material is friable and a planned removal of this asbestos material is needed.

REFERENCES

- Soil Survey of Cecil County, Maryland. United States Department of Agriculture; December 1973
- The Geology of Cecil County, Maryland, Bulletin 37. Maryland Geological Survey; 1990.
- Generalized Geological Map of Maryland, Maryland Geological Survey. 1967
- Site Operations/Ownership History Triumph Explosives, Inc. TechLaw Inc. 1992
- Quick Reference Screening Tables, National Ocean & Atmospheric Administration, 1999
- Bayview Maryland, USGS 7.5 minute Quadrangle USCGS, r1992
- Newark West Delaware/Maryland, USGS 7.5 minute Quadrangle USCGS, r1992
- MERLIN, Department of Natural Resources Mapping Database, 2003
- ESRI ArcView GIS, Mapping Database, 2003

Appendix A – Photographs

Appendix B - Toxicological Evaluations.

APPENDIX C - Data Package and QA/QC Review.

REFERENCES:

[i] Soil Survey of Cecil County, Maryland. United States Department of Agriculture; December 1973
[ii] The Geology of Cecil County, Maryland, Bulletin 37. Department of Natural Resources, Maryland Geological Survey; 1990.
[iii] Generalized Geological Map of Maryland, Maryland Geological Survey. 1967
[iv] Site Operations/Ownership History Triumph Explosives, Inc. TechLaw Inc. 1992
[v] Quick Reference Screening Tables, National Ocean & Atmospheric Administration, 1999

Formerly Used Defense Site Inspection

Unit 4

Elkton Farm Site

(MD-433)

FINAL

September 15, 2004

Prepared by: Maryland Department of the Environment
Waste Management Administration
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1.0 INTRODUCTION

1.1 Authorization

This Formerly Used Defense Site (FUDS) Inspection was performed by the Maryland Department of the Environment, Waste Management Administration (MDE/WAS), Environmental Restoration and Redevelopment Program (ERRP), Site Assessment Division under the current Cooperative Agreement with the U.S. Environmental Protection Agency (EPA).

1.2 Scope of Work

MDE was contracted to perform a FUDS Inspection of the Elkton Farm site (MD-433). The purpose of the inspection is to assess the actual and potential release of hazardous waste from the site by way of groundwater, surface water, soil exposure and air pathways. The scope of the FUDS Inspection included reviewing the available file information, site reconnaissance and sampling under the U.S. EPA Contract Laboratory Program (CLP).

1.3 Executive Summary and Conclusions

The Elkton Farm site is located two miles northwest of Elkton, Maryland near the intersection of Routes 40 and 279 (Figure 1). UNIT 4 occupies approximately 55 acres of the 400-acre Elkton Farm and is located just south of Zeitler Road between Little Elk Creek and Laurel Run. The most recent use of the site has been as a working farm. During the decade before and during World War II, the parcel had been the site of activity related to the manufacture of fireworks and munitions. The UNIT 4 has been a working farm since 1948.

During the early 1940s, Triumph Explosives, Inc (TEI) owned Elkton Farm. The Herron family, the current owners, acquired the property in 1948.

The total quantity of hazardous waste disposed of in UNIT 4 is unknown. There is no estimate of fill thickness for UNIT 4.

A sampling plan to characterize the 48-acre site was prepared by MDE after site reconnaissance and a review of available historic information of the area. On June 25 & 26, 2003, as part of the FUDS Investigation, MDE collected four groundwater samples, three surface water samples, three sediment samples plus one field duplicate. On July 22 & 23, 2003, MDE collected eight surface soil samples, eight subsurface soil samples, and five additional groundwater samples. The samples were analyzed for the presence of metals and cyanide, volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), pesticides and polychlorinated biphenyls (PCBs).

A Toxicological Evaluation was prepared for the UNIT 4 site, assuming residential future use scenario for the site. EPA recognizes an acceptable Hazard Index of less than or equal to 1 (noncarcinogenic chemicals) and a lifetime cancer risk less than or equal to 10^{-6} to 10^{-4}. MDE recognizes threshold Hazard Index values equal to 1 and lifetime cancer risk threshold values less then or equal to 1×10^{-5}. Risk estimates exceeded EPA and MDE recommended levels for all resident populations for incidental ingestion of and dermal contact with groundwater, with the risk drivers of chromium and tetrachloroethene. Risk estimates exceeded EPA and MDE recommended levels for the child resident population for ingestion of groundwater, with the risk driver of manganese. Risk to construction workers exceeded MDE and EPA recommendations for ingestion of and dermal contact with groundwater, with the risk drivers being tetrachloroethene and chromium respectively.

The Elkton Farm property is listed for sale on the real estate market. It is currently leased to Spry Brothers Farming for seasonal crops; however, in all likelihood, the entire 400-acre farm will be developed for residential use in the future, rather than continued agricultural use. Groundwater is the major source of residential water in the area of the Elkton Farm.

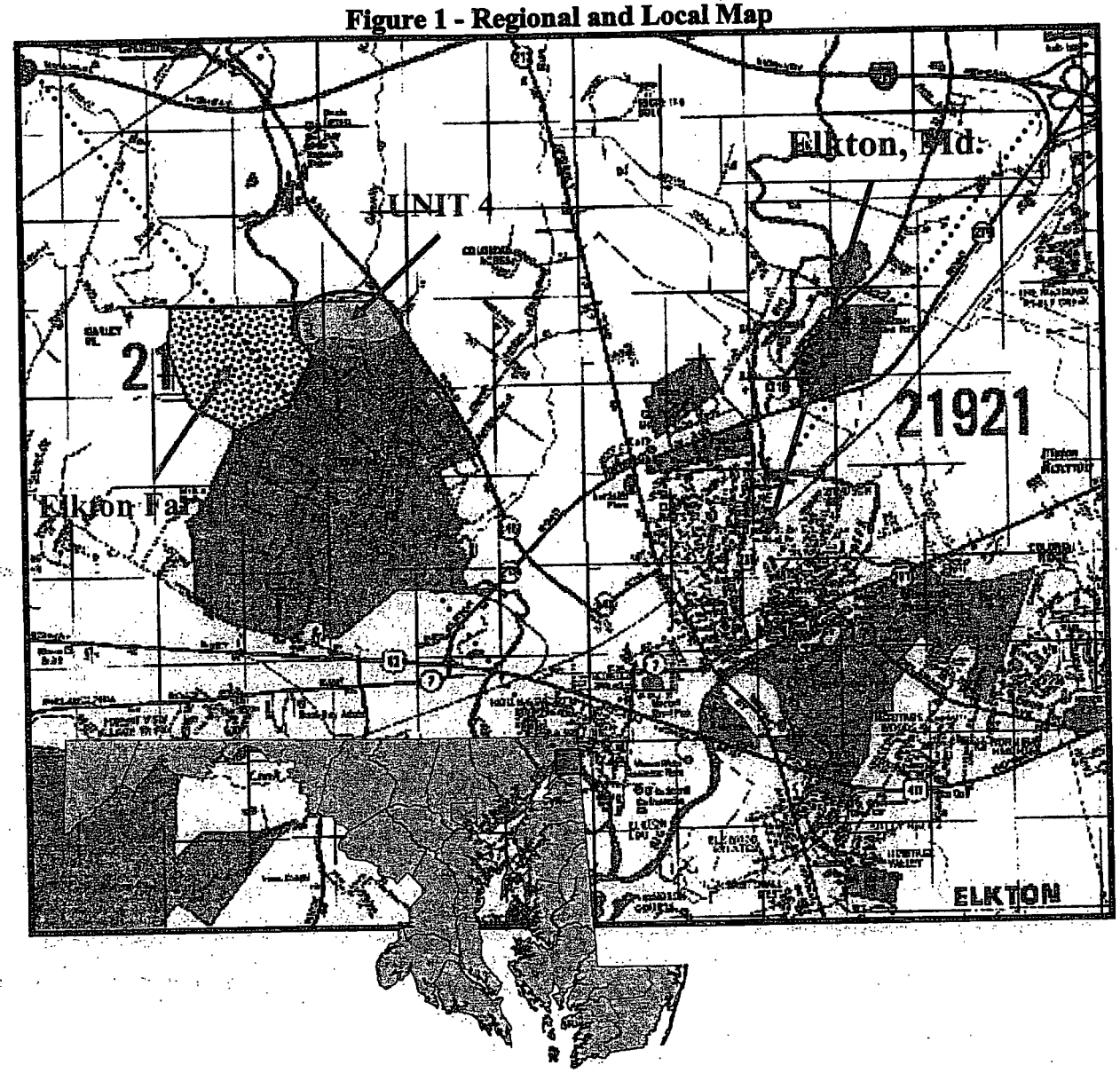
2.0 SITE DESCRIPTION

The Elkton Farm site is located at 183 Zeitler Road, Elkton, Maryland (Figure 1). The farm itself consists of approximately 400 acres and is situated in a rural setting just north of Triumph Industrial Park. MARVA Limited Partnership currently owns the farm. The property has historically been a working farm. For a brief period in the mid-1940s to early 1950s the property was impacted by military operations. MARVA Limited Partnership leases the property to a commercial farming operation that continues to rotate several seasonal crops through the Elkton Farm's fields. There are no access limitations to this property.

As a result of the military operations in the 1940s, four areas of concern were identified:

- Unit One was addressed by a CERCLA cleanup in the early 1990s.
- Unit Two is the site of the historic "Firehole" where waste explosives were disposed through open burning. This has been addressed by a separate investigation.
- Unit Three, is the site of a Morton Thiokol rocket test/cleaning center and is addressed by a separate document.
- Unit Four is a 55-acre parcel located north of the G. E. Railcar property and is the potential source of a chlorinated solvent plume.

Figure 1 - Regional and Local Map



This report addresses Unit Four of the Elkton Farm site. The UNIT 4 portion of the property is a 55-acre parcel located on the USGS Bayview/Newark West quadrangles at 39°37'30" north latitude and 75°52'30" west longitude and has a Maryland grid coordinate of 655,700 N and 1,120,750E. The rectangular 55-acre site is bounded on the west by Little Elk Creek, to the north by Zeitler Road, and to the south by a residential area, Triumph Industrial Park and Thiokol/ATK. (Figure 3). Land use surrounding the site is primarily agricultural/residential, with an area of medium to heavy industrial property to the south. Unit Four is situated in coastal plain alluvium, and is found at the intersection of Zeitler and Blue Ball Roads.

2.1 Site Ownership and Use

Throughout most of its history, Elkton Farm site has been used as a livestock farm with much of the surrounding fields under cultivation. During the early 1940s, TEI acquired ownership of the Elkton Farm. During the period between the end of World War II and the 1970s, hazardous material was stored and/or disposed of on the farm. Four waste disposal areas have been identified:

UNIT ONE

- Unit One is an area of the farm that was used by a property owner for the storage of hazardous waste, including drums of ash produced from the Thiokol area (Unit 3), ordnance from the TEI operation and drums of waste from Galaxy Chemical. In the early 1980s, the owner of the farm attempted to dispose of 53 drums of hazardous waste from Galaxy Chemical, a nearby solvent recycler, at Norris Farm Landfill in Baltimore County, Maryland. Norris Farm Landfill refused to accept the waste and Galaxy refused to take the waste back. Consequently the owner of Elkton Farm stored the drums in the two farm buildings until he reported them to MDE almost ten years later. A Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal action was completed at Unit One in 1992, which resulted in the removal of drums containing flammable organic compounds, base neutral compounds, halogenated organic compounds, drums of solids, and 10 tons of contaminated soil.

UNIT TWO

- Unit Two is the World War II era waste ordnance combustion pit known as the "Firehole," which was used by TEI during the 1940s. The Firehole was defined as the area for the disposal of waste explosives materials generated by the operations at TEI. TEI reportedly collected waste material from the manufacture of explosive ordnance and placed it in drums. This accumulated waste was kept wetted with alcohol or ether to prevent spontaneous combustion, and then carried to a shallow pit off Zeitler Road, spread thinly, and allowed to burn. Plant personnel monitored the burn until the waste explosive was consumed. Photographs in the TEI newsletter from the 1940s show the operation of the Firehole burn pit. Ordnance-related debris was observed on the ground surface during the sampling event.

UNIT THREE

- Unit 3 is a 1-acre plot of land leased by the Thiokol Corporation for the operation of a rocket motor cleaning and recovery area in the late 1950s and early 1960s. (Unit Three overlays a component of Unit Two.) The abandoned structures for this test area are located on the west side of the property. MDE currently has little information regarding the operation of this "rocket test area."

UNIT FOUR

- Unit Four, the subject of this report, is a 55-acre parcel on the farm and was reportedly impacted by disposal on adjacent lands or used during this same era to store or dispose of waste organic solvents.

TEI purchased the Elkton Farm property in the early 1940s. The current owners, the Herron Family/MARVA Ltd. Partnership, acquired the property in 1948. The farm property is currently leased to a commercial farming operation that rotates seasonal crops through the fields.

2.2 Permitting and Regulatory Actions

There are no permits on file with MDE for the disposal of waste material at the Elkton Farm site.

2.3 Remedial Actions

There have been no remedial actions conducted in the area of the Unit Four.

3.0 ENVIRONMENTAL SETTING

3.1 Water Supply

Drinking water for the Elkton area is obtained from an intake on Big Elk Creek and two municipal production wells. The total amount of municipal water withdrawn from these three sources is estimated to be 1.7 million gallons per day. The estimated number of domestic wells and non-transient non-community wells and populations they serve is represented in the following table.

Table 1 – Domestic Water Sources within a Four-Mile Radius of Site.

RING DISTANCE FROM THE SITE	ESTIMATE NUMBER OF DOMESTIC WELLS	ESTIMATED POPULATION SERVED*	COMMUNITY AND NONTRANSIENT NONCOUMMUNITY SYSTEMS	ESTIMATED POPULATION SERVED
0 – 1/4 mile	25	65		100
¼ - ½ mile	5	15	1	200
½ - 1 mile	70	183		500
1 – 2 miles	237	621	1	4300
2 – 3 miles	176	461		9100
3 – 4 miles	287	752		9300
Total	800	2096	2	23500

*According to 1998 U.S. Census data, the average population per household is 2.62.

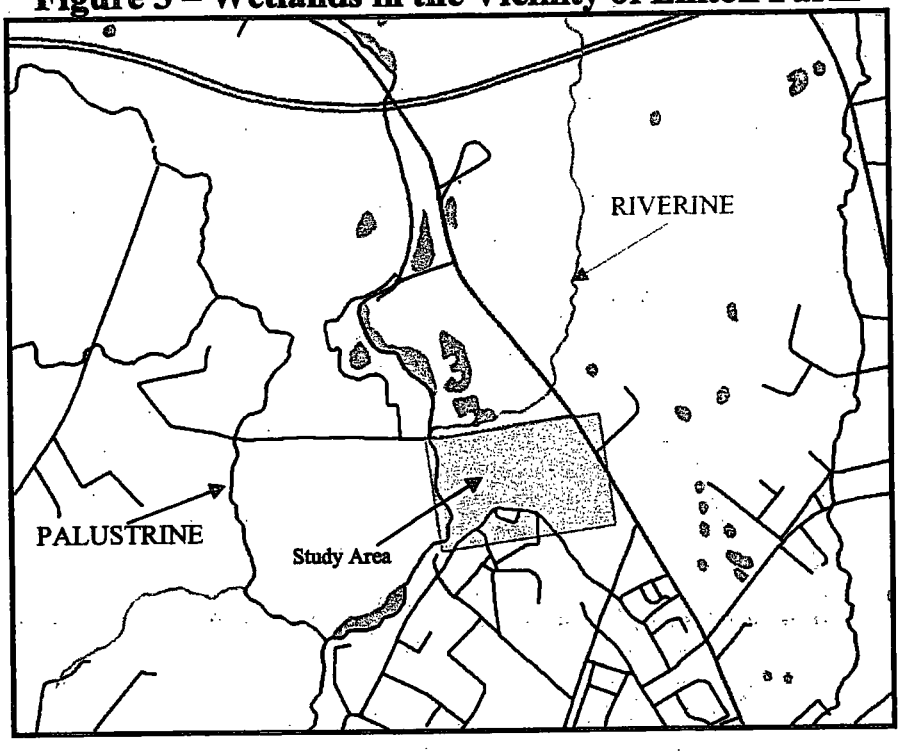
3.2 Surface Waters

The Site is situated along Little Elk Creek just above its confluence with Laurel Run. Natural drainage on the site is in a generalized north to south direction. Surface water infiltrates the soil to groundwater, or is discharged via overland flow to Little Elk Creek. Little Elk Creek discharges into Big Elk Creek which flows southward into the Elk River and eventually into the Chesapeake Bay.

Figure 2 – Floodplain Map of the Vicinity

The farthest upstream probable point of entry for the surface water route originates at a drainage ditch on the southwest corner of the site. The drainage ditch travels west for approximately 500 feet before emptying into Little Elk Creek. Little Elk Creek is classified as Palustrine Aquatic Bed wetlands. Little Elk Creek flows south southeast for approximately 6.0 miles before emptying into the Big Elk Creek. Big Elk Creek flows approximately 2.2 miles to the point where it empties into Elk River. Elk River flows approximately 15.0 miles to its confluence with the Chesapeake Bay. The 15-mile surface migration pathway ends in the tidal portion of the Elk River three miles from its confluence with the Chesapeake Bay. The tidal portion of the Elk River is classified as Estuarine intertidal wetlands and is a fishery.

Figure 3 – Wetlands in the Vicinity of Elkton Farm



3.3 Soils

Elkton Farm's soils are characterized as having been formed in the soft unconsolidated, water-lain Cretaceous and Pleistocene sediment of the Atlantic Coastal Plain. The soil series found on the Elkton Farm are a combination of Elsinboro, Mattapex, and Othello silt loams all having slopes of less than 5 percent. Elsenboro series soils are deep, well drained soils found on terraces above the flood plains of major streams. Elsenboro soils are formed in old alluvium and contain considerable amounts of fine mica flakes. Mattapex soils consist of deep moderately well drained loamy soils that formed in silty material laid down on older, coarser sediment. Othello series soils are poorly drained loamy soils on upland flats. These soils were formed in silty material underlain by coarser sediment. Most of the hardwood vegetation native to these three soil series are noted to have been cleared for use as cropland.[i]

3.4 Geology and Groundwater

Elkton Farm lies in the erosional remnants of the Coastal Plain physiographic province, near the Fall Line. The unconsolidated sediments of the Coastal Plain extend eastward from the Fall Line, dipping eastward and becoming progressively thicker with distance, eventually reaching over 8,000 feet in thickness at Ocean City.

The quaternary strata at the Elkton Farm UNIT 4 site (Figure 2) is classified as Uplands Deposits, which includes the Pamlico, Talbot, Wicomico and Sunderland Formations of earlier reports. The Uplands Deposits consists of a floodplain deposited formation comprising lenses of

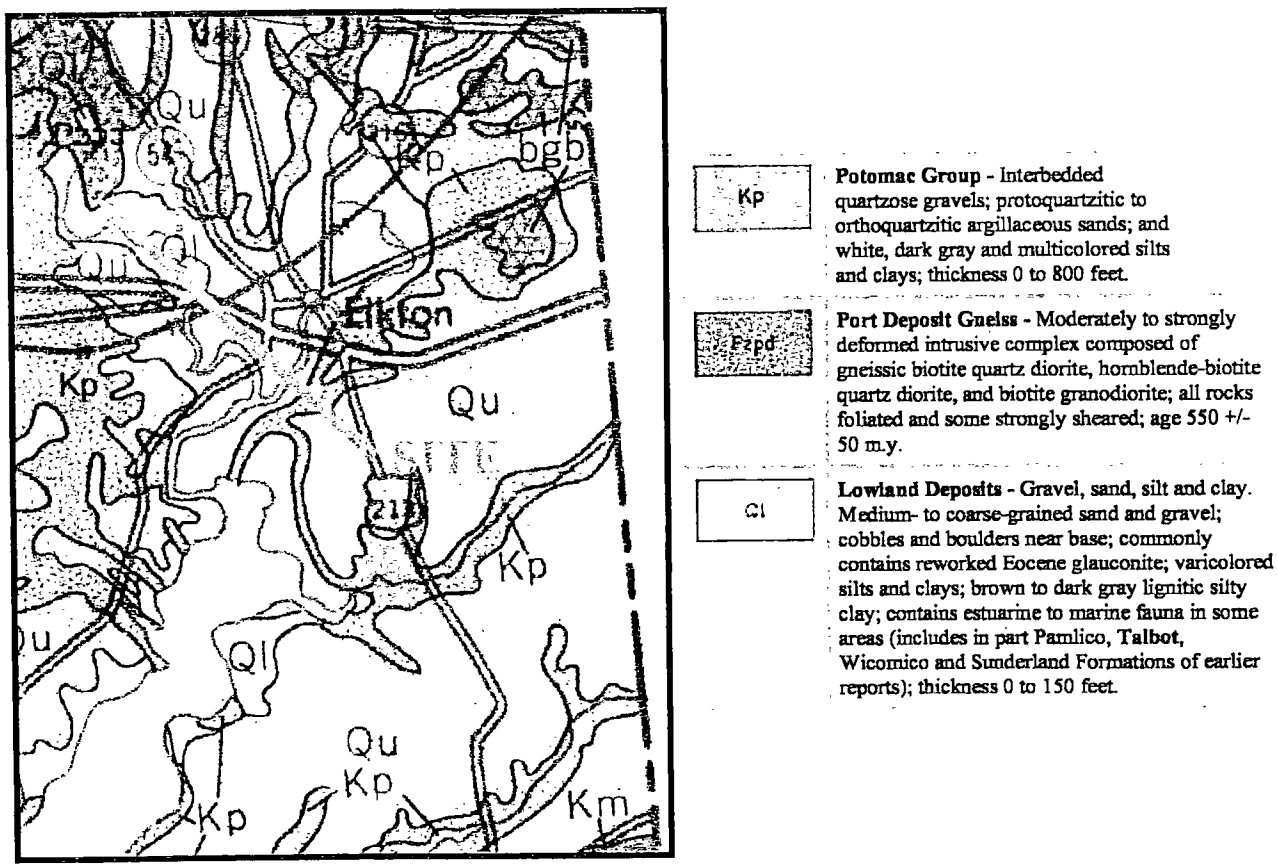
micaceous sand and gravel interbedded with thin layers of silt and fine sand. The coarse-grained sands and gravels at the base of the formation can range in size to boulders 8 foot in diameter.[ii]

Shallow groundwater was not encountered during the October 2002 sample program, in any Elkton Farm Geoprobe borings. This fact was due primarily to the severe drought in the years prior to the sampling. A review of well logs for several test wells within 0.5 mile of the site indicates that shallow groundwater is anticipated at depths of 20 feet or less.

In order to define the groundwater component at the UNIT 4, MDE contracted Earth Matters, Inc., to drill several monitoring wells. Four 2-inch monitoring wells were installed in March 2003 to monitor groundwater at the site. Wells were set at between 20 to 30 feet below ground surface, with 15 feet of threaded PVC screen, a gravel-pack to one foot over the screened interval and a clay grout above the gravel-pack to less than one foot below ground surface.

The well located at the Herron Farm farmhouse (DW-D1) was used as a domestic groundwater sample for this FUDS Investigation. The depth and casing levels for the well located at the farmhouse is not recorded. The farmhouse well is estimated to approximate the lower range of the 99 foot average depth of the top of screen for domestic production wells in the Elkton area.

FIGURE 4 – Generalized Geological Map of the Elkton Area[iii]



3.5 Groundwater

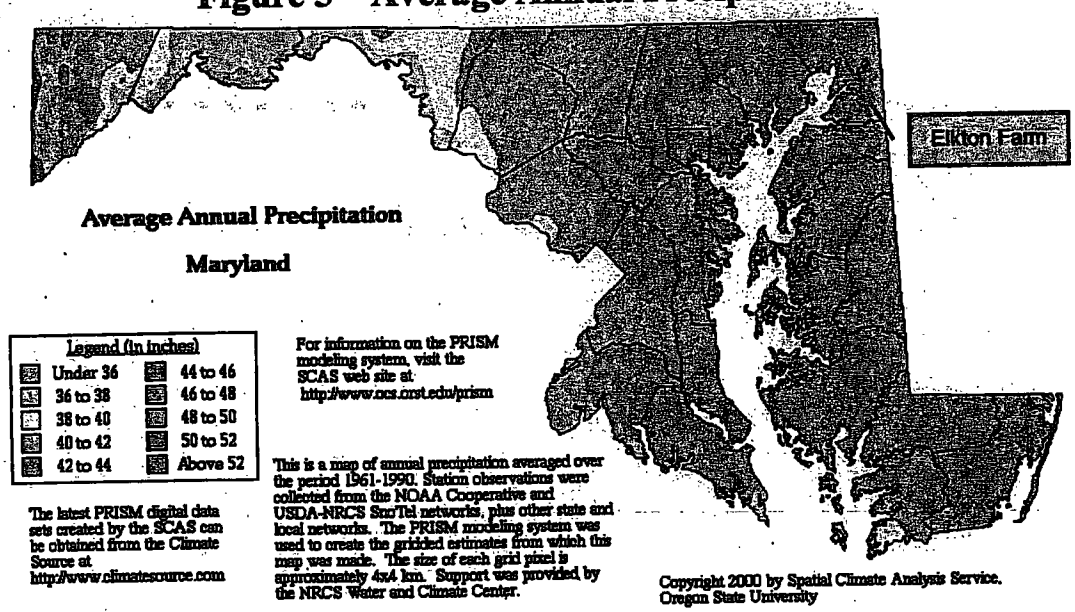
A review of well logs for several test wells within 0.5 mile of the site indicates that shallow groundwater is anticipated at depths of 20 feet or less. However, during the October 2002 sample program, shallow groundwater was not encountered in any Elkton Farm Geoprobe borings. This fact is attributed to the severe drought in the years prior to the sampling. Therefore in order to define the groundwater component at Unit Four, MDE contracted Earth Matters, Inc., to drill several monitoring wells. Three 2-inch monitoring wells were installed in March 2003 to collect groundwater at the site. Wells were set at between 20 to 30 feet below ground surface, with 15 feet of threaded PVC screen, a gravel-pack to one foot over the screened interval and a clay grout above the gravel-pack to less than one foot below ground surface.

The domestic well located at the Richard Herron Farm farmhouse (Blue Ball Road) was used as a baseline groundwater sample for this investigation. The depth and casing levels for the well located at the farmhouse is not recorded. The farmhouse well is estimated to approximate the lower range of the 99 foot average depth of the top of screen for domestic production wells in the Elkton area.

3.6 Meteorology

The climate is temperate and humid with an average of 180 freeze-free days. The average temperatures range from 74.1 degrees Fahrenheit in the summer to 34.0 degrees Fahrenheit in the wintertime. The mean annual precipitation is about 45.3 inches with an average snowfall on the order of 18 inches per year.

Figure 5 – Average Annual Precipitation



3.7 Nearby Land Use and Population Distribution

Land use surrounding the site is primarily agricultural/residential, with an area of medium to light industry situated to the south. There are four residences located along Zeitler Road and five adjacent to the site on Blue Ball Road. All are currently occupied. The Triumph Industrial Park is located a short distance south of the intersection of Zeitler Road and Blue Ball Road (MD-545). Triumph Industrial Park is located on the site of, but is unrelated to, the former TEI operations. Several industrial and chemical operations, including GE Railcar, Maryland Cork, and Thiokol Corporation (ATK), now occupy space in the industrial park.

Figure 6 – Location of Elkton Farm Units in Relation to Nearby Industry

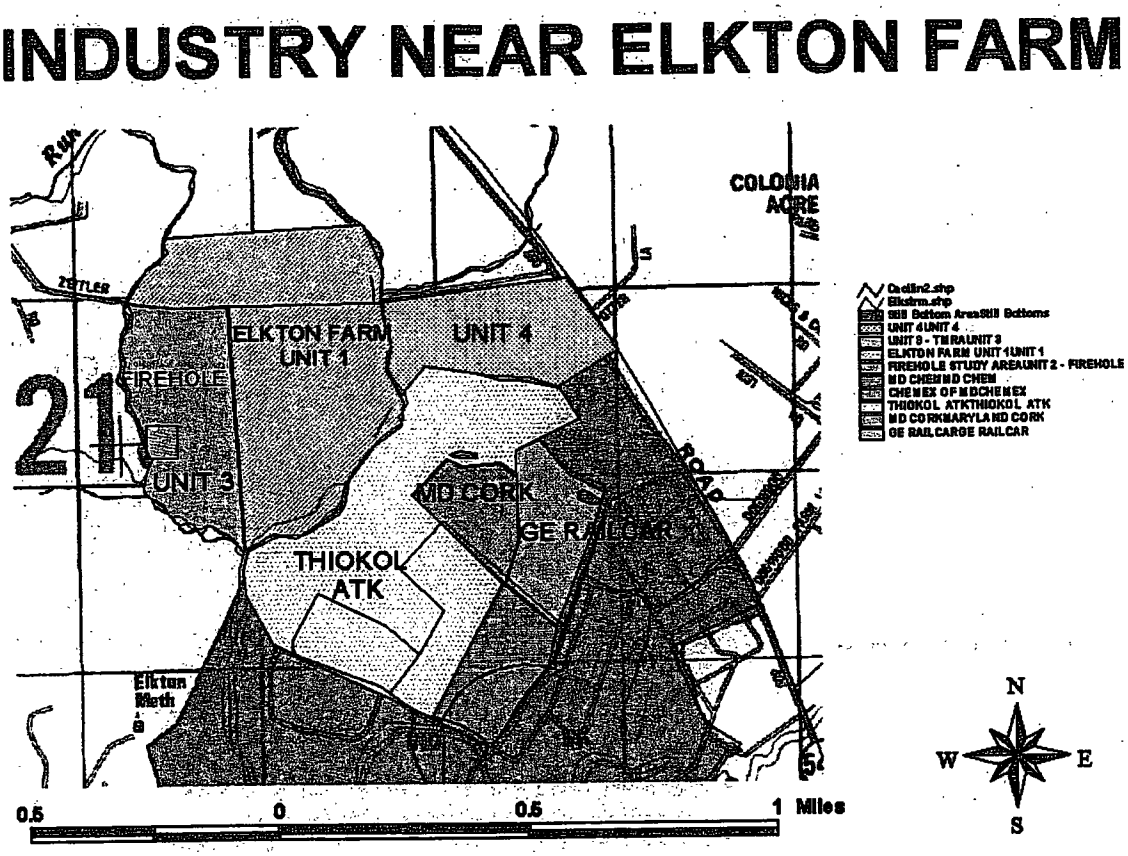
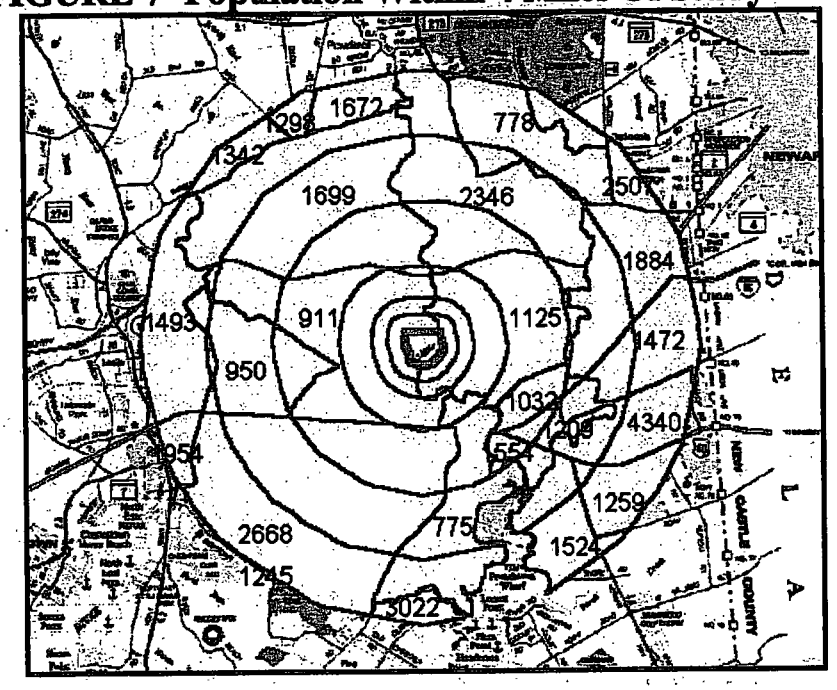


Table 2 – Population Distribution

Radius (miles)	Population
0 – 0.25	134
0.25 – 0.5	217
0.5 – 1.0	672
1.0-2.0	5001
2.0 – 3.0	9581
3.0 – 4.0	11,451
Total	**27,056**

The resident population distribution around the site was determined using a geographic interpretation system (GIS) interpretation of Maryland census figures for the year 2000.

FIGURE 7 -Population Within 4 Miles Of Study Area



4.0 WASTE DESCRIPTION

After being identified as a potentially responsible party for the operation, the U.S. Army Corps of Engineers contracted an investigation of the site operations and ownership history of the Elkton, Maryland Triumph Explosives, Inc. In February 1992, the final report for this project was prepared by TechLaw, Inc.[iv] This report documented the site as an area for the disposal of waste explosives material. According to the record, waste explosive material from the manufacture of military ordnance was collected in drums and kept wetted with alcohol or ether. This waste was accumulated and then carried to the fields off Zeitler Road, spread thinly and allowed to burn. Plant personnel monitored the burn until the waste explosive was ostensibly consumed. Photographs in the TEI newsletter from the period of concern show the operation of this burn pit. Wastes associated with the TEI operation include alcohol, ether, carbon tetrachloride, trichlorethylene, perchlorates, nitro-aromatic compounds, metals and metallic oxides and salts.

The total quantity of hazardous waste disposed of in Elkton Farm Unit Four is unknown. A plume of contamination has been documented in groundwater immediately south of the Unit 4 parcel. Tetrachloroethene, trichloroethene, benzene, and chlorobenzene have been detected in wells installed by Rosengarten, Smith and Associates (RSA) for G. E. Capital Rail Services (GE). The GE site lays due south of the Unit 4 parcel. The plume seems to emanate from a point off of the GE property, however a clear source of the chlorinated contamination has not been identified. Volatile organic waste still bottoms disposed of by Galaxy Chemical Company have been detected in soils and groundwater on adjacent properties. The Unit Four investigation is designed to define a northern extent of this disposal and contamination.

5.0 PREVIOUS STUDIES

In April 2001, MDE performed a Site Survey of the Elkton Farm site to determine whether further action was necessary. The finding of this survey was that further action was required in order to document potential hazards associated with a release of site contaminants to the ground and surface waters of the State of Maryland.

6.0 MDE CLP SAMPLING

MDE proposed an investigation of the Elkton Farm Unit Four site in its current cooperative agreement with EPA. Accordingly, a sampling plan was submitted to the EPA Region III office in May 2002 for the proposed collection of groundwater, surface water, sediment and soil at the site. The purpose of the sampling was to evaluate areas within and adjacent to Unit Four for any potential contamination. EPA gave tentative approval to the sampling proposal in their letter dated June 21, 2002.

MDE personnel conducted the sampling according to procedures outlined in EPA's CLP Routine Analytic Services as Case Number R31952. Sampling began on June 25, 2003 with the

collection of groundwater, sediment and surface water and concluded on July 23, 2003 with the collection of surface and subsurface soils and additional groundwater. All samples were analyzed for Target Analyte List inorganics and Target Compound List organics (Appendix D). Groundwater samples were further analyzed for dissolved metals. MDE collected the samples in five matrices: one organic aqueous, one organic solid, one inorganic aqueous, one dissolved inorganic aqueous and one inorganic solid. Sampling procedures for groundwater, surface water, sediment and soil are fully outlined in MDE's Standard Operating Procedures. Each matrix included the collection of a field duplicate sample and a matrix spike sample. A deionized water field blank was prepared by MDE and provided for each aqueous matrix. MDE also prepared trip blanks consisting of deionized water in 40 ml vials preserved with hydrochloric acid. These trip blanks were shipped and analyzed along with aqueous samples for volatile organic compounds. The sampling locations are shown on Figure 8 and on the sampling summary in Table 3.

Figure 8 – Topographic Map with Sampling Locations

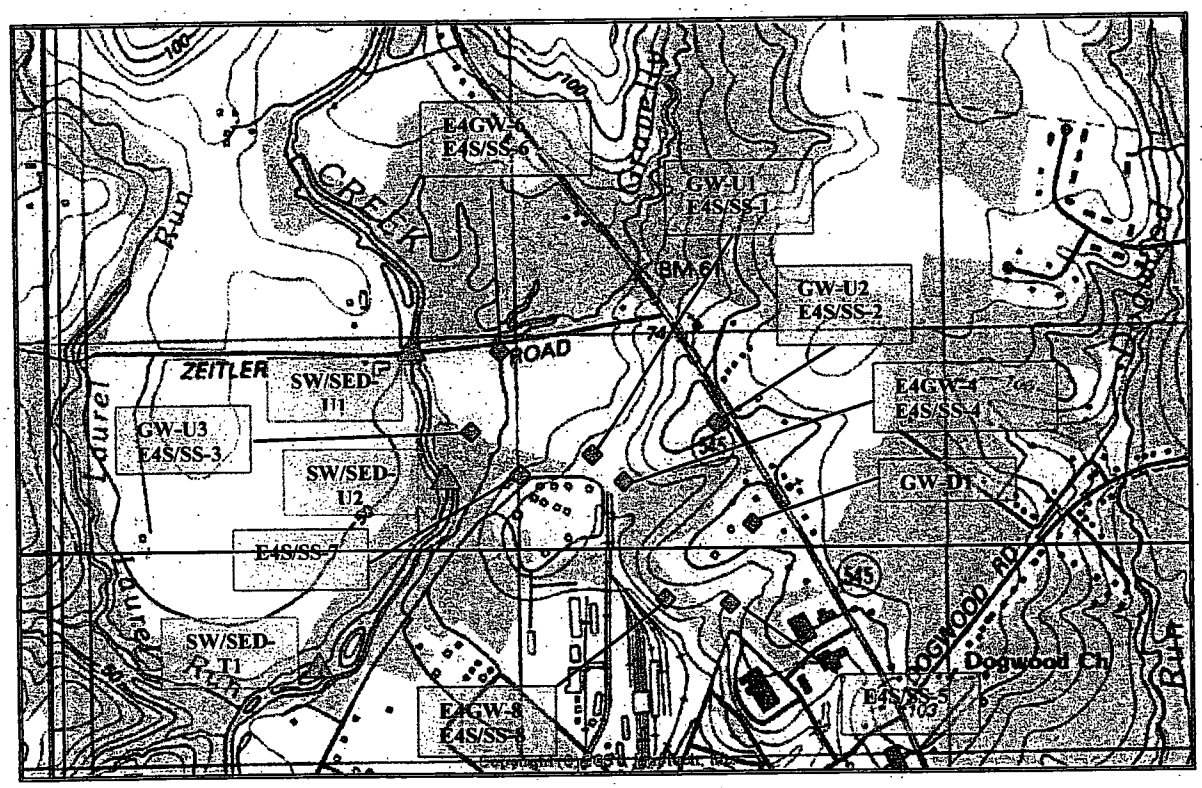


Table 3 - SAMPLE SUMMARY TABLE

Sample Identification	Sample Type	Sample Location	Rationale
GWD-1	Aqueous	Herron Domestic well	Background.
GWU-1	Aqueous	Southern edge of field at tree line.	Characterize site groundwater.
GWU-2	Aqueous	Southeastern edge of field along Blue Ball Road.	Characterize site groundwater.
GWU-3	Aqueous	Southwestern edge of field along Little Elk Creek.	Up gradient/Background.
E4GW-4	Aqueous	Southern edge of field at abandoned rail line.	Characterize site groundwater.
E4GW-5	Aqueous		(Collected as duplicate of E4GW-4)
E4GW-6	Aqueous	Northern edge of property at Zeitler Road.	Up gradient/Background.
E4GW-7			Not collected due to refusal
E4GW-8	Aqueous	GE Railcar Property	Characterize groundwater plume.
SW-U1	Aqueous	Little Elk Creek at Gravel Run.	Background.
SW-U2	Aqueous	Little Elk Creek at unnamed trib draining field.	Determine if waste source has traveled off site.
SW-U3	Aqueous	Little Elk Creek at old road crossing	Determine if waste source has traveled off site. (Not Collected)
SW-U4	Aqueous		Duplicate of SW-U2
SW-T1	Aqueous	Little Elk Creek at Laurel Run confluence	Determine if waste source has traveled off site.
SED-1	Sediment	Little Elk Creek at Gravel Run.	Background.
SED-2	Sediment	Little Elk Creek at unnamed trib draining field.	Determine if waste source has traveled off site.
SED-3	Sediment	Little Elk Creek at old road crossing	Determine if waste source has traveled off site. (Not Collected)
SED-4	Sediment		Duplicate of SED-U2
SED-T1	Sediment	Little Elk Creek at Laurel Run confluence	Determine if waste source has traveled off site.

Sample Identification	Sample Type	Sample Location	Rationale
E4S/SS-1	Soil	Southern edge of field at tree line.	Area background.
E4S/SS-2	Soil	Southeastern edge of field along Blue Ball Road.	Characterize waste source.
E4S/SS-3	Soil	Southwestern edge of field along Little Elk Creek.	Characterize waste source.
E4S/SS-4	Soil	Southern edge of field at abandoned rail line	Characterize waste source.
E4S/SS-5	Soil	Western edge of R. Herron Farm.	Characterize waste source.
E4S/SS-6	Soil	Northern edge of property at Zeitler Road.	Characterize waste source.
E4S/SS-7	Soil	Southern edge of field north of Thiokol facility.	Characterize Waste Source
E4S/SS-8	Soil	GE Railcar Property	Characterize waste source.
E4 SS-9	Soil		Duplicate of SS-5

7.0 SAMPLING RESULTS

7.1 Groundwater Sampling Results

MDE collected a total of eight groundwater grab samples from monitoring wells and Geoprobe borings located across the site. Groundwater samples collected from monitoring wells were labeled GW-U1 through GW-U3 and E4GW-8, and samples collected from Geoprobe borings were labeled E4GW-4 through E4GW-6. The samples designated GW-U1 and E4GW-6 were collected as upgradient background samples for the monitoring wells and Geoprobe borings respectively. In addition to the standard field parameters collected for this assessment, a filtered grab sample was obtained from each groundwater location for dissolved metals content analysis. The Geoprobe hit a refusal layer above the level of groundwater at sample locations S/SS5 and S/SS-7. The planned temporary wells E4GW-5 and E4GW-7 were not installed and no groundwater samples were collected from these sample points. The sample labeled E4GW-5 was collected instead as a duplicate of sample E4GW-4. The contaminants detected in the Elkton Farm Unit 4 ground water samples were screened against EPA Region III Risk Based Concentration (RBC) Table[v], and MDE's Soil and Groundwater Clean up Standards for Controlled Hazardous Substances.

The analysis of samples collected from monitoring wells GWU-2, GWU-3 and E4GW-4 and E4GW-6 showed several elevations above MDE's standards for type I and II aquifers and/or EPA Region III Risk Based Concentrations (RBCs). Traces of dissolved metals, VOCs, SVOCs and pesticides were detected in samples collected from most wells at the Elkton Farm Unit 4 site.

Aluminum, manganese, iron and chloromethane were detected at levels above MDE Cleanup Standards in the temporary wells set in the Geoprobe borings. Aluminum, chromium, manganese and bis(2-ethylhexyl)phthalate were detected in samples from the fixed monitoring wells at levels above both MDE Cleanup Standards and EPA Region III RBCs. E4GW-8, a fixed well set on the GE property, was found to contain levels of trichlorethene and tetrachloroethene above the RBC and/or MDE Cleanup Standards. This is in keeping with the earlier findings of the G. E. Railcar Consultant, Rosengarten, Smith & Associates, Inc. E4GW-5 (duplicate of E4GW-4) contained chloromethane just above the MDE clean up standard. The sample analysis of E4GW-4 did not contain chloromethane, leading to the assumption that this is a laboratory artifact rather than a site contaminant. The pesticide aldrin was found in all well samples at levels just above the EPA RBC. Heptachlor epoxide was detected in GW-U1, the background well, just above the EPA RBC; however heptachlor epoxide was not detected in the onsite wells. Trace levels of endrin and endrin aldehyde were also detected in the background well.

The toxicological evaluation of the site documented unacceptable risk relative to the incidental ingestion and dermal contact with groundwater. The drivers for risk being manganese, chromium, and tetrachlorethene.

Table 4 –Total Metals Data for Ground Water Samples:

Total Metals ug/l	GWU-1	GWU-2	GWU-3	E4GW-4	E4GW-5	E4GW-6	E4GW-8	MDE[1] Cleanup Std.	EPA RBC[2]
	Backgrnd					Backgrnd			
ALUMINUM	4670	8910	21600	10500	11600	92600	685	50	3.7E+04
ARSENIC	*ND*	*ND*	*ND*	*ND*	*ND*	60.1	*ND*	50	4.5E-02
CADMIUM	0.47 J	0.99 J	2.1 J	*ND*	*ND*	*ND*	*ND*	5	1.8E+01
CHROMIUM	76.6	309	256	84.5	90.5	704	[3.9]L	100	1.1E+02
COPPER	17.1 J	115	11.2 J	35.4	42.2	522	26 L	1,300	1.5E+03
LEAD	*ND*	*ND*	*ND*	18	23.4	265	*ND*	15	–
MANGANESE	197	541	878	200	238	1310	296	50	7.3E+02
MERCURY	*ND*	0.06 J	0.09 J	0.31K	[0.18]K	*ND*	*ND*	2	–
SELENIUM	*ND*	20.4 J	*ND*	*ND*	*ND*	[4]K	*ND*	50	1.8E+02
VANADIUM	21.2 J	38.5 J	67.8	58.8	69.1	744	[8.4]L	50	2.6E+02
BARIUM	*ND*	*ND*	*ND*	[175]	[199]	[1640]	[69.4]	2000	2.6E+03
BERYLLIUM	*ND*	*ND*	*ND*	[0.76]	[0.94]	[19.8]	*ND*	4	7.3E+01
CALCIUM	*ND*	*ND*	*ND*	8590	8960	69300	7570	–	–
COBALT	*ND*	*ND*	*ND*	[9.1]	[10.7]	231	78.7L	73	7.3E+02
IRON	*ND*	*ND*	*ND*	11900	12500	78400	1400	300	1.1E+04
MAGNESIUM	*ND*	*ND*	*ND*	9820	9980	31200	[4980]	–	–
NICKEL	*ND*	*ND*	*ND*	[33.9]	[35.7]	412	[16.2]L	73	7.3E+02
POTASSIUM	*ND*	*ND*	*ND*	[1380]	[1440]	9070	[1120]	–	–
SODIUM	*ND*	*ND*	*ND*	[3630]	[3690]	9290	9700	–	–
ZINC	*ND*	*ND*	*ND*	136	182	516	*ND*	1,100	1.1E+04
	Monitoring Well	Monitoring Well	Monitoring Well	Geoprobe Boring	Geoprobe Boring	Geoprobe Boring	Monitoring Well		

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
L = biased low.
R = Unusable Result.
ND = Not Detected.
Yellow Highlighted greater than 3X background.
Blue Highlighted = exceeds MDE Standards for Type I & II Aquifers.

1 – MDE Soil & Groundwater Cleanup Standards.
2 – USEPA Region 3 Risk Based Concentrations for Groundwater.

Table 5 –Dissolved Metals Data for Ground Water Samples:

Total Metals ug/l	GWU-1 Bgd	GWU-2	GWU-3	E4GW-4	E4GW-5	E4GW-6 Bgd	E4GW-8	MDE[1] Cleanup Std.	EPA RBC[2]
ALUMINUM	*ND*	148 B	99 B	[77.6]	[78.9]	[140]	*ND*	50	3.7E+04
CHROMIUM	2.2 B	3.3 B	1.6 B	*ND*	*ND*	[2.3]K	*ND*	100 (Cr+6)	1.1E+02
COPPER	3.2 B	12.2 J	*ND*	[5.4]K	[6.1]K	[5.1]B	[14.1]B	1,300	1.5E+03
MANGANESE	128	286	307	98.1	93.9	586	288	50	7.3E+02
MERCURY	*ND*	*ND*	*ND*	R	[0.16]L	R	R	2	–
BARIUM	*ND*	*ND*	*ND*	[77.6]	[82.2]	[169]	[60.9]	2000	2.6E+03
CALCIUM	*ND*	*ND*	*ND*	5430	5570	49000	5100	–	–
COBALT	*ND*	*ND*	*ND*	[5.3]	[5.3]	[7.1]	69.3	73	7.3E+02
IRON	*ND*	*ND*	*ND*	666	625	7810	[37.7]	300	1.1E+04
MAGNESIUM	*ND*	*ND*	*ND*	7860	8110	18400	[4610]	–	–
NICKEL	*ND*	*ND*	*ND*	[23.6] K	[25.0]K	[10.0]K	[18.6]K	73	7.3E+02
POTASSIUM	*ND*	*ND*	*ND*	[1060]	[1170]	[2900]	[1270]	–	–
SODIUM	*ND*	*ND*	*ND*	[3300]	[3620]	9120	10400	–	–
ZINC	*ND*	*ND*	*ND*	94.9	87.4	53.5 B	32.6 B	1,100	1.1E+04
	Monitoring Well	Monitoring Well	Monitoring Well	Geoprobe Boring	Geoprobe Boring	Geoprobe Boring	Monitoring Well		

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
L = biased low
R = Unusable Result.
ND = Not Detected
Yellow Highlighted greater than 3X background
Blue Highlighted = exceeds MDE Standards for Type I & II Aquifers
1 – MDE Soil & Groundwater Cleanup Standards
2 – USEPA Region 3 Risk Based Concentrations for Groundwater

Table 6 – VOC data for Groundwater Samples:

Analyte µg/l	GWU-1 Bgd	GWU-2	GWU-3	E4GW-4	E4GW-5	E4GW-6 Bgd	E4GW-8	MDE[1] Cleanup Std.	EPA RBC[2]
TRICHLOROETHENE	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	2 J	5	2.6E-02
CHLOROMETHANE	*ND*	*ND*	*ND*	*ND*	3 J	*ND*	*ND*	2.1	1.9E+02
ETHYLBENZENE	*ND*	*ND*	*ND*	3 J	3 J	*ND*	*ND*	7.0E+2	1.3E+03
TETRACHLOROETHENE	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	71	5.0	0.53
XYLENES	*ND*	*ND*	*ND*	10	11	*ND*	*ND*	1.0E+4	1.2E+02
	Monitoring Well	Monitoring Well	Monitoring Well	Geoprobe Boring	Geoprobe Boring	Geoprobe Boring	Monitoring Well		

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
L = biased low
R = Unusable Result.
ND = Not Detected
Yellow Highlighted greater than 3X background
Blue Highlighted = exceeds MDE Standards for Type I & II Aquifers
Green Highlighted exceeds EPA RBC
1 – MDE Soil & Groundwater Cleanup Standards
2 – USEPA Region 3 Risk Based Concentrations for Groundwater

Table 7 - SVOC data for Groundwater Samples:

Analyte ug/kg	GWU-1 Bgd	GWU-2	GWU-3	E4GW-4	E4GW-5	E4GW-6 Bgd	E4GW-8	MDE[1] Cleanup Std.	EPA RBC[2]
BIS(2-ETHYLHEXYL)PHTHALATE	50	4 B	4 B	*ND*	*ND*	*ND*	*ND*	20	4.8E+00
CAPROLACTAM	0.7 J	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	-	1.8E+04
2-METHYLNAPHTHALENE	*ND*	*ND*	*ND*	3 J	*ND*	*ND*	*ND*	20	1.2E+02
	Monitoring Well	Monitoring Well	Monitoring Well	Geoprobe Boring	Geoprobe Boring	Geoprobe Boring	Monitoring Well		

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
L = biased low
R = Unusable Result.
ND = Not Detected
Yellow Highlighted greater than 3X background
Blue Highlighted = exceeds MDE Standards for Type I & II Aquifers
1 – MDE Soil & Groundwater Cleanup Standards
2 – USEPA Region 3 Risk Based Concentrations for Groundwater

Table 8 - Pesticide data for Groundwater Samples:

Analyte µg/l	GWU-1 Bgd	GWU-2	GWU-3	GW-D1	MDE[1] Cleanup Std.	EPA RBC[2]
ALDRIN	0.017 J	0.0082 J	0.0094 J	0.011 J	8.0E-02	3.9E-03
ENDRIN	0.028 J	*ND*	*ND*	*ND*	2.0	1.1E+01
ENDRIN ALDEHYDE	0.01 J	*ND*	*ND*	*ND*	2.0	-
HEPTACHLOR EPOXIDE	0.017 J	*ND*	*ND*	*ND*	2.0E-01	7.4E-03

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
L = biased low
R = Unusable Result.
ND = Not Detected
Yellow Highlighted greater than 3X background
Blue Highlighted = exceeds MDE Standards for Type I & II Aquifers
Green Highlighted exceeds EPA RBC
1 – MDE Soil & Groundwater Cleanup Standards
2 – USEPA Region 3 Risk Based Concentrations for Groundwater

7.2 Surface Water Sampling

MDE collected three surface water samples (SW-U1, SW-U2, and SW-T3) plus one duplicate sample (SW-U4) from Little Elk Creek. The sediment sample locations were coincident with the surface water sampling locations. The chemicals detected in the surface water samples were screened against Toxic Substance Criteria for Ambient Surface Water (Table 1B) in the Code of Maryland Regulations, Volume XXIV, Subtitle 26.08.02.03-2 and National Ocean and Atmospheric Administration (NOAA) screening guidelines for freshwater respectively. No metals were detected in the surface water samples exceeding MDE Cleanup Standards or EPA RBC values. No VOCs or pesticides/PCBs were detected. One SVOC, caprolactam, was detected at 0.7 µg/l; there are no standards for this organic compound.

Table 9 –Total Metals Data For Surface Water Samples:

Total Metals ug/l	SWU1 Background	SWU2	SWU4 Dup SWU2	SWT1	NOAA[1] SQRT CCC	MDE[2] TSC
BARIUM	35.3 J	33.7 J	33.7 J	30.3 J	—	—
CALCIUM	12800	12400	12100	11800	—	—
COPPER	4.9 B	4.7 B	4.5 B	4.7 J	9	9
IRON	365 B	318	475	336 B	1000	—
MAGNESIUM	8570	8410	8120	8070	—	—
MANGANESE	31.5	32.6	34.4	34.3	—	—
NICKEL	5.4 J	5.6 J	4.5 J	5.0 J	52	52
POTASSIUM	3000 J	2650 J	2610	2310 J	—	—
SODIUM	11400	11000	10800	10300	—	—

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R = Unusable Result.
Yellow Highlighted exceeds NOAA-SQRT levels for chronic freshwater acceptable inorganics levels (CCC)
Red Highlighted = greater than 3X background
ND = Not Detected
1 – NOAA Screening Quick Reference Tables – Surface Water Freshwater Chronic Levels
2 – Maryland Toxic Substances Criteria for Ambient Surface Waters - COMAR 26.08.02.03 Table 1 Freshwater Chronic

Table 10 – VOC data for Surface Water Samples:

Analyte ug/l	SWU1 Background	SWU2	SWU4 Dup SWU2	SWT3	NOAA[1] SQRT CCC	MDE[2] TSC
	No VOC Detected					

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R = Unusable Result.
Yellow Highlighted exceeds NOAA-SQRT levels for chronic freshwater acceptable inorganics levels (CCC)
Red Highlighted = greater than 3X background
ND = Not Detected
1 – NOAA Screening Quick Reference Tables – Surface Water Freshwater Chronic Levels
2 – Maryland Toxic Substances Criteria for Ambient Surface Waters - COMAR 26.08.02.03 Table 1 Freshwater Chronic

Table 11 – SVOC data for Surface Water Samples:

Analyte ug/l	SWU1 Background	SWU2	SWU4 Dup SWU2	SWT1	NOAA[1] SQRT CCC	MDE[2] TSC
CAPROLACTAM	*ND*	*ND*	*ND*	**0.7 J**	–	–

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted exceeds NOAA-SQRT levels for chronic freshwater acceptable inorganics levels (CCC)
Red Highlighted = greater than 3X background
ND = Not Detected
1 – NOAA Screening Quick Reference Tables – Surface Water Freshwater Chronic Levels
2 – Maryland Toxic Substances Criteria for Ambient Surface Waters - COMAR 26.08.02.03 Table 1 Freshwater Chronic

Table 12 – Pesticide and PCB data for Surface Water Samples:

Analyte µg/L	SWU1 Background	SWU2	SWU4 Dup SWU2	SWT1	NOAA[1] SQRT CCC	MDE[2] TSC
	No Pesticides or PCBs Detected					

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
Yellow Highlighted exceeds NOAA-SQRT levels for chronic freshwater acceptable inorganics levels (CCC)
Red Highlighted = greater than 3X background
ND = Not Detected
1 – NOAA Screening Quick Reference Tables – Surface Water Freshwater Chronic Levels
2 – Maryland Toxic Substances Criteria for Ambient Surface Waters - COMAR 26.08.02.03 Table 1 Freshwater Chronic

7.3 Sediment Sampling

MDE collected three sediment samples (SEDU1, SEDU2, and SEDT-3) plus one duplicate sample (SEDU4). Sediment samples were collected from the Little Elk Creek, which flows along the western edge of the Unit 4 parcel. SEDU-1 is an upstream background sample collected at a point uninfluenced by runoff from the Elkton Farm site. SEDU-2 is collected from the Little Elk Creek immediately downstream of the Unit 4. SEDT-3 is collected at a point upstream of the confluence of Laurel Run with Little Elk Creek. SEDU-4 was a duplicate of SEDU-2.

Samples of Elkton Farm sediments revealed contaminants generally at levels that were below regulatory limits for the protection of human health and the environment. All detections were below NOAA Effects Range Median (ERM) and Threshold Effects Levels (TEL) for marine and freshwater sediment respectivly.[vi] The sediment samples revealed minor levels of metals, VOCs, SVOCs, pesticides and PCBs contamination. The highest levels of contamination were found in sample SED-T1, which was collected downstream of the site just above the confluence of Laurel Run with Little Elk Creek. These levels were for the most part less than 3X background and below any risk based concentration levels. SED-T1 however revealed levels of copper, lead, manganese, and nickel marginally greater than three times the background level. Mercury while less than three times background was detected above the TEL in this sample. The highest levels of VOCs were detected in the upstream background sample and pesticide detections were noted to be at levels approaching those found in blank samples.

The toxicological evaluation of the contaminants detected in the surface water and sediment samples did not reveal an unacceptable risk to human health. The results of the toxicological evaluation are found in Appendix B of this report.

Table 13 – Total Metals Data For Sediment Samples:

Analyte Mg/kg	SEDU-1 Bkgrnd	SEDU-2 (Dup SED4)	SEDU-4 (Dup SED2)	SEDT-1	NOAA[1] SQRT (ERM)	NOAA[2] SQRT (TEL)
ALUMINUM	2250	940	1120	8420	–	–
ARSENIC	2.4 B	0.94 B	1.8 B	4.2	70	5.9
BARIUM	16.7 J	6.3 J	10.4 J	67.8	–	–
BERYLLIUM	0.18 B	0.054 J	0.15 J	0.79 J	–	–
CADMIUM	0.24 J	0.11 B	0.17 B	0.52 J	9.6	0.596
CALCIUM	303 J	102 B	126 B	604 J	–	–
CHROMIUM	6.8	4.4	3.8	18.3	370	37.3
COBALT	2.8 J	1.4 J	2.4 J	8.3 J	–	–
COPPER	3.6 B	1.7 B	2.3 B	11.6	270	35.7
IRON	5210	2000	2950	11400	–	–
LEAD	6.3 J	2.2 J	2.7 J	19.9 L	218	35
MAGNESIUM	688 J	259 J	197 J	1980	–	–
MANGANESE	79.4	69.2	128	364	–	–
MERCURY	*ND*	*ND*	0.18	0.26	0.71	0.174
NICKEL	7.6 J	2.9 J	4.3 J	25 J	51.6	18
POTASSIUM	282 B	85.2 J	90.9 J	781 J	–	–
VANADIUM	6.4 J	2.5 J	2.9 J	17.6	–	–
ZINC	22.2	7.1 J	9.6 J	48.4	410	123.1

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
+=10X Dilution
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds NOAA TEL
1 – NOAA Screening Quick Reference Tables – Marine Sediment Effects Range Median (ERM)
2 – NOAA Screening Quick Reference Tables – Freshwater Sediment Toxic Effects Level (TEL)

Table 14 – VOC data for Sediment Samples:

Analyte	NOAA SQRT (ERM)	SEDU-1 Bkgrnd	SEDU-2 (Dup SED4)	SEDU-4 (Dup SED2)	SEDT-1
ACETONE	—	7 J	6 J	6 J	*ND*

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R= unusable result, analyte may or may not be present.
Yellow Highlighted = greater than 3X background
--- = No NOAA SQRT
ND = NOT DETECTED

Table 15 – SVOC data for Sediment Samples:

Analyte ug/kg	SEDU-1 Bkgrnd	SEDU-2 (Dup SED4)	SEDU-4 (Dup SED2)	SEDT-1	NOAA[1] SQRT (ERM)	NOAA[2] SQRT (TEL)
CAPROLACTAM	28 J	*ND*	24 J	*ND*	—	—
PHENANTHRENE	23 J	*ND*	*ND*	37 J	1500-	41.9
FLUORANTHENE	27 J	*ND*	*ND*	65 B	5100	111
PYRENE	42 J	*ND*	*ND*	41 J	2600	53
BENZO(A)ANTHRACENE	*ND*	*ND*	*ND*	32 J	1600	31.7
CHRYSENE	*ND*	*ND*	*ND*	31 J	2800	57.1
BENZO(B)FLUORANTHENE	*ND*	*ND*	*ND*	24 J	—	—
BENZO(A)PYRENE	*ND*	*ND*	*ND*	23 J	1600	31.9

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
ND = Not Detected
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds NOAA TEL
1 – NOAA Screening Quick Reference Tables – Marine Sediment Effects Range Median (ERM)
2 – NOAA Screening Quick Reference Tables – Freshwater Sediment Toxic Effects Level (TEL)

Table 16 - Pesticide and PCB data for sediment samples:

Analyte	SEDU-1 Bkgrnd	SEDU-2 (Dup SED4)	SEDU-4 (Dup SED2)	SEDT-1	NOAA[1] SQRT (ERM)	NOAA[2] SQRT (TEL)
	No Pesticides/PCBs Detected					

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
U= analyte not detected/ analyte below detection limit
ND = Not Detected
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds NOAA TEL
1 – NOAA Screening Quick Reference Tables – Marine Sediment Effects Range Median (ERM)
2 – NOAA Screening Quick Reference Tables – Freshwater Sediment Toxic Effects Level (TEL)

7.4 Soil Sampling

MDE collected eight surface soil and nine subsurface soil (including a duplicate) samples that were screened against MDE Cleanup Standards and EPA RBCs for residential soils. Surface soils were collected from the first 12 inches of soil below ground surface. Subsurface soils were collected from the four to five feet below ground surface. Levels of arsenic, iron and manganese were detected in surface soils across much of the site at concentrations slightly above MDE's soil removal guidelines. The levels of these contaminants approximate the anticipated typical concentrations (ATC) for soils in the eastern part of Maryland. The cleanup standard for arsenic is set at 2.0 mg/kg however the ATC for the eastern shore of Maryland is 3.6 mg/kg. Detections range between 1.7 and 4.7 mg/kg. The upper limits of the data are more than one standard deviation greater than the ATC. Similarly aluminum, iron and manganese were detected at levels greater that the cleanup standards and more than one standard deviation greater than the ATC. Although there were levels of surface and subsurface inorganic and organic contaminants detected in the soil samples which exceeded screening values, MDE's detailed toxicological evaluation did not find these levels to present unacceptable risks to human health under a residential use scenario. A detailed explanation of the potential health effects of the inorganic

and organic compounds detected in the on-site soil samples is outlined in the toxicology report found in Appendix B of this document.

Table 17 - Inorganic Data for Surface Soils:

Analyte mg/kg	E4S1 Bgrd	E4S2	E4S3	E4S4	E4S5	E4S6	E4S7	E4S8	MDE[1] RCS mg/kg*	EPA[2] RBC
ALUMINUM	5040 J	6460 J	11700 J	4240 J	5780	2940 J	5480 J	11300 J	7800	7.8E+04
ARSENIC	[2.1]	4	4.2	2.4	3.9	[1.9]	[1.7]	5.7	2	4.3E-01
BARIUM	[43.2]	44.4	137	58.5	[44.3]	[40]	[16.8]	58.7	550	5.5E+03
BERYLLIUM	[0.32]	[0.37]	[1.0]	[0.34]	[0.40]	[0.33]	[0.2]	[0.54]	16	1.6E+02
CALCIUM	[948] J	1570 J	[987] J	[646] J	1570 J	[1100] J	[250] J	[548] J	–	–
CHROMIUM	11.5	16.3	24.5	9.4	26.6	9	14.3	22.1	230 (Cr+6)	2.3E+02
COBALT	[3.6]	[4.4]	14.1	[4.0]	[4.6]	[3.5]	[1.6]	[3.6]	160	1.6E+03
COPPER	6.2 K	7.8 K	31.5	[4.4] K	8 K	6.1 K	[3.7] K	7.7 K	310	3.1E+03
IRON	9420	13100	19300	7990	14500	7570	10900	17600	2300	2.3E+04
LEAD	19.2	21.6	51.4	15.5	15.8	14.4	5.1	9.6	400	–
MAGNESIUM	[728] J	1110 J	2790 J	[602] J	[818] J	[559] J	[397] J	[1150] J	–	–
MANGANESE	176 J	168 J	553 J	285 J	170 J	208 J	18.6 J	54.5 J	160	1.6E+03
MERCURY	*R*	*R*	[0.09] L	*R*	*R*	*R*	*R*	*R*	0.1	–
NICKEL	[4.5] K	[5.7] K	24.4	[3.4] K	[5.1] K	[3.3] K	[2.6] K	[6.3] K	160	1.6E+03
POTASSIUM	[211]	[354]	[1140]	[130]	[346]	[166]	[160]	[313]	–	–
SODIUM	*ND*	*ND*	[167]	*ND*	*ND*	*ND*	*ND*	*ND*	–	–
VANADIUM	16.9 K	24.9	33	18.3 K	28.1	13.5 K	18.4 K	32	55	5.5E+02
ZINC	22.4	25.3	67.7	16.6	27.7	35.5	10.3	30	2300	2.3E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R= unusable result, analyte may or may not be present.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
ND = Not Detected
Yellow Highlighted = greater than 3X background
Red Highlighted values exceed MDE Residential Clean-up Standard (NRCS)
Green Highlighted exceeds MDE standard and 3X Background
Blue Highlighted = exceeds EPA RBC.
1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.
2 – EPA Region III Risk Based Concentration for Residential Soils

Table 18 - Inorganic Data for Subsurface Soils:

Analyte mg/kg	E4SS-1 Bgrd	E4SS-2	E4SS-3	E4SS-4	E4SS-5 Dup SS-9	E4SS-6	E4SS-7	E4SS-8	E4SS-9 Dup SS-5	MDE[1] NRCS mg/kg*	EPA[2] RBC
Sample Depth - Feet	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5		
ALUMINUM	7970 J	10800 J	5360	6650 J	8590 J	4670 J	7360 J	5410 J	7560J	7800	7.8E+04
ARSENIC	3	4.1	[1.6]	[1.6]	4.1	[1.1]	3	[1.9]	2.8	2	4.3E-01
BARIUM	[45.8]	62.5	72.2	45.7	[46.6]	55.3	[36.9]	[19.9]	[38.7]	550	5.5E+03
BERYLLIUM	[0.47]	[0.68]	[0.57]	[0.44]	[0.5]	[0.54]	[0.49]	[0.27]	[0.43]	16	1.6E+02
CALCIUM	[431] J	[720] J	[749] J	[398] J	1360 J	[933] J	[319] J	[429] J	1220J	–	–
CHROMIUM	21.5	18.5	13.3	18.4	19.3	14	20.4	18.6	16.5	230 (Cr+6)	2.3E+02
COBALT	[11.4]	[11.6]	[8.0]	[4.0]	[4.5]	[5.3]	[3.1]	[2.0]	[4.0]	160	1.6E+03
COPPER	7.2 K	11.9 K	12.8	[5.6] K	7.9 K	[4.9] K	6.5 K	[5.5] K	6.3K	310	3.1E+03
IRON	15200	20400	9780	8470	16400	8560	14000	11200	14100	2300	2.3E+04
LEAD	7.9	7.8	19.4	6.8	8.6	6.9	5.6	4.3	7.2	400	–
MAGNESIUM	1500 J	2660 J	1560 J	1160 J	[1170] J	[593] J	1140 J	[650] J	[1130]J	–	–
MANGANESE	289 J	229 J	485 J	50.2 J	147 J	243 J	56.5 J	40 J	127J	160	1.6E+03
MERCURY	*R*	*R*	0.12 L	[0.07] L	*R*	*R*	*R*	R	R	0.1	–
NICKEL	[7.1] K	11.5 K	20.7	[5.8] K	[6.0] K	[3.9] K	[5.2] K	[2.9] K	[5.6]K	160	1.6E+03
POTASSIUM	[330]	[584]	[527]	[310]	[333]	[189]	[317]	[193]	[308]	–	–
SODIUM	[134]	*ND*	*ND*	[123]	*ND*	[199]	*ND*	[127]	ND	–	–
VANADIUM	26.8	35.9	16.2 K	25.6	29.8	16 K	26.7	22.2	25.6	55	5.5E+02
ZINC	17.6	32.4	47.7	24.7	22.1	21.3	13.8	10.3	20.3	2300	2.3E+04

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R= unusable result, analyte may or may not be present.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
ND = Not Detected
Yellow Highlighted = greater than 3X background
Red Highlighted values exceed MDE Residential Clean-up Standard (NRCS)
Green Highlighted exceeds MDE standard and 3X Background
Blue Highlighted = exceeds EPA RBC.

1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.
2 – EPA Region III Risk Based Concentration for Residential Soils

Table 19 – VOC Data for Subsurface Soil Samples:

Analyte µG/KG	E4SS-1 Bgrd	E4SS-2	E4SS-3	E4SS-4	E4SS-5 Dup SS-9	E4SS-6	E4SS-7	E4SS-8	E4SS-9 Dup SS-9	MDE[1] Standard	EPA[2] RBC
Sample Depth - Feet	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5		
BROMOMETHANE	ND	ND	ND	ND	ND	0.5 J	ND	0.5 J	ND	1.1E+04	1.1E+05
ACETONE	16 B	7 B	8 B	24 B	8 B	10 B	5 B	8 B	9 B	4.8E+05	7.8E+06
METHYL ACETATE	ND	ND	ND	ND	2 B	2 B	ND	1 B	0.8 B	—	7.8E+07
METHYLENE CHLORIDE	1 B	2 B	1 B	2 B	6 B	8 B	1 B	6 B	4 B	8.5E+04	8.5E+04
2-BUTANONE	4 B	3 B	ND	3 B	3 B	4 B	2 B	2 B	3 B	4.7E+06	4.7E+07
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	0.5 J	ND	1.2E+04	3.2E+04
STYRENE	ND	ND	ND	11	ND	ND	ND	ND	ND	1.6E+06	1.6E+07

Qualifiers: J = analyte present, reported value may not be accurate or precise.
B = not detected substantially above the level reported in laboratory or field blanks.
R= unusable result, analyte may or may not be present.
[ ] = analyte present, as values approach the instrument detection limit the quantitation may not be accurate.
K = analyte present, reported value may be biased high., actual value is expected to be lower.
ND = Not Detected
Yellow Highlighted = greater than 3X background
Red Highlighted values exceed MDE Residential Clean-up Standard (NRCS)
Green Highlighted exceeds MDE standard and 3X Background
Blue Highlighted = exceeds EPA RBC.
1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.
2 – EPA Region III Risk Based Concentration for Residential Soils

Table 20 – SVOC Data for Surface Soil Samples:

Analyte ug/kg	E4S-1 Bgrd	E4S-2	E4S-3	E4S-4	E4S-5	E4S-6	E4S-7	E4S-8	MDE[1] Standard	EPA[2] RBC
ACENAPHTHYLENE	ND	ND	ND	ND	64 J	ND	ND	ND	4.7E+05	–
PHENANTHRENE	ND	ND	ND	ND	130 J	ND	ND	ND	2.3E+06	–
ANTHRACENE	ND	ND	ND	ND	44 J	ND	ND	ND	2.3E+06	2.3E+07
FLUORANTHENE	88 J	40 J	67 J	46 J	270 J	ND	ND	ND	3.1E+05	3.1E+06
PYRENE	110 J	38 J	69 J	53 J	310 J	ND	ND	ND	2.3E+05	2.3E+06
BENZO(A)ANTHRACENE	ND	ND	ND	ND	140 J	ND	ND	ND	870	870
CHRYSENE	70 J	ND	48 J	38 J	180 J	ND	ND	ND	8.7E+04	8.7E+04
BIS(2-ETHYLHEXYL)PHTHALATE	ND	ND	ND	ND	ND	55 J	ND	ND	4.6E+04	4.6E+04
BENZO(B)FLUORANTHENE	74 J	ND	70 J	42 J	140 J	ND	ND	ND	870	870
BENZO(K)FLUORANTHENE	ND	ND	ND	ND	97 J	ND	ND	ND	8700	8.7E+03
BENZO(A)PYRENE	48 J	ND	ND	ND	140 J	ND	ND	ND	330	87
INDENO(1,2,3-CD)PYRENE	ND	ND	ND	ND	91 J	ND	ND	ND	870	870
BENZO(G,H,I)PERYLENE	51 J	ND	ND	ND	110 J	ND	ND	ND	2.3E+05	–
BUTYLBENZYLPHTHALATE	ND	ND	ND	ND	ND	ND	ND	64 J	–	1.6E+07

Qualifiers: J = analyte present, reported value may not be accurate or precise.
ND = Not Detected
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds EPA RBC.
1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.
2 – EPA Region III Risk Based Concentration for Residential Soils

Table 21 – SVOC Data for Subsurface Soil Samples:

Analyte ug/kg	E4SS-1 Bgrd	E4SS-2	E4SS-3	E4SS-4	E4SS-5	E4SS-6	E4SS-7	E4SS-8	E4SS-9 DUP SS5	MDE[1] Standard	EPA[2] RBC
Sample Depth - Feet	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5	4 - 5		
ACENAPHTHYLENE	ND	ND	ND	ND	46 J	ND	ND	ND	110 J	4.7E+05	—
PHENANTHRENE	ND	ND	ND	ND	73 J	ND	ND	ND	200 J	2.3E+06	—
ANTHRACENE	ND	ND	ND	ND	ND	ND	ND	ND	58 J	2.3E+06	2.3E+07
DIBUTYLPHTHALATE	97 J	ND	ND	ND	ND	ND	ND	ND	ND	7.8E+05	7.8E+06
FLUORANTHENE	ND	ND	ND	ND	130 J	ND	ND	48 J	370 J	3.1E+05	3.1E+06
PYRENE	ND	ND	ND	ND	160 J	ND	ND	ND	490	2.3E+05	2.3E+06
BENZO(A)ANTHRACENE	ND	ND	ND	ND	65 J	ND	ND	ND	200 J	870	870
CHRYSENE	ND	ND	ND	ND	85 J	ND	ND	ND	270 J	8.7E+04	8.7E+04
BIS(2-ETHYLHEXYL)PHTHALATE	89 J	76J	ND	43 J	ND	59 J	46 J	210 J	ND	4.6E+04	4.6E+04
BENZO(B)FLUORANTHENE	ND	ND	ND	ND	69 J	ND	ND	ND	210 J	870	870
BENZO(K)FLUORANTHENE	ND	ND	ND	ND	42 J	ND	ND	ND	110 J	8700	8.7E+03
BENZO(A)PYRENE	ND	ND	ND	ND	71 J	ND	ND	ND	220 J	330	87
INDENO(1,2,3-CD)PYRENE	ND	ND	ND	ND	ND	ND	ND	ND	140 J	870	870
DIBENZO(A,H)ANTHRACENE	ND	ND	ND	ND	ND	ND	ND	ND	48 J	330	87
BENZO(G,H,I)PERYLENE	ND	ND	ND	ND	50 J	ND	ND	ND	170 J	2.3E+05	—

Qualifiers: J = analyte present, reported value may not be accurate or precise.
Yellow Highlighted = greater than 3X background
Blue Highlighted = exceeds EPA RBC.
1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances –Residential.
2 – EPA Region III Risk Based Concentration for Residential Soils

Table 22 - Pesticide and PCB data for surface soil samples:

Analyte µg/Kg	E4S1 Bgrd	E4S2	E4S3	E4S4	E4S5	E4S6	E4S7	E4S8	MDE[1] Standard	EPA[2] RBC
4,4'-DDE	ND	ND	3.1 J	ND	ND	0.92 J	ND	ND	1900	1900
4,4'-DDT	ND	0.7 J	22	ND	ND	0.49 J	ND	ND	1900	1900

1 – MDE Soil and Groundwater Cleanup Standards for Controlled Hazardous Substances – Non-Residential.
Qualifiers: J = analyte present, reported value may not be accurate or precise.

Table 23 - Pesticide and PCB Results for subsurface soil samples:

Analyte	E4SS1 Bgrd	E4SS2	ESS3	E4SS4	E4SS5	E4SS6	E4SS7	E4SS8	E4SS9 DUP SS5	MDE[1] Standard	EPA[2] RBC
NO PESTICIDE OR PCB DETECTED IN SAMPLES											

SUMMARY

In general, samples from the Elkton Farm Unit 4 investigation did not reveal inorganic and organic contaminants at levels of concern for human health and the environment. The groundwater sample (E4GW-6) with the highest elevations of measured inorganic parameters was collect along Zeitler Road on the upgradient perimeter of the site. The only samples containing measurable levels of volatile organic compounds were E4GW-8, a G. E. Railcar monitoring well (GE26), E4GW-5 and its duplicate E4GW-4, all of which are downgradient of and outside the Elkton Farm Unit 4 property limits. Pesticides and SVOCs were at or below detection limits in all groundwater samples. The only contaminant of concern in the surface water or sediment samples was aluminum, which was detected at levels slightly above the NOAA SQRT in the water sample. Samples of site soil indicated levels of arsenic on the margins of tilled soil above MDE Cleanup Standards for residential soils. Similarly aluminum, iron and manganese were detected at levels greater that the cleanup standards. These levels are low and may be indicative of local soil chemistry and/or historic farm chemical applications.

The results of this sample program do not indicate any undue influences on the Unit 4 parcel by past munitions manufacturing or disposal practices of the Triumph Explosives Industry or chemical dumping by Galaxy Chemical and related companies.

Results do indicate an impact to Groundwater in the vicinity of Unit 4. In the event this area is developed either groundwater treatment must be provided to remove the contaminants or public water supplied to the area. The limited number of samples collected could not categorically document all contaminant hot spots that may have resulted from past waste disposal practices. Contaminant anomalies may exist at Unit 4 and could potentially be encountered during development of the area; said anomalies will need to be addressed as encountered.

Appendix A – Photographs

Appendix B – Toxicology Evaluation

Appendix C – Data Package and QA/QC Review

References:

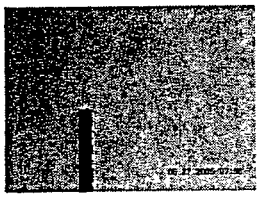
[i] Soil Survey of Cecil County, Maryland. United States Department of Agriculture; December 1973
[ii] The Geology of Cecil County, Maryland, Bulletin 37. Department of Natural Resources, Maryland Geological Survey; 1990.
[iii] Generalized Geological Map of Maryland, Maryland Geological Survey. 1967
[iv] Site Operations/Ownership History Triumph Explosives, Inc. TechLaw Inc. 1992
[v] USEP Region III Risk Based Concentration Tables, October 2002
[vi] Quick Reference Screening Tables, National Ocean & Atmospheric Administration, 1999

Air

- Four Priority 1 Findings
  - No quantification or reporting of non-VOC emissions (e.g. particulate matter)
  - Not all emission sources identified in Title V permit (e.g. metallizer, zinc pots, welders, second acid cleaning process)

Air (cont.)

- Visible Emissions appear to at or above opacity limit; Particulate concentration standard is likely exceeded;



Air (cont.)

- No Plan approvals or exemption determinations for sources or control devices (e.g. zinc pots/dust hogs, wastewater evaporator)

Air

- Other Priority Findings
  - Miscellaneous Title V monitoring, recordkeeping and reporting issues
  - No NSR/PSD applicability reviews with new equipment
  - Refrigerant device management
  - Annual certification improvement

Wastewater

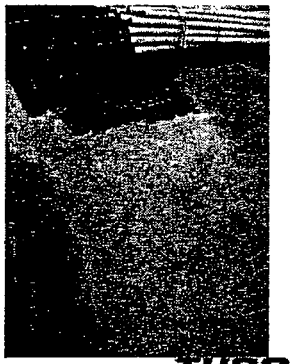
- No Priority 1 Findings
- One other Finding:
  - Potential for unpermitted levels of oil going to sanitary sewer.
  - No spill prevention plan for sanitary system

Storm Water

- No Priority 1 Findings
- Other Findings
  - Updating the PPC Plan to better manage stormwater
  - Implement/Maintain BMPs to clean up stormwater
  - Storm water pollutant levels are extremely high and indicating BMPs are not working

Storm Water (cont.)

- Potential for direct release of pollutant to environment (Creek)



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Storage Tanks

- One Priority 1 Finding
  - Muriatic Acid Storage tank is only regulated tank that is registered/permitted. Other tanks such as muriatic acid Zinc Pot Cleaning Tank and various oil storage tanks/totes should be registered, as they are considered "regulated substances"

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Storage Tanks (cont.)

- Other Priority Findings – Miscellaneous
  - Upgrades to various aspects of the Muriatic Acid Storage Tank:
    - Labeling;
    - Secondary Containment;
    - Piping;
    - Inspections.

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