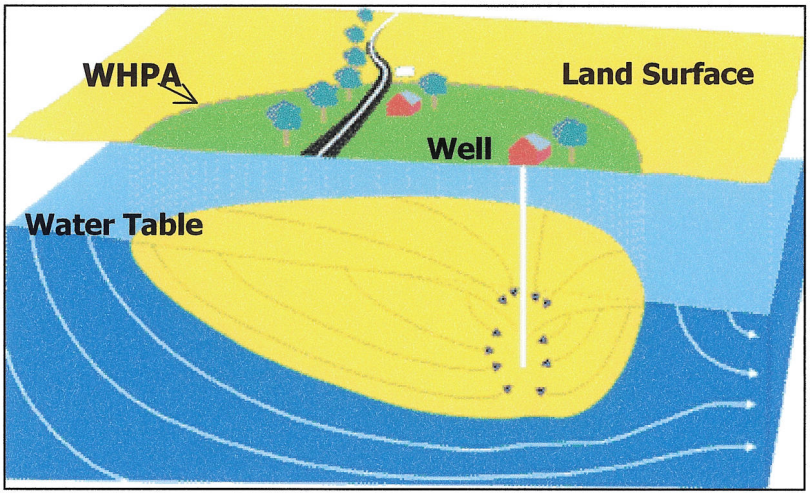
SOURCE WATER ASSESSMENT

for

SEVENTEEN NON TRANSIENT NON COMMUNITY WATER SYSTEMS

Prince George's County, MD



Prepared By
Water Management Administration
Water Supply Program
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MDE

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EXECUTIVE SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has performed a Source Water Assessment for 17 non transient non community water systems in Prince George's County, Maryland. These water systems are identified with Public Water System Identification Numbers (PWSID) by the Maryland Department of the Environment (MDE) and are listed in Table 1. The required components of this report as described in Maryland's Source Water Assessment Plan (SWAP) are:

- Delineation of the area that contributes water to the source
- Identification of potential sources of contamination
- Determination of the susceptibility of the water supply to contamination
- Recommendations for protecting the drinking water supply

Sixteen (16) of the seventeen (17) systems have wells drilled in confined aquifers. The well serving Fairhaven School does not have a substantial confining unit above the aquifer and is classified as unconfined for this report. Some of the wells at the Beltsville Agricultural Research Center, while classified as confined, are relatively close to the out crop area for the Patuxent aquifer and therefore subject to contamination in the recharge area. The confining units above the aquifers protect water supplies from contaminants originating on the land surface. Thirty-four wells supply the seventeen systems covered in this report. The Source Water Assessment Areas for the wells were delineated using EPA approved methods.

Potential point sources of contamination within the assessment areas were identified from field inspections and contaminant inventory databases. Figure 1 shows the well locations and assessment areas for the 17 systems, and maps showing potential contaminant sources are attached at the end of this report.

The Water Supply Program reviewed water quality results from the MDE database, the presence of potential sources of contamination within the individual assessment areas, the integrity of the system's wells and the vulnerability of the aquifers to determine that none of the seventeen non transient non community water systems are susceptible to contamination by inorganic compounds. The Beltsville Agricultural water system is susceptible to contamination by volatile organic compounds and synthetic organic compounds. The WSSC Western Branch Wastewater Plant well is susceptible to volatile organic contamination. Additional sampling is recommended to further investigate contamination at these sources. Seven systems are susceptible to microbiological contaminants through deficiencies in the well construction or distribution system. The sanitary integrity of the water supply systems may be maintained by following the protection recommendations at the end of this report. These include disinfection after work is performed on the systems, installing two-piece caps on the wells, caulking the electrical conduits and continuing regular inspections.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for seventeen non transient non community water systems in Prince George's County, Maryland (Figure 1). According to the Maryland Source Water Assessment Plan (SWAP), a non transient non community water system is any non community water system that regularly serves 25 or more of the same individuals for more than six months of the year.

Prince George's County is located in the Coastal Plain physiographic province, which consists entirely of unconsolidated sediments. The Coastal Plain province is geologically the youngest province in Maryland and covers nearly half of the State.

WELL INFORMATION

Well information for each system was obtained from the Water Management Administration files and from site visits to each system. The 17 systems have a total of 34 production wells that are being used for potable water supply.

A review of the well data and sanitary surveys of the systems indicates that 13 of the wells were drilled before the State's current well construction standards were put into place in 1973. Table 1 summarizes information on each of the 34 wells.

The Beltsville Agricultural Research Center (BARC) operates seven wells drilled to the Patuxent Formation. All of these wells were drilled after 1973 and are in compliance with the State well construction regulations. The wells are all enclosed in three-feet diameter steel vaults with lockable covers. Figure 2 is a map of the well locations on the property. The wells supply potable water to a research campus of 800 connections and 1,400 employees and fewer than 15 residences.

The two wells serving the Law Enforcement Training Center are both buried below the pump house. These wells were drilled in the Magothy aquifer. A treatment plant was constructed for each well and feeds to a 100,000 gallon capacity elevated storage tower. This system is categorized as a school with a population of 120 with 2 connections. The wells supply water to 32 buildings on the campus in a looped system.

Second Genesis has one well located in a pit along with a 10,000 gal hydropneumatic tank. The system serves a population of about 100 persons with 2 connections. The well was completed in 1965 before the State well regulations went into effect.

The well at Baden Elementary School is used to supply water only for bathrooms and boiler makeup. The school buys bottled water for potable use. The well was drilled in 1969 prior to the adoption of current well connection standards.

Chalk Point generating station has three wells that supply water to the facility. Two hundred (200) employees are served potable water from these wells. Treatment consists of aeration, flocculation and filtration for iron removal and chlorination for disinfection. Additional

treatment is used for process water. The three wells were drilled prior to the adoption of current well construction regulations.

Croom Vocational School has two wells located on two campus sites about a mile apart. The well at site 2 was completed in 1954 before the State well construction regulations were put in place. The well which serves the other site (site 1) was completed in 1997 and is in very good condition. At this time the school provides bottled water to the students and staff for potable use and the well is used only for sanitary facilities.

Queen Anne School is served by two wells. The wells feed into two separate treatment plants before entering the distribution system. The system serves a population of 300 students and staff with 10 connections. Both wells were completed after 1973 and are in good condition.

Tall Oaks Vocational School uses bottled water for potable supply. The single well, drilled in 1984, has one connection and serves a population of 135 students and staff. Water from the well is stored in four bladder tanks, each with a capacity of 100 gallons. After treatment for iron removal using ion exchange, the water is stored in four contact tanks before it enters the distribution system.

William Schmidt Outdoor Center has three wells serving three separate locations. All wells were drilled after the adoption of State well construction regulations in 1973. Bottled water is used for potable supply at all three locations. Each well supplies a separate plant and operates independently of the others. The three locations are: the administrative building (PG-73-1418), the school building also called the Orem building (PG-88-2844), and the sleeping cabins also called the villages (PG-73-1417). The school has a 1000-gallon hydropneumatic tank with no treatment system in place. The villages have a 5000-gallon hydropneumatic storage tank with no treatment. The administrative building has a 5000-gallon hydropneumatic storage tank with no treatment.

WSSC-Western Branch is a waste water treatment facility with a population of 70 employees that uses bottled water for potable use. The system has one well with 15 connections. The well was drilled in 1969 prior to the adoption of current well construction standards. The water is discolored and used only in restrooms, showers and limited processes in the laboratory.

County Crysler Jeep has one well that serves a population of 50 with one connection. Water from the well is stored in a 1200-gallon hydropneumatic tank before entering the distribution system. Carbon filters have been installed at the point of use.

Sheehy Chevrolet has one well that serves a population of 60 employees with one connection. Most of the water from the well is used for washing cars. Bottled water is available for potable consumption but the system is not required to use bottled water. The facility maintains system pressure with a 50-gallon bladder tank.

Patuxent Research Refuge has two wells drilled to the Patuxent Formation that provide water for the system. Several other wells are scattered around this 12,000 acre wildlife refuge used as a research facility for endangered species, primarily waterfowl. Most of the water from these

wells is supplied to bird pens, cages, etc. The treatment plant and the supply wells for the public water system are located in the administrative headquarters area of the facility off American Holly Drive. The Patuxent Wildlife Research Center water system is owned by the U.S. Department of the Interior, Fish and Wildlife Service and has two certified operators. It serves a current population of 250 people with 20 connections. The average daily flow is 6,000 gallons. At this time, only well 03 (PG-94-1251) is operating. This well is located in a pit next to the game bird yard at building # 82. The other well, located in front of the Gabrielson Lab at building # 135, has been shut down due to problems which may be related to its age. It is not likely to be placed on line in the future. Water from the well is pumped to a 100,000-gallon elevated storage tank after treatment.

Fairhaven School has one well drilled in the Aquia Formation. The well serves a population of 33 students and staff with one connection. System pressure is maintained with a 50-gallon bladder tank. Point of use treatment is provided under the kitchen sink using carbon filtration, reverse osmosis and a sediment filter.

The well at Potomac Ridge Golf Course serves a population of 60 employees through 2 building connections. There is no treatment provided to the water.

Richards Office Park has a single well that serves a population of 30 employees with one connection. No treatment is used before the water enters the distribution system. Three bladder tanks are used to maintain system pressure. Bottled water is available for potable use but the system is not designated as a bottled water facility.

Sacred Heart School and Church operates three (3) wells to provide water. One well serves the school and a chapel. A second well serves the rectory and an office. The third well is about a quarter mile away at the church and it serves only the church.

HYDROGEOLOGY

Prince George's County is located in south central Maryland. The county is located mostly in the Coastal Plain physiographic province, which is characterized by low topography due to the underlying horizontal sedimentary layers. A small portion of the northern most part of the county is in the Piedmont Province. All of the non transient wells in Prince George's County described in this report draw water from unconsolidated sediments. Ground water flows through pores between gravel, sand, and silt grains in unconsolidated sedimentary aquifers. An aquifer is any formation that is capable of yielding a significant amount of water to a well. Confined aquifers are those formations that are overlain by a confining layer consisting of clay or fine silt. This confining layer, generally composed of clay and silt, allows very little water to travel vertically through it. Confined aquifers are recharged from the water stored in the confining unit above and from precipitation that infiltrates into the formation where it is exposed at the surface. Unconfined aquifers are also known as water table aquifers. Only one of the systems covered in this report use a unconfined aquifer. Non transient water systems in Prince George's County pump water from one of four formations. The first is the Aquia Formation, the second is the Magothy Formation, the third is the Patapsco Formation, and the fourth is the Patuxent

Formation. The shallowest and youngest formation is the Aquia, with the Patuxent being the deepest and oldest formation.

Aquia Aquifer

The Aquia Formation is composed of fine to coarse-grained, greenish-brown sand that contains layers of grayish-green silt and clay, indurated calcite-cemented sand and fossil beds composed of shell debris. The greenish-brown color is from the minerals glauconite and goethite which compose 20 to 70 percent of the formation. The Aquia greensand is relatively thin, but it yields adequate supplies of water for domestic purposes to many dug wells. Permeability decreases downdip as a result of the decreasing grain size until the Aquia Formation no longer functions as an aquifer. Fairhaven School is the only non transient non community system relying on the Aquia aquifer. The school is located just downdip of the outcrop area and the driller's log shows about 6 feet of pink clay at the land surface signifying the Nanjemoy Formation.

Magothy Aquifer

The Magothy Formation consists of light gray, crossbedded coarse sand containing a small amount of glauconite and pyrite which oxidizes to iron oxide where exposed and brown, white or gray clay. Particles of carbonaceous matter are also common throughout the formation. The Magothy Formation outcrops in Bowie and ranges in thickness from 0 to about 100 feet. It reaches a maximum basal depth of about 550 feet below sea level. The capacity of the water-bearing material in the Magothy Formation is not uniform, but it is a very important aquifer in the county. It yields adequate supplies of water to several municipalities and institutions and many domestic drilled wells. The chemical character of the water in the Magothy Formation is fairly uniform throughout the county. Near the outcrop in the northern part of the county the hardness of the water is lower than in the southern part. The Magothy Formation has undesirable concentrations of dissolved iron in some areas but in general can be expected to yield water that is not objectionably high in iron. The water generally is neutral with the pH averaging 7.5.

Patapsco Aquifer

The Patapsco Formation is the youngest formation of the Potomac group. It is composed chiefly of clay, sand and some gravel. The beds of sand are usually light gray to buff and the clay varies in color from white to gray to shades of red. The Patapsco Formation is present over all except the northwestern edge of Prince George's County. It outcrops in a broad area just inside of the northwestern boundary edge. It has a basal depth ranging from +200 to –1275 ft. relative to sea level; however, the thickness and extent of the aquifer are difficult to define. Water supplies for domestic use generally are readily obtained from the Patapsco Formation. The iron content averages 4.67 parts per million and the pH averages 6.7. The water in the Patapsco Formation in the northern part of the county is lower in dissolved solids, hardness and pH than that found in the southern part of the county.

Patuxent Aquifer

The Patuxent Formation outcrops in northern Prince George's County. The Formation is the basal unit of the Potomac Group and consists of irregularly stratified, crossbedded and lenticular white or light gray to orange-brown, moderately sorted, angular sands and subrounded quartz gravels with gray to ocherous silt and clay beds occurring locally. The formation is a multi-

aquifer unit that is generally used for water supply in its updip portions where the natural water quality is generally good (WRA,1987).

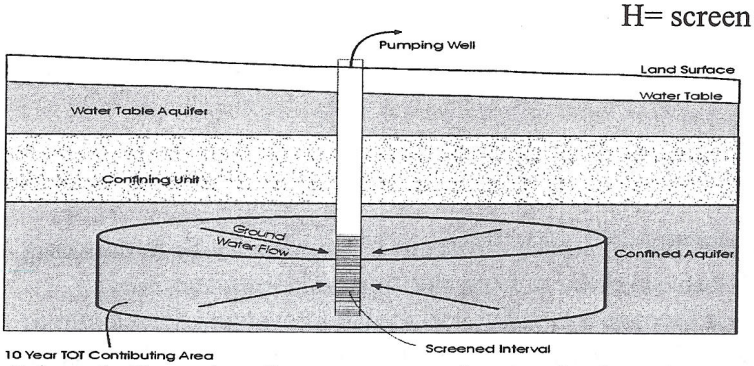
SOURCE WATER ASSESSMENT AREA DELINEATION

The Wellhead Protection Area (WHPA) for non transient non community water systems using more than 10,000 gallons per day (gpd) whose wells are completed in confined Coastal Plain aquifers is a circle whose radius is calculated using the Florida method (MDE, 1999). This radius is based on a volumetric equation equating the volume of water pumped over a given time period with the volume of aquifer needed to store an identical quantity of water.

The equation can be written numerically as:

$$r = \sqrt{\frac{Q\,t}{\pi\, n\, H}}$$

Where r = fixed radius(ft)
t = time of travel (yrs)
Q= pumping rate (ft^3/yr)
n= aquifer porosity (dimensionless)
H= screen length (ft)



Schematic illustration of a transport zone for a confined aquifer.

The WHPA for confined systems using less than 10,000 gpd is a circle with a 600-foot radius. The WHPA for the one unconfined system (Fairhaven School) is a 1000-foot circle.

INVENTORY OF POTENTIAL CONTAMINANTS WITHIN THE DELINEATED AREA

MDE Water Supply Program staff conducted a field survey on August 24, 2005 to check for potential sources of contamination within and near the area surrounding the wells at the 17 systems. Additionally, the MDE database was queried for contaminant sources within and near the sites. The contaminant databases include the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS), which includes National Priority List (Superfund) sites, Maryland Registered Underground Storage Tank (UST) sites, Maryland Leaking Underground Storage Tank (LUST) sites, landfills, pesticide dealers, ground-water discharge permits, Colonial Pipeline, and Controlled Hazard Substances (CHS) generator sites.

The MDE database of USTs indicate that Queen Anne School, Richards Office Park, Tall Oaks School, and Croom Vocational School had USTs (underground storage tanks) located in their wellhead protection areas. The presence of these USTs is not necessarily a threat to the well but

if a leak occurs it could cause a contaminant to find its way into the well, if the well does not meet construction standards.

The MDE database of CERCLA sites indicates the presence of potential hazardous waste sites at BARC and Croom Vocational school. These sites are within the WHPA for some of the wells that supply the facilities. The BARC site is a research site with almost 100 years of history that has used and tested numerous chemicals for research, maintenance and agricultural purposes including pesticides, solvents, cleaners, and low level radioactive chemicals. Past disposal practices of these chemicals has led to concentrations of various compounds above natural levels in soils and shallow ground water in scattered locations on the site. The Croom Nike site is a former US military missile launch site that is now used as a school. Investigation of past activities at the site have detected the presence of trichloroethene in the ground water. Appendix A has more details on these sites and other related sites in the general vicinity of Beltsville.

The MDE databases also indicate ground water discharge at USDA-Beltsville, Tall Oaks School, and Lowe Chevrolet.

The MDE database indicates CHS generators located in the wellhead protection area at Richards Office Park and County Chrysler.

REVIEW OF WATER QUALITY DATA

Water quality data was reviewed from the Water Supply Program's database for Safe Drinking Water Act (SDWA) contaminants. All data reported is from the finished water supplied to consumers. Nine of the seventeen Prince George's County non transient systems are known to have some type of water treatment. Table 3 summarizes the treatment methods and the reason for that treatment. Table 4 lists the number of samples of IOCs, SOCs, and VOCs taken for each system since 1996 and the results that were detected at greater than 50% of MCL for each contaminant.

Synthetic Organic Compounds (SOC)

There is one occurrence out of 21 samples where a SOC was detected at a level greater than 50% of a MCL. A detection of 0.14 ppb of 1,2 dibromo-3-chloropropane (DBCP) was present at WSSC Western Branch Wastewater Treatment Plant. Repeat and previous samples showed no detection of DBCPs. This system does not treat the water because the water is not used for potable supply. The well is also very old (completed in 1969) and the detection occurred in 1997.

PWSID	System Name	Plant ID	Contaminant ID	Contaminant Name	MCL (ppb)	Sample Date	Result (ppb)
1160035	WSSC	1	2931	1,2 DIBROMO-3-CHLOROPROPANE	0.2	08-APR-97	0.14

Inorganic Compounds (IOC)

Of the 1073 samples collected for nitrate analysis at the 17 systems, only 1 sample had a detection of Nitrate greater than 50% of the MCL. This single detect was more than 10 years ago

and is not consistent with most other results collected from the system. No detection of heavy metals exceeded 50% of maximum contaminant level.

PWSID	System Name	Plant ID	Contaminant ID	Contaminant Name	MCL (ppb)	Sample Date	Result (ppb)
1160026	QUEEN ANNE SCHOOL	1	1040	NITRATE	10	29-NOV-95	6.5

Iron is present in the raw water and removed during the treatment process at seven systems. Iron removal is practiced at three of the eleven systems using the Magothy aquifer, all three systems using the Patapsco aquifer and both systems using the Patuxent aquifer.

Volatile Organic Compounds (VOC)

Two systems reported results of VOCs greater than 50% of the maximum contaminant level. At the WSSC Western Branch Wastewater Treatment Plant, 31 samples have been collected for Volatile Organic Compound analysis. Nine of the samples reported some level of methylene chloride. Two results are shown below as greater than 50% of the MCL for methylene chloride.

PWSID	System Name	Plant ID	Contaminant ID	Contaminant Name	MCL (ppb)	Sample Date	Result (ppb)
1160035	WSSC	1	2964	METHYLENE CHLORIDE	5	14-JUL-92	2.8
1160035	WSSC	1	2964	METHYLENE CHLORIDE	5	06-OCT-98	2.6

BARC well # 1 tested positive for VOCs in September 1998; 1,2, dichloropropane is an organic chemical discharged from industrial facilities and has been known to increase the risk of cancer.

BARC well # 5 tested positive for Trichloroethylene in May 2000. TCE is a degreasing agent that is known to cause liver problems and increase risk of cancer.

Microbiological Contaminants

All of the non transient water suppliers are routinely sampled at least quarterly for microbiological contamination. If any of the routine samples test positive, the system must then resample within twenty-four hours or as soon as possible. This bacteriological sampling is required by the SDWA. The number of samples taken over the period of record and the results are given in Table 5. Seven of the systems have never had a positive bacteriological sample. Four systems have had more than twenty-five percent of their bacteriological samples come back positive since 1996. The aquifers used by the water supply system are free of any living coliform bacteria. The potential sources include a fouled ion-exchange unit breaks in the distribution system or breaks in the snitary integrity of the wellhead or storage vessels. None of the systems have ever had a confirmed positive fecal coliform sample.

SUSCEPTIBILITY ANALYSIS

To evaluate the susceptibility of the ground-water source to contamination, the following criteria were used:

1. available water quality data
2. presence of potential contaminant sources in the WHPA
3. aquifer characteristics
4. well integrity
5. the likelihood of change to the natural conditions

Wells serving the Prince George's County non transient non community water systems all draw water from wells in unconsolidated sedimentary aquifers. Prince George's County's unconsolidated sediments and soil provide protection from microbiological contamination as water percolates through the overlying soil and aquifer sediments.

Inorganic Compounds (IOC)

Nitrate was the only IOC detected at greater than 50% of a maximum contaminant level. The result was not consistent with many other results collected at the system and occurred about a decade ago. It has been determined that the systems covered by this report are not susceptible to nitrate contamination. Iron is a naturally occurring metal and is commonly present in the Patuxent and Patapsco aquifers and in some supplies relying on the Magothy aquifer. There is a secondary standard for iron (0.5 mg/l). Data reviewed for other heavy metals and the lack of detections and sources in the proximity to the production wells indicate that these 17 systems are not susceptible to other regulated inorganic constituents.

Based on the water quality data reviewed and other well information, none of the 17 systems listed in this report are susceptible to nitrate contamination or other regulated inorganic compounds (IOCs).

Synthetic Organic Compounds (SOC)

The occurrence of 1,2 dibromo-3-chloropropane in the water sample taken at WSSC in 1997 with a result of 0.14 ppb was not supported by additional samples over the period of record.

BARC is considered susceptible to SOCs given the history of poor disposal practices at the facility, usage of pesticides compounds in the vicinity of the wellfield and contamination of two wells with volatile organic compounds.

Based on the water quality data reviewed and other well information, none of the other 16 systems listed in this report are susceptible to synthetic organic compounds (SOCs).

Volatile Organic Compounds

Methylene Chloride was detected at greater than 50% of the MCL on two separate occasions at WSSC. An additional seven samples also had some reportable level of MCL. Methylene Chloride is a solvent found in many cleaning supplies and could be found at many places in a wastewater treatment plant.

The Beltsville Agricultural Research Center (BARC) and Croom Vocational school are two sites that were former federal facilities that carried out maintenance activities that require the use of

many types of chemicals. As a result of the use of these chemicals, contamination occurred to the soil and ground water at these two sites.

The Croom Nike Launch and Control sites had historical records of VOCs detected in wells at the site but the Water Supply database indicate no detection in any of the wells used to supply the facilities. This is probably because of the depth (+400') of the supply wells.

Based on the water quality data reviewed and other well information, the WSSC well and BARC water system is susceptible to volatile organic compounds. None of the other 15 systems are susceptible.

Microbiological Contaminants

This analysis concerns the susceptibility of the sources to microbial contamination. As the aquifers used in this report are not susceptible, due to the filtration capacity of the unconsolidated deposits, the sources can only be susceptible if there are deficiencies in well construction or contaminated when repairs are made to a well or well pump.

As stated earlier in this report, if there are no well construction problems with a well drawing from a confined aquifer the supply should be safe from microbiological contamination. A review of Table 5 indicates that four of the systems have positive total coliform sample greater than 25% in the past 10 years. This could be due to a fouled ion-exchange unit, broken distribution line, broken wells casing, cap, etc. Storage or a distribution problem or repair can also introduce the coliform into the system. Correctly disinfecting the water system is very important after pulling a well pump or completing improvements to the distribution system. Wells may also be physically damaged from a vehicle hitting the well and that can provide a route for microbial contaminants to enter a well.

All four of the systems with more than 25% of positive total coliform have a bottled water designation and the water is not routinely used for drinking. Ten of the seventeen systems have less than 5% or no positive sample results for total coliform in the water sample taken over the period of record.

Based on the results of Table 5, seven of the systems covered in this report are susceptible to total coliform bacteria.

SUMMARY AND RECOMMENDATIONS FOR PROTECTING WATER SUPPLIES

The water supply sources used by non transient non community water systems in Prince George's County are generally not vulnerable to contamination present at the land surface. The exception, as noted above, are wells used at the Beltsville Agricultural Research Center (BARC) and the Washington Suburban Sanitary Commission (WSSC) Western Branch Wastewater Treatment Plant. Land use in the outcrop area near Sacred Heart and Fairhaven Schools should also be addressed for a comprehensive source protection plan.

Due to the presence of numerous ground water contamination sites on and around BARC property, we recommend that BARC maintain an aggressive sampling program. The program should target not only regulated contaminants but also other chemicals found in the ground water in the area. A better understanding of the route that contaminants have followed to enter production wells at BARC would provide valuable insight into the most effective method for protecting the sources. The contaminants may have entered the aquifer in the outcrop areas and from there moved toward the production wells, or the contaminants may have migrated through the confining unit(s) to the production wells.

The WSSC Western Branch well is not located near the quifer outcrop area and is rather deep, yet a decade's worth of data shows intermittent contamination of methylene chloride. The most recent data, however, is from 1999. It is recommended that additional samples be collected. If contaminant levels at equal or greater to highest levels previously observed, then WSSC should make plans to replace the old well (drilled circa 1969) with a new well that is grouted to the top of the confining unit.

The remaining recommendations are to address the observed high frequency of coliform contamination at several of the water systems. Due to the nature of the confined aquifers, the coliform detections are not believed to relate to actual contamination in the ground water, but rather maintenance of the well, treatment unit and or distribution system.

- The sanitary integrity of the water supply system must be maintained. Sanitary defects noted in county sanitary surveys should be corrected. All work on the water system should be performed in a sanitary manner and followed with a one-time disinfection.
- Coliform testing results are a good indication if the sanitary integrity of the system has been affected. All positive results should be investigated to determine the cause of the positive tests. Separate samples should be collected to represent the water from the wells to determine if the positive coliform is attributable to well deficiencies on contamination in the storage or distribution system. Corrective action should be taken to eliminate the source of the problem.
- Installing new two-piece well caps is a good way to reduce potential contamination from insects. Caulking of the electrical conduit is needed to ensure a sanitary seal.
- Any wells in areas subject to flooding or just above grade should be sampled following significant rain events to demonstrate if they are sensitive to flooding impacts.
- Water systems for seasonal facilities (schools) should be disinfected and flushed prior to the opening of a new season.
- Wells should be protected from damage by vehicles or other machinery. If a well is or was damaged, it should be repaired. All work on wells should be followed by disinfection to avoid contamination of the water supply.

REFERENCES

1. Maryland Department of the Environment Water Supply Program, 1999, Maryland's Source Water Assessment Plan.

2. Maryland Department of Natural Resources (DNR), 1987, *The Quantity and Natural Quality of Ground Water in Maryland*: DNR Water Resources Administration.

3. Cooke Wythe, Martin Robert, Meyer Gerald, 1952, *Geology and Water Resources of Prince George's County*: Department of Geology, Mines and Water Resources Bulletin 10.

4. Maryland Geological Survey (MGS), 1983, *Water Resources Basic Data Report Number 13*, Maryland Department of Natural Resources.

Other Sources of Data

Water Appropriation and Use Permits
Prince George's County Sanitary Survey Inspection Reports
MDE Water Supply Program (PDWIS) Database
MDE Geographic Information System Database
Department of Natural Resources Digital Orthophoto Quarter Quadrangles
USGS Topographic 7.5 Minute Quadrangles

FIGURES

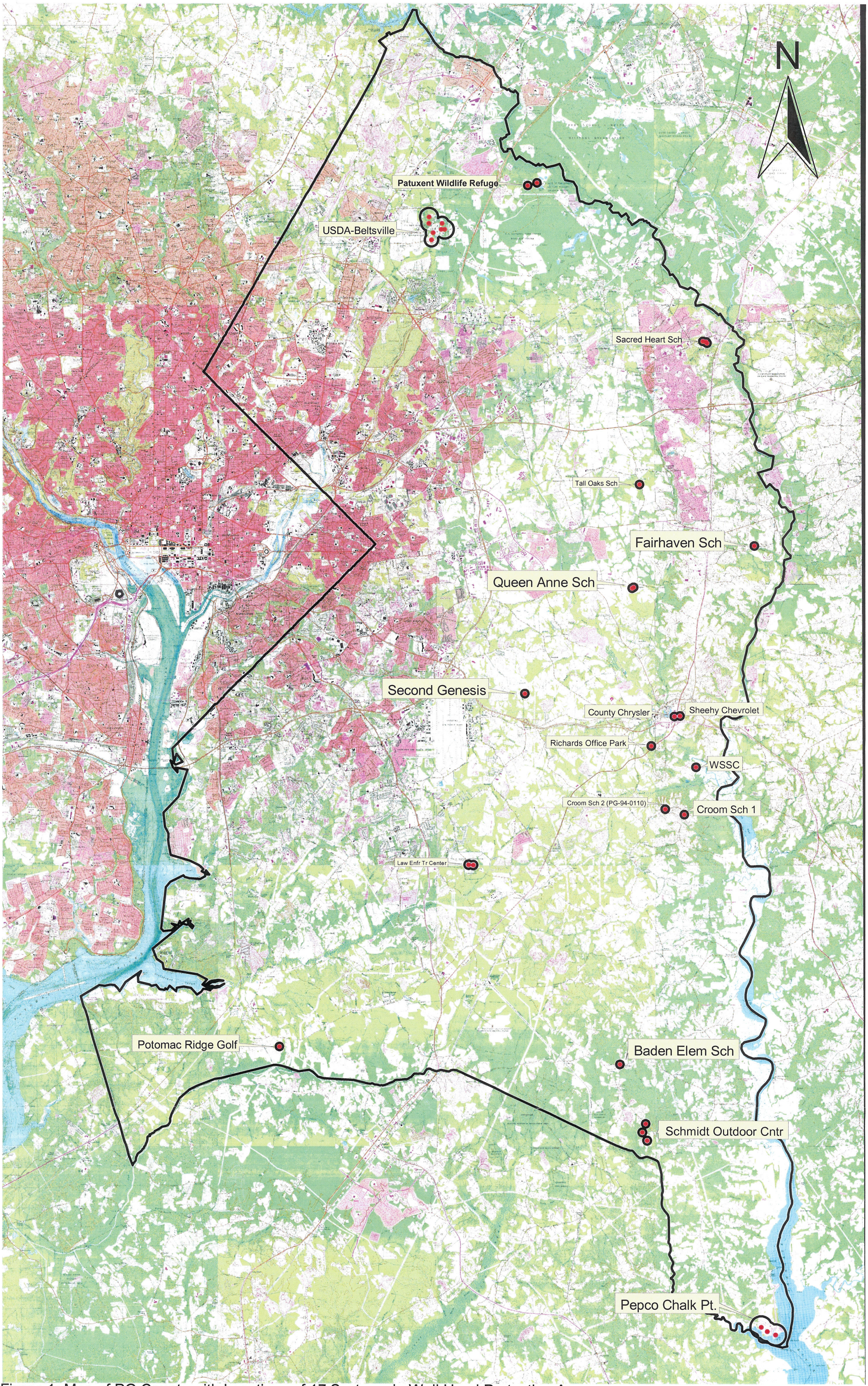


Figure 1: Map of PG County with Locations of 17 Systems in Well Head Protection Areas

Figure 2: Location Map of USDA-Beltsville and Patuxent Refuge in PG County.

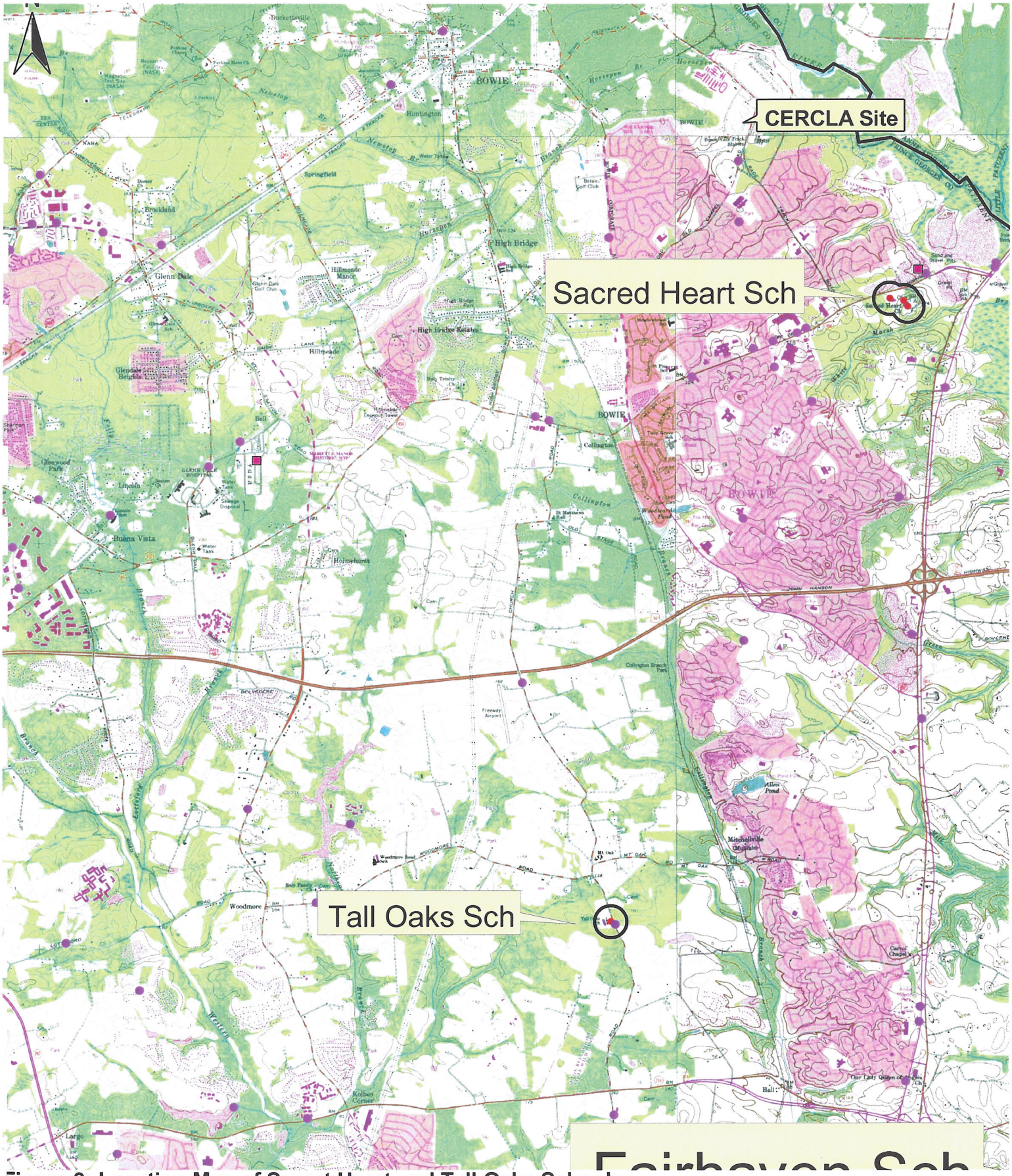


Figure 3: Location Map of Secret Heart and Tall Oaks Schools

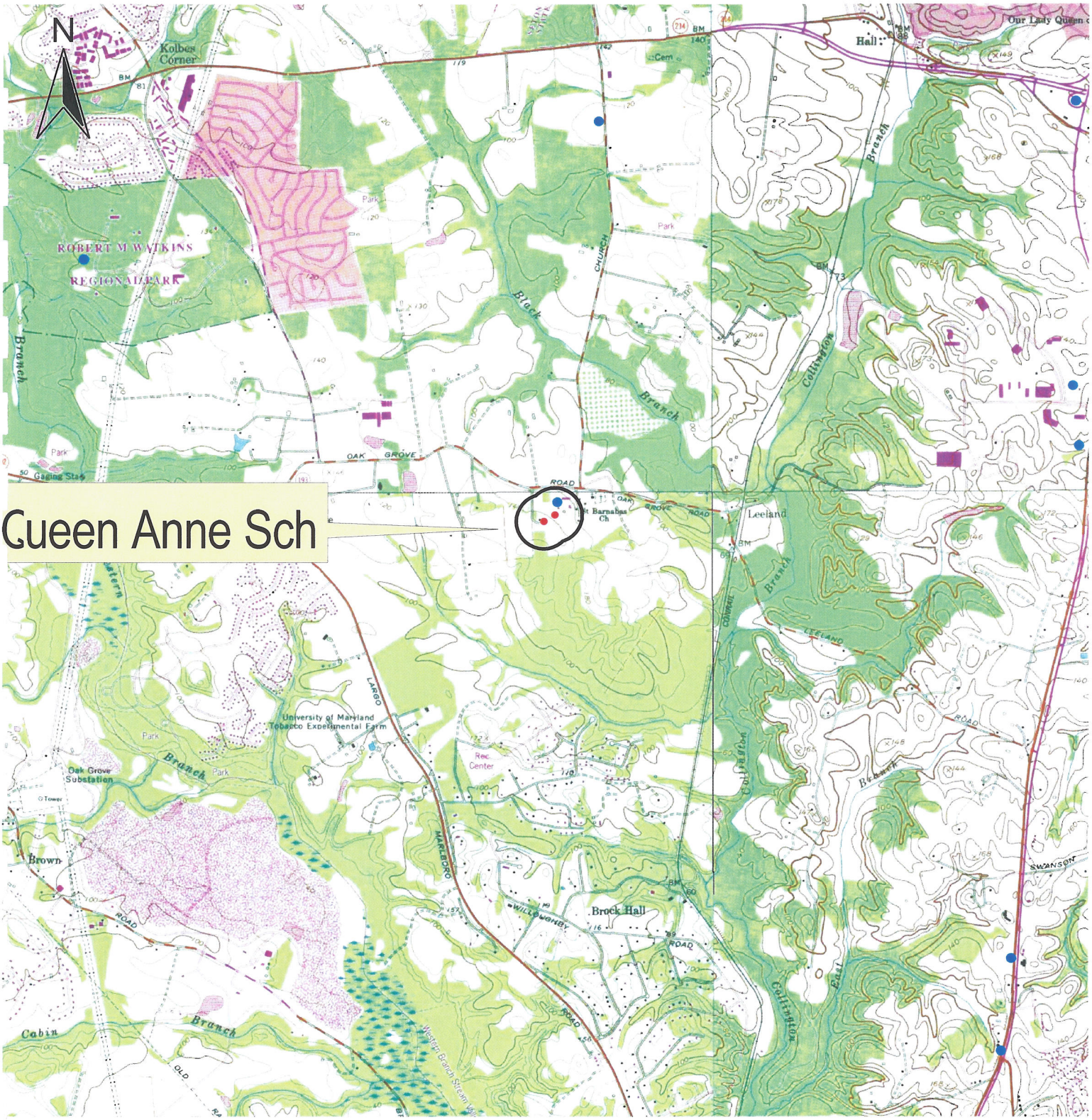


Figure 4: Location Map of Queen Anne School in PG County

2000 0 2000 4000 Feet

Legend

Wells USTs WHPA

Figure 5: Location Map of 5 Systems in PG County and the Associated Potential Contaminants

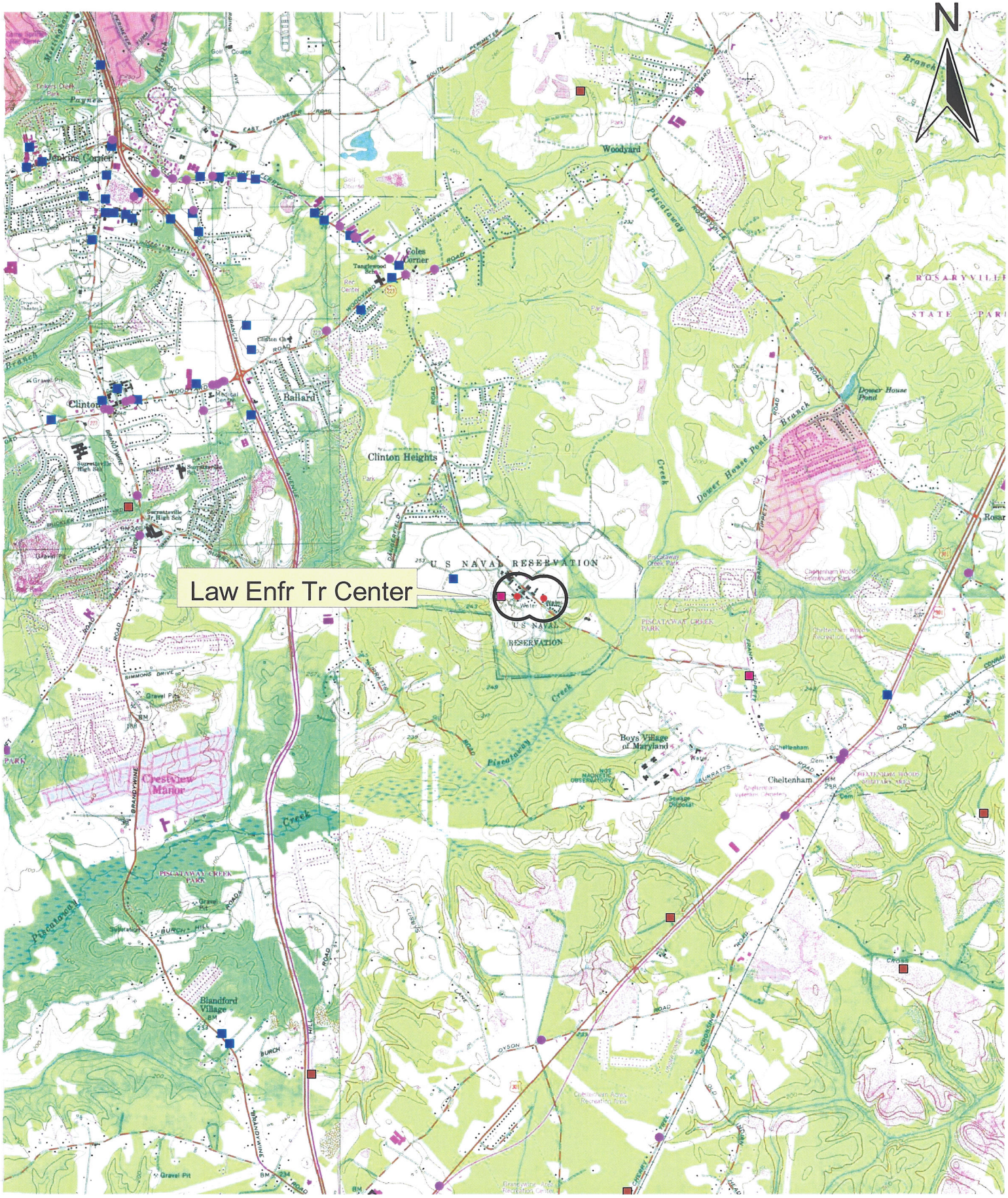


Figure 6: Location Map of Law Enforcement Training Center in PG County

TABLES

Table 1: Systems and Wells Information

	[1] PWSID	System Name	[2] Plant #	Source ID	Source Name	[3] WAPID	Average Daily Use (gpd)	Well Tag #	Well Depth	Casing Depth	Well Completion Date	Formation (Aquifer)
1	0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	01	USDA 1	PG1990G012	510,000	PG920973	155	125	8/8/96	PATUXENT
2	0160001		01	02	USDA 2	PG1990G012	510,000	PG731451	238	234	10/14/81	PATUXENT
3	0160001		01	03	USDA 3	PG1990G012	510,000	PG810541	275	235	11/27/84	PATUXENT
4	0160001		01	04	USDA 4	PG1990G012	510,000	PG730623	255	235	3/21/77	PATUXENT
5	0160001		01	05	USDA 5	PG1990G012	510,000	PG940129	251	230	2/5/98	PATUXENT
6	0160001		01	06	USDA 6	PG1990G012	510,000	PG920972	150	120	10/4/96	PATUXENT
7	0160001		01	07	USDA 7	PG1990G012	510,000	PG940134	258	220	2/10/98	PATUXENT
8	0160018	FED LAW ENFORCEMENT TRAINING CENTER	01	01	NAV COM 9	PG1994G007	35,000	PG003724	444	396	5/12/49	MAGOTHY
9	0160018		02	02	NAV COM108	PG1994G007	35,000	No tag	450			MAGOTHY
10	0160201	SECOND GENESIS	01	01	SECOND GENESIS	PG1966G001	3,500	PG660012	257	257	8/3/65	MAGOTHY
11	1160004	BADEN ELEMENTARY	01	01	BADEN ELEMENTARY	PG1970G003	4,700	PG700007	692	672	10/27/69	MAGOTHY
12	1160010	CHALK POINT GENERATING STATION	01	01	CHALK POINT (well 1)	PG1962G007	660,000	PG051271	640	593	5/10/63	MAGOTHY
13	1160010		01	03	CHALK POINT (well 2)	PG1984G001	660,000	PG049921	650	595	4/5/63	MAGOTHY
14	1160010		01	04	CHALK POINT (well 3)	PG1984G001	660,000	PG049920	650	605	2/8/63	MAGOTHY
15	1160012	CROOM VOCATIONAL SCHOOL	01	01	CROOM SCHOOL 1 (SITE 2)	PG1993G020	3,100	PGEF018	342	342		MAGOTHY
16	1160012		02	02	CROOM SCHOOL 2 (SITE 1)	PG1993G020	3,100	PG940110	454	424	2/2/97	MAGOTHY
17	1160026	QUEEN ANNE SCHOOL	01	01	Primary (school) well	PG1969G007	4,000	PG811859	385	382	2/18/88	PATAPSCO
18	1160026		01	03	New (Rectory) well	PG1969G007	4,000	PG920601	320	305	12/15/94	MAGOTHY

	[1] PWSID	System Name	[2] Plant #	Source ID	Source Name	[3] WAPID	Average Daily Use (gpd)	Well Tag #	Well Depth	Casing Depth	Well Completion Date	Formation (Aquifer)
19	1160031	TALL OAKS VOCATIONAL SCHOOL	01	01	TALL OAKS VOCATIONAL SCHOOL	PG1984G011	4,000	PG810749	282	250	10/12/84	PATAPSCO
20	1160034	WILLIAM SCHMIDT OUTDOOR CENTER	02	02	School building well	PG1975G003	6,500	PG882844	440	420	3/2/93	MAGOTHY
21	1160034		03	03	Administration building well	PG1975G003	6,500	PG731418	446	436	9/12/81	MAGOTHY
22	1160034		01	04	Villages (cabins) well	PG1975G003	6,500	PG731417	440	430	9/12/81	MAGOTHY
23	1160035	WSSC-WESTERN BRANCH	01	01	Well	PG1970G002	30,000	PG700009	341	281	12/17/69	MAGOTHY
24	1160036	COUNTY CHRYSLER JEEP	01	01	Well	PG1972G005	1,500	PG811618	250	150	6/20/87	MAGOTHY
25	1160040	SHEEHY CHEVROLET	01	01	WELL	PG1969G011	1,500	PG940727	236	226	11/4/98	MAGOTHY
26	1160042	PATUXENT RESEARCH REFUGE	01	02	WELL 2 - GABRIELSON LAB(ADMIN)	PG1958G103	200,000	No Tag	302	287		PATAPSCO
27	1160042		01	03	WELL 3 - NEW WELL	PG1958G103	200,000	PG941251	278	255	12/16/99	PATAPSCO
28	1160043	FAIRHAVEN SCHOOL	01	01	WELL	PG1998G008	1,000	PG940468	120	100	8/26/98	AQUIA
29	1160045	POTOMAC RIDGE GOLF COURSE	01	01	WELL 1	PG1991G115	3,500	PG941045	410	345	5/5/99	MAGOTHY
30	1161116	RICHARDS OFFICE PARK	01	01	WELL	PG1993G005	300	PG810805	322	302	8/8/85	MAGOTHY
31	1161235	SACRED HEART SCHOOL & CHURCH	01	01	Chapel Well2	PG1966G009	800	PG660085	168	168	3/11/66	PATAPSCO
32	1161235		02	02	Large Church well	PG1966G009	800	PG680056	179		6/17/66	PATAPSCO
33	1161235		02	03	Rectory & Office well	PG1968G011	800	PG731077	182	177	7/18/79	PATAPSCO

Table 1: Systems and Wells Information

[1] PWSID = Public Water System Identification Number

[2] The Point of entry to a system from a source

[3] WAPID = Water Appropriation Permit Number

Table 2: Point Sources of Contamination in WHPA

System	Name of Contaminant	Figure
	USTs in WHPA	
Tall Oaks School		3
Queen Anne School		4
Richards Office Park		5
Croom Vocational School		5
	Dischargers in WHPA	
USDA-Beltsville		2
Sheehy Chevrolet		5
	CERCLA Sites in WHPA	
USDA Beltsville		
Croom Vocational Sch		
Law Enforcement Training Center		
	CHS-Generators	
Richards Office Park		5
County Chrysler		5

Table 3: Treatment Methods for each system

PWSID	System Name	Plant #	Treatment	Reason for Treatment
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	PH Adjustment Gaseous Chlorination(pre&post) Cascade Aeration Pressure Sand Filtration	Corrosion Control Disinfection Iron Removal
0160018	FED LAW ENFORCEMENT TRAINING CENTER	01	Pre Hypochlorination	Disinfection
0160201	SECOND GENESIS	01	Post Hypochlorination	Disinfection
1160004	BADEN ELEMENTARY	01	Post Hypochlorination Ion Exchange	Disinfection Iron Removal
1160010	CHALK POINT GENERATING STATION	01	Post Hypochlorination Rapid Sand Filtration Diffused Areation	Disinfection Iron Removal
1160012	CROOM VOCATIONAL SCHOOL	01	No treatment	
1160026	QUEEN ANNE SCHOOL	01	Pressure Sand Filtration Ion Exchange-Iron(Non-SDWIS) Ion Exchange	Iron Removal
1160031	TALL OAKS VOCATIONAL SCHOOL	01	Ion Exchange-Iron (non-SDWIS) Ion Exchange Catridge filtration	Disinfection Iron Removal
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	01	No treatment	
1160035	WSSC-WESTERN BRANCH	01	No treatment	
1160036	COUNTY CHRYSLER JEEP	01	No treatment	
1160040	SHEEHY CHEVROLET	01	No treatment	
1160042	PATUXENT RESEARCH REFUGE	01	PH Adjustment Greensand Filtration	Corrosion Control Iron Removal
1160043	FAIRHAVEN SCHOOL	01	No treatment	
1160045	POTOMAC RIDGE GOLF COURSE	01	No treatment	
1161116	RICHARDS OFFICE PARK	01	No treatment	
1161235	SACRED HEART SCHOOL & CHURCH	01	Post Hypochlorination Catridge Filter (Non-SDWIS) Ion Exchange-Iron (Non-SDWIS) Ion Exchange Catridge Filtration	Disinfection Iron Removal Inorganics Removal

Table 4: Contaminant Detects greater than 50% of MCL for IOC, SOC & VOC

PWSID	System Name	Plant #	SOCs		VOCs		IOCs	
			No. of samples	No. of samples > 50% MCL	No. of samples	No. of samples > 50% MCL	No. of samples	No. of samples > 50% MCL
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	2	0	11	2	82	0
0160018	FED LAW ENFORCEMENT TRAINING CENTER	01	1	0	9	0	77	0
0160018	FED LAW ENFORCEMENT TRAINING CENTER	0 2	0	0	5	0	45	0
0160201	SECOND GENESIS	01	3	0	8	0	74	0
1160004	BADEN ELEMENTARY	01	0	0	4	0	33	0
1160010	CHALK POINT GENERATING STATION	01	0	0	8	0	68	0
1160012	CROOM VOCATIONAL SCHOOL	01	1	0	5	0	50	0
1160012	CROOM VOCATIONAL SCHOOL	0 2	0	0	3	0	4	0
1160026	QUEEN ANNE SCHOOL	01	0	0	8	0	48	1
1160031	TALL OAKS VOCATIONAL SCHOOL	01	1	0	5	0	46	0
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	01	0	0	5	0	37	0
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	0 2	0	0	4	0	33	0
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	0 3	0	0	4	0	32	0
1160035	WSSC-WESTERN BRANCH	01	6	1	31	2	84	0
1160036	COUNTY CHRYSLER JEEP	01	0	0	6	0	73	0
1160040	SHEEHY CHEVROLET	01	1	0	8	0	86	0
1160042	PATUXENT RESEARCH REFUGE	01	2	0	9	0	58	0
1160043	FAIRHAVEN SCHOOL	01	1	0	6	0	40	0
1160045	POTOMAC RIDGE GOLF COURSE	01	1	0	5	0	15	0
1161116	RICHARDS OFFICE PARK	01	1	0	6	0	69	0
1161235	SACRED HEART SCHOOL & CHURCH	01	1	0	3	0	17	0
1161235	SACRED HEART SCHOOL & CHURCH	0 2	0	0	0	0	2	0
Totals			21	1	153	4	1073	1

Table 4: Contaminant Detects greater than 50% of MCL for IOC,SOC & VOC

Table 5: Routine Bacteriological samples for each system since 1996

PWSID	System Name	No. of Samples	Number tested positive	Percent Positive	Fecal Positive
160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	103	4	4%	0
160018	FED LAW ENFORCEMENT TRAINING CENTER	46	0	0%	0
160201	SECOND GENESIS	101	2	2%	0
1160004	BADEN ELEMENTARY	37	13	35%	0
1160010	CHALK POINT GENERATING STATION	40	1	3%	0
1160012	CROOM VOCATIONAL SCHOOL	37	16	43%	0
1160026	QUEEN ANNE SCHOOL	35	7	20%	0
1160031	TALL OAKS VOCATIONAL SCHOOL	37	13	35%	0
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	37	28	76%	1
1160035	WSSC-WESTERN BRANCH	36	0	0%	0
1160036	COUNTY CHRYSLER JEEP	33	4	12%	0
1160040	SHEEHY CHEVROLET	44	0	0%	0
1160042	PATUXENT RESEARCH REFUGE	30	0	0%	0
1160043	FAIRHAVEN SCHOOL	19	0	0%	0
1160045	POTOMAC RIDGE GOLF COURSE	7	1	14%	1
1161116	RICHARDS OFFICE PARK	23	0	0%	0
1161235	SACRED HEART SCHOOL & CHURCH	12	0	0%	0

Table 6: Buffer distance calculation for each well

PWSID	System Name	Plant #	Source ID	Source Name	Water Appropriation Permit	Average Daily Use (gpd)	Well Tag #	Well Depth	Casing Depth	Screen Length (ft)	Pumpage (cf/yr)	WHPA Radius	Buffer Distance
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	01	USDA 1	PG1990G012	72857	PG920973	155	125	30	3,555,188	1,228	1228
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	02	USDA 2	PG1990G012	72857	PG731451	266	234	32	3,555,188	1,189	1189
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	03	USDA 3	PG1990G012	72857	PG810541	275	235	40	3,555,188	1,064	1064
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	04	USDA 4	PG1990G012	72857	PG730623	255	235	20	3,555,188	1,504	1504
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	05	USDA 5	PG1990G012	72857	PG940129	251	230	21	3,555,188	1,468	1468
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	06	USDA 6	PG1990G012	72857	PG920972	150	120	30	3,555,188	1,228	1228
0160001	U.S.D.A. AGRICULTURAL RESEARCH CENTER	01	07	USDA 7	PG1990G012	72857	PG940134	258	220	38	3,555,188	1,091	1091
0160018	FED LAW ENFORCEMENT TRAINING CENTER	01	01	NAV COM 9	PG1994G007	35000	PG003724	444	396	48	1,707,888	673	673
0160018	FED LAW ENFORCEMENT TRAINING CENTER	02	02	NAV COM108	PG1994G007	35000	No tag	450	400	50	1,707,888	659	659
0160201	SECOND GENESIS	01	01	SECOND GENESIS	PG1966G001	3500	PG660012	257	237	20	170,789	330	600
1160004	BADEN ELEMENTARY	01	01	BADEN ELEMENTARY	PG1970G003	4700	PG700007	692	672	20	229,345	382	600
1160010	CHALK POINT GENERATING STATION	01	01	CHALK POINT (well 1)	PG1962G007	220000	PG051271	640	593	47	10,735,294	1,705	1705
1160010	CHALK POINT GENERATING STATION	01	03	CHALK POINT (well 2)	PG1984G001	220000	PG049921	650	595	55	10,735,294	1,576	1576
1160010	CHALK POINT GENERATING STATION	01	04	CHALK POINT (well 3)	PG1984G001	220000	PG049920	650	605	45	10,735,294	1,743	1743
1160012	CROOM VOCATIONAL SCHOOL	01	01	OOM SCHOOL 1 (SIT	PG1993G020	3100	PGEF018	342	322	20	151,270	310	600
1160012	CROOM VOCATIONAL SCHOOL	02	02	OOM SCHOOL 2 (SIT	PG1993G020	3100	PG940110	454	424	30	151,270	253	600
1160026	QUEEN ANNE SCHOOL	01	01	Primary (school) well	PG1969G007	4000	PG811859	385	365	20	195,187	353	600
1160026	QUEEN ANNE SCHOOL	01	03	New (Rectory) well	PG1969G007	4000	PG920601	320	305	15	195,187	407	600
1160031	TALL OAKS VOCATIONAL SCHOOL	01	01	AKS VOCATIONAL S	PG1984G011	4000	PG810749	282	250	32	195,187	279	600
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	02	02	School building well	PG1975G003	6500	PG882844	440	420	20	317,179	449	600
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	03	03	dministration building w	PG1975G003	6500	PG731418	446	436	10	317,179	635	635
1160034	WILLIAM SCHMIDT OUTDOOR CENTER	01	04	Villages (cabins) well	PG1975G003	6500	PG731417	440	430	10	317,179	635	635
1160035	WSSC-WESTERN BRANCH	01	01	Well	PG1970G002	30000	PG700009	341	281	60	1,463,904	557	600
1160036	COUNTY CHRYSLER JEEP	01	01	Well	PG1972G005	1500	PG811618	250	150	100	73,195	97	600
1160040	SHEEHY CHEVROLET	01	01	WELL	PG1969G011	1500	PG940727	236	226	10	73,195	305	600
1160042	PATUXENT RESEARCH REFUGE	01	02	- GABRIELSON LAB(	PG1958G103	6000	PG999999	302	287	15	292,781	499	600
1160042	PATUXENT RESEARCH REFUGE	01	03	WELL 3 - NEW WELL	PG1958G103	6000	PG941251	278	255	23	292,781	403	600
1160043	FAIRHAVEN SCHOOL	01	01	WELL	PG1998G008	1000	PG940468	120	100	20	48,797	176	600
1160045	POTOMAC RIDGE GOLF COURSE	01	01	WELL 1	PG1991G115	3500	PG941045	410	345	65	170,789	183	600
1161116	RICHARDS OFFICE PARK	01	01	WELL	PG1993G005	300	PG810805	322	302	20	14,639	97	600
1161235	SACRED HEART SCHOOL & CHURCH	01	01	Chapel Well2	PG1966G009	800	PG660085	168	148	20	39,037	158	600
1161235	SACRED HEART SCHOOL & CHURCH	02	02	Large Church well	PG1966G009	800	PG680056	179	159	20	39,037	158	600
1161235	SACRED HEART SCHOOL & CHURCH	02	03	Rectory & Office well	PG1968G011	800	PG731077	182	177	5	39,037	315	600

APPENDIX A

United States Department of Agriculture | Agricultural Research Service | Beltsville Area Director's Office | Beltsville, Maryland 20705

May 24, 1994

SUBJECT: Potential Sites of Environmental Contamination

TO: All BARC Employees and Tenants

FROM: K. D. Murrell KDM
Area Director

An employee meeting was held on April 20, 1994 for all employees and tenants of the Beltsville Agricultural Research Center (BARC) to discuss sites of potential environmental contamination at BARC. This is a follow-up to that meeting.

Enclosed is a map of the subject sites (Enclosure 1). If you are planning work or research in these areas or are aware of other activities in the area, please contact Mark Schoppet of the Safety, Occupational Health and Environmental Section. Mr. Schoppet will advise you of any potential hazards that may exist and clarify the exact location of these sites relative to the work in question. Although these sites have been identified as potential hazards, we do not believe that they pose any immediate threat to human health and or the environment.

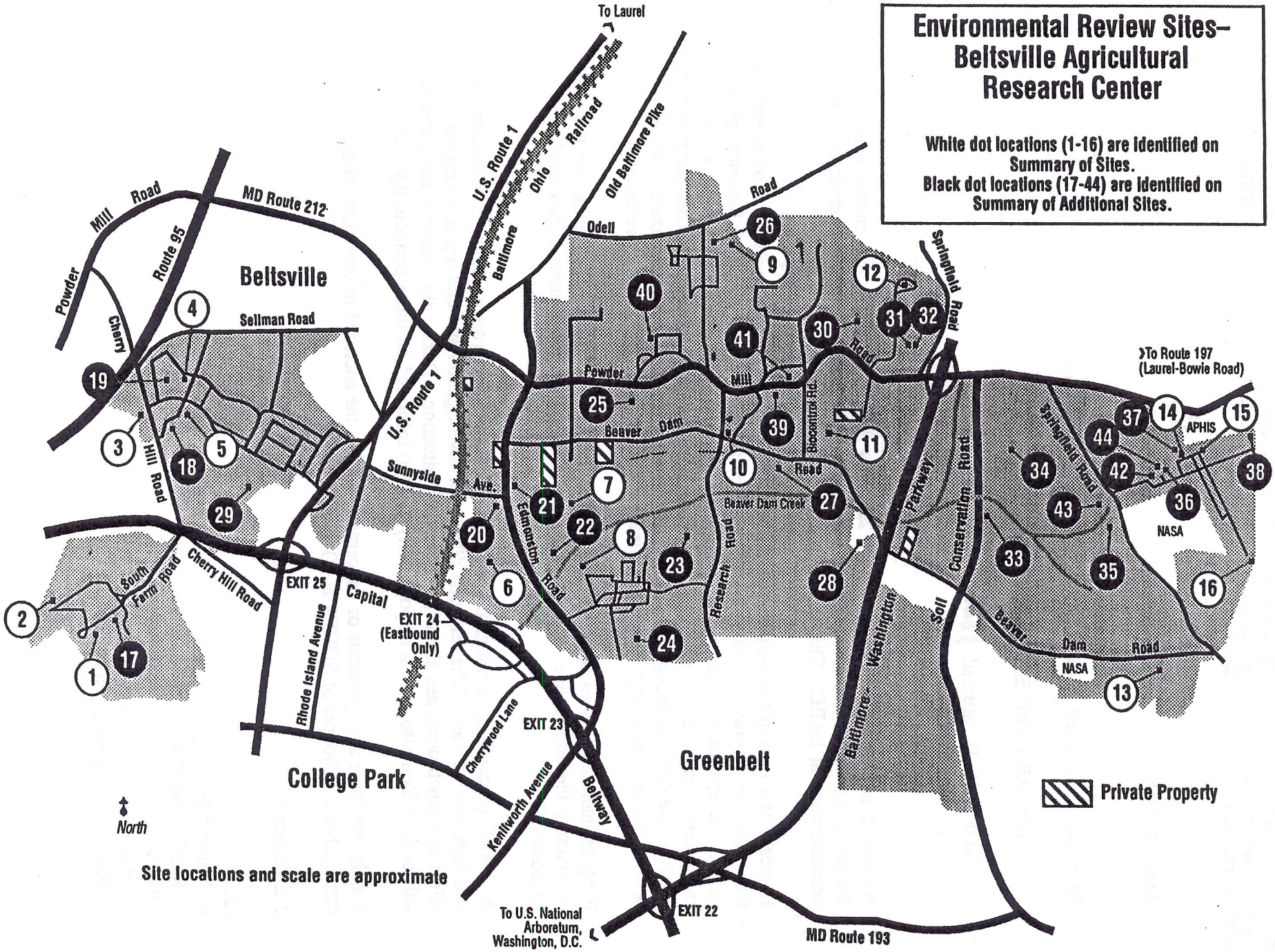
Because many employees were unable to attend the April 20 employee meeting, we are again distributing the information prepared for that meeting. This information is provided as Enclosure 2.

As BARC proceeds in investigating the subject sites and performs cleanups as necessary, we will keep you advised. The remedial process of investigation and cleanup is a long-term effort and much work lies ahead to address this situation. During this process many updates will occur. You also have a responsibility to keep informed on these periodic updates.

Should you have any questions or concerns related to the enclosed information, please contact Mark Schoppet of SOHES at 504-5557.

2 Enclosures

cc:
B. Norton, IS
T. Roark, SHEMB
ID/CDs
W. Horner/J. Van de Vaarst, FMOD
D. Prevar/M. Schoppet, SOHES


Environmental Review Sites–
Beltsville Agricultural
Research Center
White dot locations (1-16) are identified on Summary of Sites.
Black dot locations (17-44) are identified on Summary of Additional Sites.
To Laurel
U.S. Route 1
Baltimore
Ohio
Railroad
Old Baltimore Pike
Powder Mill Road
MD Route 212
Route 95
Cherry Hill Road
Beltsville
Sellman Road
Odell Road
Springfield Road
To Route 197
(Laurel-Bowie Road)
Powder Mill
Beaver Dam Road
Sunnyside Ave.
Edmonston Road
Research Road
Beaverdam Rd.
Beaver Dam Creek
Parkway
Conservation Road
Springfield Road
APHIS
NASA
Beaver Dam Road
Soil Conservation
Baltimore-Washington Parkway
South Farm Road
Cherry Hill Road
EXIT 25
Capital Beltway
EXIT 24
(Eastbound Only)
Rhode Island Avenue
Cherrywood Lane
EXIT 23
Kenilworth Avenue
College Park
Greenbelt
Beltway
EXIT 22
To U.S. National Arboretum, Washington, D.C.
MD Route 193
North
Site locations and scale are approximate
Private Property

ENCLOSURE 1

United States
Department of
Agriculture

Agricultural
Research
Service

Beltsville Agricultural Research Center

Placement on the EPA National Priorities List

April 1994

In 1990, the Agricultural Research Service (ARS) conducted an inspection of its 6,600-acre Beltsville Agricultural Research Center (BARC) to evaluate the location for sites of potential environmental contamination. Such investigations are required of federal facilities such as BARC to comply with Environmental Protection Agency (EPA) regulations.

As a result of information developed from this investigation, EPA has placed BARC on its National Priorities List (NPL).

Background

BARC was first set up in 1910 when the U.S. Department of Agriculture (USDA) purchased 475 acres to conduct research on farm animal production. Since the 1930s, research at BARC has been expanded to include a wide variety of subjects, including natural resource management, product quality and development, crop production and variety development, plant sciences, livestock and poultry management, and human nutrition.

BARC conducts a wide range of activities and therefore uses many types of chemicals for research, maintenance, and agricultural purposes.

In addition, BARC is host to several tenant agencies, including EPA, Food and Drug Administration, and the Food Safety and Inspection Service (USDA).

Much of the property that BARC now holds has been actively farmed since the 1800s. As an agricultural facility, BARC necessarily uses pesticides, following standard landscape and farming practices. In addition, BARC conducts research on new pesticide formulations, efficacy testing, and developing alternatives to chemical pesticides.

Site History

In the original BARC preliminary assessment/site inspection (PA/SI), 44 sites were found to be of possible concern. Of these, 16 were found to require further study. The remaining 28 were identified by BARC as not being contaminated or not containing material falling under relevant EPA regulations.

The results of this PA/SI were reported to EPA in May 1991 and is the basis on which EPA is placing BARC as a whole on the National Priorities List of potentially contaminated facilities.

EPA has identified an additional 48 potential sites (a total of 92 sites, including the original 44) that they believe require assessment. EPA's identifications were based on historical data and a review of aerial photographs of BARC from as early as the 1930s, indicating disturbed ground, pits, stained ground, and open storage areas. Many of these areas appear to be unplanted crop fields and land clearings resulting from ordinary agricultural activities or wetlands not meant to be planted.

Complete identification of these areas and an assessment of their potential for being contaminated will be BARC's first priority.

There is no imminent threat to the environment or people working at or living in communities surrounding the research center due to the suspected environmental contamination, based on current information.

Summary of Sites

The 17 sites listed merit further investigation for hazardous waste contamination. Where substances are noted as being "elevated", this refers to them only as being present at levels above background and is not related to levels considered harmful to human health or the environment. For location of these sites on BARC, refer to the accompanying map.

1) **Experimental Wood Treatment Area** – Half-acre site where wood was experimentally treated with chemicals through surface application or soaking in the 1940s and 1950s; elevated levels of antimony, arsenic chromium, copper, nickel, and zinc.

2) **South Farm Dump** – Two-acre site used to dispose of municipal type waste and a small amount of waste chemicals; elevated levels of chromium, copper lead, mercury, nickel and zinc. Also acetone and pesticides: dichlorodiphenyldichloroethane (DDD), dichlorodiphenyldichloroethylene (DDE), and dichlorodiphenyltrichloroethane (DDT).

3) **North Farm Dump** – Pit, about 20 feet in diameter, used to dispose of debris and possibly some chemicals in the late 1960s; elevated levels of arsenic, chromium, plus DDD, DDE, DDT, toluene, and xylenes (common in petroleum products).

4) **B033 Washdown Area** – Site used for mixing, loading, washing and rinsing of chemical sprayers and other farm equipment; elevated levels of arsenic, copper, lead, mercury, nickel, and zinc plus DDE and DDT.

5) **Herbicide Washdown Area** – Open field used for trash burning and disposal of rinse water from cleaning of herbicide sprayers; elevated levels of nickel and the pesticides atrazine and simazine.

6) **Biodegradable Site/Metro Site** – Four-acre landfill used for disposal of general refuse and some chemicals. Samples from the site contained elevated levels of arsenic, barium, beryllium, copper, lead, magnesium, manganese, mercury, zinc and asbestos. Also polynuclear aromatic hydrocarbons (PAHs), xylenes, DDT, and dieldrin were detected. Soil samples collected outside the site contained polychlorinated biphenyls (PCBs), 1,1,1-trichloroethane and trichloroethene (industrial degreasers) as well as elevated levels of lead and nickel. Stream samples contained 1,1,1-trichloroethane. Stream sediment samples contained elevated levels of barium and mercury. Ground water samples indicated DDD, DDE, DDT, 1,1,1-trichloroethane, trichloroethene as well as elevated levels of antimony, arsenic, barium, chromium, copper, lead, manganese, nickel, and zinc. The waste materials and surrounding soils have been excavated, according to plans developed in coordination with the Maryland Department of the Environment.

7) **South Dairy Road Spill** – Patch of ground where a chemical spill from a loaded sprayer occurred; atrazine, propazine, and simazine were found.

8) **APU Dump** – Disposal site for waste generated at the Animal Parasitology Unit; DDE, DDT, and xylenes and elevated levels of beryllium, lead, and zinc.

9) **Dump Off Odell Road** – Formerly a gravel pit, this eight-acre site was used for general refuse disposal; DDE, DDT, toluene, xylene and elevated levels of arsenic, chromium, lead, mercury, and zinc.

10) **B301 Washdown Area** – Site for mixing, loading, washing, and rinsing of chemical sprayers and other farm equipment; DDE and elevated levels of beryllium. Analytical data obtained independently by BARC indicated the presence of other pesticides in the dry-well on the site.

11) **Dump East of B409** – Two ravines in a wooded area used for disposal of general refuse and potentially waste chemicals; DDE, DDE, DDT, cyanide, and xylenes and elevated levels of mercury, nickel, and zinc. Sediment samples from nearby stream indicated releases of xylene, nickel, and zinc.

NO

12) **Chemical Disposal Pits** – Chemicals were disposed of in this area from late 1960s to 1980; several pits were excavated for chemical disposal and subsequently backfilled; DDD, DDE, and DDT and elevated levels of arsenic, beryllium, chromium, copper, lead, mercury, nickel, silver, and zinc. Shallow groundwater, not used for drinking water, contained chloroform, 1,2-dichloroethane, DDD and DDT.

13) **Hayden Farm Spill** – Patch of ground where a chemical spill from a pesticide sprayer occurred in 1976; simazine and toxaphene found.

14) **Airport Mixing Pad** – Area used for mixing and loading pesticides for aerial application; soil samples collected at the source and along drainage channels from the site contained the pesticides dieldrin, DDD, DDE, and DDT and elevated levels of nickel and zinc found.

15) **Test Droplet Area** – Area used for airplanes to test spraying equipment before takeoff; DDD, DDE, and DDT and elevated levels of nickel and zinc.

16) **Chemical Burial at Airport** – Clearing at the end of the north-south runway where a 10-15 pound box of unidentified chemicals was buried; Attempts to locate the box were unsuccessful. Soil samples contained toluene and xylenes.

R) **Low-Level Radiation Burial Site** – (listed in PA/SI as site 18) This site is currently regulated by the U.S. Nuclear Regulatory Commission as well as EPA. It was used for licensed subsurface disposal of low-level radioactive wastes from 1949-1987 in accordance with NRC regulations.

Summary of Additional Sites 17 - 44

These sites were determined to pose no threat to human health or the environment or contained materials not eligible for consideration under relevant EPA regulations.

17) **B-064 Scrap Area** – Wooded site used to store old materials and farm equipment. There is no information available to indicate that this area was used for chemical storage, but several empty 55-gallon drums were found.

18) **See Site (R) on Summary of Sites List.**

19) **Trenches Behind B-029** – Gully behind a hill containing junked cars and other refuse.

20) **Fill on SW Corner of Edmonston and Sunnyside Ave.** – Site in a wooded area with access from Edmonston Road. Miscellaneous appliances and furniture appeared to have been dumped here. The materials have been removed and a fence has been placed to prevent further dumping.

21) **Fill on NE Corner of Edmonston and Sunnyside Ave.** – Natural depression filled in the 1960s with soil and other material from greenhouses. The site has since been used for agriculture.

22) **College Park Landfill** – Former 28-acre sanitary landfill operated by the City of College Park from 1954 to 1978 following EPA solid waste guidelines. The landfill has been capped and is now used as a baseball field.

23) **APU Animal Burial Area** – Area was used at one time for animal burial. No records indicate chemicals were buried here.

24) **APU Sewage Sludge Site** – Area used at one time as an experimental site for the application of sewage sludge from a waste water treatment plant to crops. Use of sewage sludge as fertilizer is now a proven technology.

25) **Radioactive Truck Spill** – In the mid 1980s, a truck carrying low-level radioactive waste spilled its load. All materials were cleaned up and there is no remaining radioactivity.

26) **Dump off Poultry Road** – 800-square-foot site was used for disposing of manure from the nearby poultry operations.

27) **Beaver Dam Road Landfill** – Site operated as a state permitted rubble landfill from 1958 until late 1980s, currently undergoing official closure under state oversite. Monitoring wells installed around the landfill do not indicate the presence of chemicals.

28) **SCS Dump Area** – Soil Conservation Service (SCS), a tenant agency, used this area in the 1970s for dumping of municipal waste including trash, furniture, and organic debris.

29) **Fill Area along Little Paint Branch** – Area along the east bank of Little Paint Branch used for disposal of construction debris. No records indicate chemicals were dumped in this area.

30) **Chemical Storage Shed** – Two small sheds once used to store chemicals. Currently, no chemicals are present and there is no indication of any spills.

31) **B-442 Scrap Area** – Area used before 1963 as storage for scrap metal and surplus machinery.

32) **PCB Storage Area** – Area used since 1963 for service and repair of transformers. BARC has removed all transformers and cleaned up the PCBs contaminated soil, with oversight from the State of Maryland.

33) **Fill Area Behind B-531** – Small area of what appears to be household debris.

34) **Fill Area Behind B-537** – Site where 10 empty 55-gallon drums were once located. They have been removed.

35) **Chicken Hill** – One-acre site used for burial and surface disposal of manure from poultry operations.

36) **Airport Scrap Pile** – Area used to store scrap metal and old machinery during the time the airport was in operation. This pile was removed after the airport was closed.

37) **Waste Oil Pit** – Natural ravine used for dumping of waste oil while the airport was in operation. Although petroleum products are not covered under Superfund, this area will receive any necessary cleanup.

38) **Airport Detonation Area** – Area used for the detonation of unstable explosive chemicals, as permitted by the State Fire Marshal. Sampling indicates no chemical residues remain.

39) **Hydraulic Leak in B-303** – Hydraulic fluid leak from the elevator system in this building. Contaminated soil was removed, and the elevator has been permanently shut down.

40) **Hydraulic Leak in B-203** – Small but continual leak of hydraulic fluid from the elevator lift at this building. Absorbent was placed on the ground to absorb any fluid, and the elevator has since been repaired.

41) **Underground Storage Tank next to B-312** – Tank has been removed in accordance with Maryland state requirements.

42) **Cement Pad at Airport** – Large circular concrete pad with a large metal tripod used for surveying activities during operation of the airport and not for waste disposal activities.

43) **Excavation Near B-551** – Structure appears to be an old dug well.

44) **Dump in Woods at Airport** – Area appears to be a natural depression filled in by miscellaneous debris. Materials observed include aircraft parts, mattresses, and aluminum siding.

BELTSVILLE AGRICULTURAL RESEARCH CENTER
MD-053
Beltsville, Prince Georges County, Maryland
(National Priorities List Site)

Site Location

The Beltsville Agricultural Research Center Superfund site (BARC) is a 6,600-acre parcel of property in northwestern Prince George's County near Beltsville, Maryland. BARC is divided into five separate administrative units known as "Farms": the North, South, Linkage, Central, and East Farms.

Site History

In 1910, the United States Department of Agriculture (USDA) purchased a 475-acre farm in order to conduct agricultural research. The facility expanded to a maximum of 12,000 acres and is now at its present size of 6,600 acres. Research at BARC involves soil, water, and air conservation, plant sciences, animal sciences, commodity conversion and delivery, and human nutrition. In addition, research is done on pesticides, herbicides, insecticides, and fungicides. On-site laboratories are equipped with numerous chemicals, solvents, cleaners, and low-level radioactive chemicals for laboratory studies. Solid wastes generated at BARC included manure, waste bedding, animal carcasses, vegetative cuttings, wood, paper, scrap metal, laboratory waste, construction debris, and pesticide-, herbicide-, insecticide-, and fungicide-derived wastes.

Environmental Investigations

In 1991, a Preliminary Assessment/Site Investigation (PA/SI) report was submitted to the Environmental Protection Agency (EPA), that identified 44 potential areas of concern (AOCs). In 1994, the Beltsville Agricultural Research Center (BARC) was placed on the National Priorities List (NPL). In 1998 the USDA-Agricultural Research Center entered into a Federal Facility agreement (FFA) with the EPA, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Later studies by the EPA and environmental subcontractors identified an additional 122 AOCs. After additional investigations, the number of AOCs was reduced. Currently, out of over 60 AOCs identified, 27 are considered to be "no further action", 23 require additional sampling and/or a removal action, six are in negotiation with the EPA on site disposition, and four sites were put in the CERCLA Remedial Investigation/Feasibility Study (RI/FS) process (described below).

The Biodegradable Site (BARC 6) is a 3-4 acre landfill used until the mid-1970s for disposal of construction debris, laboratory waste, and biodegradable plant material. This site is now part of a parcel of land leased to the Washington Metropolitan Area transit authority (WMATA) for use as a rail maintenance yard, with the future goal of transferring ownership of this property to WMATA. In 1993, a removal action resulted in 70,000 cubic yards of landfill material removed and replaced with clean backfill.

The College Park Landfill (BARC 22) is a 30-acre landfill, active from 1954 to 1978. It was operated by BARC, the City of College Park, and the City of Greenbelt for disposal of residential wastes, construction debris, and chemical wastes from greenhouses in BARC. Currently, there are two softball fields on top of the landfill. No cap was constructed on top of the landfill and no groundwater monitoring system was implemented.

The Chemical Disposal Pits (BARC 12) were initially identified for a PA/SI report in 1991. In historical aerial photography, the site was identified as an open burning/disposal area as early as 1943. Chemical disposal in an estimated 100 pits, measuring 10x10x12 feet, began in 1965. In the late 1970s and early 1980s, the USDA conducted a pilot sludge composting operation in this area. Presently, the site is used as an equipment and bulk materials marshalling yard for BARC. Site characterization sampling has identified volatile organic compounds, metals, and pesticides as contaminants of concern.

The Beaver Dam Road Landfill (BARC 27) was identified in the 1991 PA/SI as a 3-1/2 acre landfill used to dispose of construction rubble, furniture and other debris as early as 1943. Landfill operations ceased in 1990 and groundwater monitoring wells were installed for landfill permit requirements. Closure activities at the site included the construction of a clay cap with a geo-synthetic liner underneath. Groundwater sampling at the 4 monitoring wells as well as surface water sampling (Beaver Dam Creek and a tributary) showed elevated concentrations of volatile organic compounds and metals.

The Low-Level Radiation Burial Site (BARC 18) is an inactive 1.5-acre landfill used from the late 1940s to 1987. Radioactive isotopes, scintillation tubes, metals, glass, plastic, and animal waste were disposed at the site. BARC records indicate that a total of 50 10x12x10 feet deep pits were dug and five feet of clean backfill to grade covered the debris. 33,00 cubic feet of waste is estimated to be at this site. A hydrogeologic characterization report in 1994 and the implemented work plan of June, 1997 found groundwater contamination with chloroform, radium 226/228, and C-14.

Current Status

With the discovery of a groundwater plume of perchloroethylene, originating off-site from the W.P. Ballard Company, a dry cleaning supplier, the Biodegradable Site (BARC 6) RI report is being revised. The final RI report is anticipated in mid 2004.

The College Park Landfill (BARC 22) RI Work Plan was approved in December, 1999, but the RI report was put on hold due to the EPA's rejection of a presumptive remedy. Instead, a pilot study was designed and presented to MDE in March 2003. The pilot study, conceptual in design, will be used to focus the RI/FS, which is due to be completed in 2006.

The Chemical Disposal Pits (BARC 12) RI Work Plan was approved in February, 2000. A draft RI report on this operable unit is scheduled for mid 2004.

The Beaver Dam Road Landfill (BARC 27) RI Work Plan was submitted in July, 2002. Fieldwork for that RI began in March, 2002. Estimated completion of the RI is Spring, 2004.

CERCLA and the Nuclear Regulatory Commission (NRC) monitor the Low-Level Radiation Burial site (BARC 18). A "non-time critical" removal action was deemed to be necessary at the site by EPA. An engineering evaluation/cost analysis (EE/CC) report for the non-time critical removal, which will entail excavation of radiological waste from the landfill and proper treatment and disposal of these wastes, was prepared and submitted in September, 2002. A draft characterization plan was submitted in April, 2003. A follow-up Decommissioning Plan and a Site Investigation report are to be submitted later at an undetermined time, depending on future funding.

MD-90 Prince George's County	
1981	Notification on Hazardous Waste form submitted to EPA.
1983	MDE conducted a Preliminary Assessment.
1984	EPA performed site inspection.
1992	Triegel and Associates conducted field investigations.
1992	MDE conducted *Level III Site Inspection Prioritization*.
1995	MDE collected groundwater samples.
1996	Expanded *Site Inspection* report prepared for EPA.
2001	Quarterly sampling performed.
2001	Topographic site survey completed.

BOWIE-BELAIR LANDFILL
Bowie, Maryland

Site Location

The Bowie-Belair Landfill is located in the town of Bowie, Prince George's County, Maryland. The site coordinates are 38°59'22" North and 76°42' 48" West. The site comprises approximately 120 acres of land and includes two landfill mounds or cells referred to as the Eastern and Western Mounds. The Mounds are connected to a leachate collection system via aboveground conduits. The Western Mound measures approximately 29 acres; it was placed over a former sand quarry. The Eastern Mound covers an approximate area of 53 acres; it is presently fitted with methane vents.

Site access is through Public Works Road, which branches off State Road 450, which in turn branches off State Road 3. The site is limited to the north by heavily vegetated but vacant properties and to the east by the Little Patuxent River. State Roads 3 and 450 constitute the southern boundary of the site and Public Works Road, its western boundary.

Site History

Landfilling activities began at the site in 1960 and continued without permits until 1975. The first regulatory record pertaining to the site is Permit No. 74-16-14-09A issued by the Maryland Department of Health and Mental Hygiene in January 1975. The permit authorized construction of a sanitary landfill on the premises.

In 1975, Browning-Ferris Industries, Inc. (BFI) leased the facility and obtained a Certificate of Use and Occupancy in August 1976 (Permit No. 204-750) from the Prince George's County Department of Licenses and Permits. BFI retained control of all landfilling operations through 1980 when the landfill ceased to operate.

Although Bowie-Belair was a sanitary landfill, BFI reportedly accepted "hazardous material consisting of rotary press cleaning paper impregnated with ink and solvents from the Government Printing Office." BFI also informed the U.S. Environmental Protection Agency (EPA) that "unknown quantities of hazardous waste of undetermined identity were probably mixed with industrial, municipal, and household wastes. Small quantities were probably also mixed with sanitary sewage sludge." Environmental remedial actions such as soil or groundwater treatment, soil excavation, and off-site disposal were not implemented at Bowie-Belair. BFI did, however, ensure that the Eastern and Western Mounds were covered with soil and seeded. These mounds were also fitted with leachate collection sumps, the contents of which were periodically collected and properly disposed of off site. BFI managed such maintenance activities during and after landfilling activities.

Environmental Investigations

In June 1981, BFI submitted a *Notification of Hazardous Waste* form to EPA. The notification led to multiple investigations whose findings were documented by the EPA and Maryland Department of the Environment (MDE) in the reports discussed below.

In 1984, EPA performed a site inspection at the Bowie-Belair site. They collected six aqueous samples from nearby ponds and streams, both up and downstream, a water sample from a private well, a soil sample "near the gas vent area" and four other soil samples along the same streams and ponds. The 1985 EPA report contended that possible on-site contaminants could be detected in nearby wells under flood conditions and reported levels of metals in on-site ponds.

A field investigation in 1992 included installation of five monitoring wells and collection of 15 core samples on and off site, surface and subsurface soil samples, and groundwater and surface water samples.

Samples were analyzed for inorganic, volatile organic, and semi-volatile organic compounds. Concentrations of these compounds were reported in the report of findings.

In 1992, MDE's Hazardous and Solid Waste Management Administration performed a Level III Site Inspection Prioritization of the site. Samples were analyzed for all priority pollutants (volatile organic compounds, semi-volatile organic compounds, pesticides, polychlorinated biphenyls, total metals and cyanides). Organic compounds were detected, but did not exceed applicable standards. Inorganic constituents were also detected, and their concentrations in the samples collected near the Eastern Mound exceeded standards.

In 1995, MDE collected groundwater samples from five on-site monitoring wells and two residential wells within a half-mile radius of the site. Metals and organic compounds were detected in the monitoring wells and elevated concentrations of beryllium were detected in one residential well. MDE also collected surface water and sediment samples from ponds and streams located on and near the site and soil samples from locations on and off site. The samples were analyzed for metals, semi-volatile organic compounds and volatile organic compounds. The analytical results were presented in a report prepared for EPA, *Expanded Site Inspection Report, Browning Ferris Industries, Bowie-Belair Sanitary Landfill*, dated December 1996 and revised May 2001. The results of the toxicological report established that the site presented no direct threat to human health and to the environment.

Compliance sampling performed in early 2001 indicated that all organic compounds were below the method detection limit. However, total unfiltered metal analyses detected antimony in one monitoring well at a concentration of 8 parts per billion (ppb), which slightly exceeded the criterion of 6 ppb (*MDE Cleanup Standards for Soil and Groundwater*, December 2000). Cadmium was detected above the 5 ppb criteria in three monitoring wells at concentrations of 6 ppb, 7 ppb, and 14 ppb. Dissolved (filtered) metals were below the MDE criteria in all samples.

In early 2001, a topographic site survey was completed, the erosion control system was evaluated, and a methane vent was installed in the Western Mound.

Current Status

This site is on the State Master List that identifies potential hazardous waste sites in Maryland. The Master List includes sites currently identified by EPA's Comprehensive Environmental Response Compensation and Liability Information System. EPA has given the site a designation of No Further Remedial Action Planned (NFRAP). The designation of NFRAP by EPA does not mean that MDE has reached the same conclusion concerning further investigation at the site. The information contained in the fact sheet presents a summary of past investigations and site conditions currently known to MDE.

Current Activity

MDE is monitoring the site in terms of erosion control measures for the landfill cover, leachate collection, and other ecological factors pertaining to the local flora. The site owners are addressing MDE's methane gas emission and leachate collection system concerns. Additionally, the owners have implemented a quarterly groundwater-monitoring program.

Future Activity

MDE has requested that the owners evaluate the soil cover on the landfill and provide an accurate groundwater contour map.

Facility Contact

Arthur O'Connell, Chief	Site and Brownfields Assessments/State Superfund Division Maryland Department of the Environment	410-537-3493

MD-267 Prince George's County	
1936	PWRC was established.
1963-1986	Chemical Leachfield used for disposal of liquid wastes.
mid-1970	Slit Trench used for disposal of chemical wastes.
1950s-1970s	Old Dump used for disposal of construction debris, furniture and household waste.
1986	Disposal of chemical wastes into Leachfield discontinued.
1988	R & R International conducted investigation.
1989-1990	R & R conducted *Preliminary Assessment* and *Site Investigation* of the entire site.
1991	*Site Investigation Report* and *Addendum* prepared.
1992	*Expanded Site Investigation* conducted.
1993	Additional 8,100 acres were added to site.
1995	*Supplemental Expanded Site Investigation* report completed.
1997	USFWS notified MDE of its intention to close the sites under a non-CERCLA action.

PATUXENT WILDLIFE RESEARCH CENTER
Laurel, Maryland

Site Location

The Patuxent Wildlife Research Center (PWRC) is located in the Patuxent River Valley, just south of the Patuxent River near Laurel, Maryland. The site occupies approximately 12,800 acres midway between Washington, D.C. and Baltimore, Maryland. PWRC land consists of fields, woodlands, man-made ponds, marshes and swamps.

Site History

PWRC was established in 1936 under the Bureau of Biological Survey, now the U.S. Fish and Wildlife Service (USFWS) as America's first national wildlife experiment station. PWRC's mission has been to help protect and conserve the nation's wildlife resources through research on critical environmental problems and issues.

Three areas of concern were identified at the PWRC as a result of reported chemical disposal practices. The areas of concern consisted of the Chemical Leachfield, the Slit Trench, and the Old Dump. Between 1963 and February 1986 liquid wastes from Stickel Laboratory, which provided analytical support to the PWRC, were disposed of in a 50-foot by 100-foot Chemical Leachfield. The wastes were poured into laboratory sinks, conveyed through a sewer pipe to a concrete distribution box on the north-west side of the leachfield, and transferred from the distribution box to the leachfield through a series of seven distribution drain pipes. On-site disposal of chemical wastes into the leachfield was discontinued in February 1986.

The Slit Trench was reportedly a 4 feet by 20 feet rectangular excavation, 2 to 4 feet deep, about 55 feet southwest of the Old Dump. It was purportedly used for about 2 years in the mid 1970s for disposal of small volumes of chemical wastes (e.g., pesticide standards mixed in food oils).

The Old Dump was situated on 0.56 acres of land and reportedly was used between the 1950s and 1970s for disposal of construction debris, old furniture, and household waste. Interviews with former employees indicate it may have been used as a chemical disposal area, although one employee disputed the allegation that chemicals were buried at the Old Dump. He stated that in the 1950s and 1960s waste chemicals, batteries and drums were disposed of at the Old Agricultural Research Center Dump, rather than at PWRC.

Initially the site consisted of 4,700 acres. In 1993, an additional 8,100 acres were transferred from Fort George G. Meade under the Base Realignment and Closure legislation.

Environmental Investigations

Three significant phases of site investigation activity have taken place at the PWRC between 1986 and 1995. The investigations and evaluations were conducted as part of the site evaluation process defined by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

In 1988, R & R International Inc. (R & R) conducted an investigation that generally focused on the Chemical Leachfield area. However, based on the results of the initial investigation, R & R conducted a *Preliminary Assessment* (PA) and a *Site Investigation* (SI) of the site, including the Old Dump and Slit

Trench, in 1989 and 1990, respectively. The purposes of the PA and SI were to determine if the site required additional investigation in accordance with CERCLA requirements and to determine if the site should be placed on the National Priorities List (NPL). The PA and SI concluded that sufficient evidence was available to proceed with ranking the site using the Hazard Ranking System (HRS) developed by the U.S. Environmental Protection Agency (EPA).

In regard to the Old Dump and Slit Trench, the PA and SI phase included the installation of monitoring wells, background wells and one well between the Old Dump and Slit Trench; the excavation of one test pit near the Slit Trench; and the collection of subsurface soil and groundwater samples. The results of the PA and SI were presented in the *Site Investigation Report* of February 1991, and a subsequent addendum in April 1991. Groundwater quality data indicated that elevated concentra-tions of aluminum, iron, lead, manganese, nickel and vanadium existed in monitoring well MW-5. Metal constituents were observed in monitoring well MW-2 but none exceeded background levels.

An *Expanded Site Investigation* (ESI) was conducted in 1992. The ESI included the collection of one surficial background sample, four surficial soil samples from depths of 0 to 1 foot at the Old Dump, and one surficial composite sample at the Slit Trench. The composite sample was collected near the reported estimated middle of the Slit Trench. The sample contained metals at concentrations slightly above background, plus endrin and Aroclor-1254. No groundwater samples were collected during this investigation.

The ESI also included the collection of four surficial soil samples from depths of 0 to 1 foot at the Old Dump and a geophysical survey of the area. This information was collected to determine the character of surficial soils and approximate limit of waste. The area of waste for the Old Dump was estimated to be about 0.75 acres. The soil samples contained metals generally around background levels, with one sample slightly exceeding background levels for cadmium, chromium and lead and another sample located in an area for drum storage exhibiting the highest concentration for lead and some semi-volatile organic compounds (benzo(a)pyrene, fluoranthene, phenathrene, and pyrene).

Following completion of the HRS, EPA identified several data deficiencies, which required the completion of a *Supplemental Expanded Site Investigation* report (SESI). The report was completed in August 1995. Based on a review of the laboratory analysis and subsurface observations made at the site, the SESI determined that the reports of dumping in the Slit Trench and reports of disposal of hazardous materials in the Old Dump could not be substantiated. Furthermore, it concluded that there were no significant migration pathways to the site groundwater, with the exception of surface water percolation. The report concluded that the Slit Trench and Old Dump were not a threat to human health or to the environment due to the low concentrations of contamination and the distance from the site to sur-rounding potable water wells and recreational surface waters. It was also concluded that the combined HRS score for the site, including the Chemical Leachfield was well below the score that would warrant the site being placed on the NPL. Therefore, site remediation and closure would be performed in accordance with Maryland solid waste regulations.

A small sampling program was conducted in March 1995 to characterize the sediment/sludge in the headbox associated with the Chemical Leachfield and a sample was collected for chemical analysis. The waste sludge was found to be Resource Conservation and Recovery Act hazardous waste due to the concentration of lead.

In June 1997, the USFWS notified the Maryland Department of the Environment (MDE) of its intention to close the Old Dump, the Slit Trench and the Chemical Leachfield sites under a non-CERCLA action since EPA had not placed the PWRC on the NPL.

Current Status

This site is on the State Master List that identifies potential hazardous waste sites in Maryland. The Master List includes sites currently identified by EPA's Comprehensive Environmental Response Compensation and Liability Information System. EPA has given the site a designation of No Further Remedial Action Planned (NFRAP). The designation of NFRAP by EPA does not mean that MDE has reached the same conclusion concerning further investigation at the site. The information contained in the fact sheet presents a summary of past investigations and site conditions currently known to MDE.

MD-278
Prince George's County

1941	Norman Scow founded a plant that produced chrome pigments and iron oxide.
1972	Rockwood Industries purchased property; Mineral Pigments became a subsidiary.
1977	WRA issued Administrative Complaint and Order.
	WRA collected upstream and downstream sediment samples.
1978	DNR hearing rescinded Complaint and Order; but ordered intensive survey of area.
1985	MDE completed routine inspection.
	Investigation of Soil and Shallow Ground-Water Quality Conditions report prepared.
	Facility experienced a #2 fuel oil spill.
1985-1986	MDE observed land supervised excavation of drums and deteriorated fiber containers.
	MDE sampled the fill area.
1987	Mineral Pigments signed Consent Order CO-87-184, agreeing to perform annual groundwater monitoring.
1988	Mineral Pigments signed Consent Order CO-88-298, agreeing to obtain WSSC approval for wastewater disposal.
1990	*Environmental Priorities Initiative/Preliminary Assessment* report prepared.
1992	Mineral Pigments installed two wells and collected groundwater samples.

MINERAL PIGMENTS CORPORATION
Beltsville, Maryland

Site Location

Mineral Pigments Corporation is located in Prince George's County, Maryland approximately 2 miles north of Beltsville. The address is 7011 Muirkirk Road, Beltsville. The site is 500 feet southeast of the intersection of Baltimore Avenue (U.S. Route 1) and Muirkirk Road, in a predominantly commercial and industrial area. Chessie railroad tracks are to the west. Conway Road is to the east and a light industrial park is to the south. The site geographic coordinates are 39° 03' 30" North and -76° 53' 08" West. The site slope is less than 3 percent.

Site History

The 3 ½-acre Mineral Pigments parcel was purchased by Norman Scow just before World War II, although the exact date of purchase is unknown. Prior to Scow's purchase, a brick-manufacturing firm owned the property. Scow founded a plant that produced chrome pigments and iron oxide. In 1972, Rockwood Industries obtained the property and Mineral Pigments became a subsidiary. Production expanded over the years and zinc phosphate, "Clear Shield" and "Form Shield" were manufactured along with the chrome pigments. These colors or pigments may be composed of either zinc chromate, barium chromate or strontium chromate.

Environmental Investigations

On July 18, 1977, the Water Resources Administration (WRA) issued Administrative Complaint and Order Nos. C-78-037 and C-0-78-037, respectively, to Mineral Pigments Corporation. These documents informed the corporation of the finding of toxic pigments that were discharged from the facility into an unnamed tributary of Indian Creek as a result of incomplete wastewater treatment. The complaint ordered Mineral Pigments to remove the inorganic pigment material from the stream and pond sediments. The facility did not comply with the order.

In October 1977, WRA obtained sediment samples upstream from Mineral Pigments and downstream from the pond area. The upstream analysis revealed the presence of zinc (24.60 parts per million [ppm]), chromium (18.00 ppm), and lead (47.50 ppm). The downstream analyses revealed elevated levels of zinc (23.9 to 7,986 ppm) chromium (41.3 to 9,749 ppm), and lead (35.8 to 10,870 ppm). The Department of Natural Resources held a hearing in Annapolis, Maryland in January 1978 with Mineral Pigments concerning chromium-bearing pigments being discharged into waters of the State. The hearing decision rescinded WRA's Complaint and Order as being unclear but ordered an intensive survey of the area.

In early 1985, the Maryland Hazardous Waste Enforcement Division completed a routine inspection of the facility and discovered extremely poor housekeeping. Samples were collected for EP toxicity testing and Mineral Pigments was ordered to take specific clean-up actions. A follow-up inspection recorded a nitric acid spill that was cleaned up, but not reported to state authorities.

Mineral Pigments conducted a site investigation in Summer 1985 and reported the results in December 1985 in the report, *Investigation of Soil and Shallow Ground-Water Quality Conditions at the Mineral*

Pigments Plant, Beltsville, Maryland. The investigation included installation and sampling of soil and groundwater from six monitoring wells, collection of groundwater samples from within the augers of another seven borings, and an assessment of the fill area located north of the plant. The investigation determined that degradation of shallow groundwater had occurred over much of the site, although metal levels in groundwater were generally low. EP toxicity testing of soil samples from the fill area detected less than 1.0 milligram per liter (mg/l) total chromium and lead in most samples.

In late 1985 and early 1986, the Maryland Department of the Environment (MDE) observed and supervised the excavation of approximately 20 55-gallon drums and numerous, deteriorated fiber containers from the fill area. The containers and drums held approximately 80 percent iron oxide and 20 percent paint, chrome pigments, hydrochloric acid, ferric ferrocyanide (blue pigment) and sulfuric acid. On February 19, 1986, the fill area was sampled by MDE and analyzed for EP Toxicity. Chromium levels were less than 2.0 ppm so MDE allowed the excavated fill area to be filled.

In September 1985, the facility experienced a #2 fuel oil spill of 50 to 75 gallons from a ruptured line. The product was recovered and authorities were notified.

Consent Order C-0-87-184, signed in April 1987, documented Mineral Pigments' agreement to perform semi-annual groundwater monitoring for two years followed by annual monitoring for three years. The order stipulated that if contamination levels were significantly reduced at the end of the monitoring period, all monitoring would cease.

Consent Order CO-88-0298, signed August 1, 1988, documented Mineral Pigments' agreement to obtain the approval of the Washington Suburban Sanitary Commission (WSSC) to discharge all process wastewater to the WSSC sanitary system and cease all surface-water discharge, which was authorized by their Discharge Permit 86-DP-0492.

An *Environmental Priorities Initiative/Preliminary Assessment* report prepared in February 1990 reported that although Mineral Pigments had corrected some on-site deficiencies in waste handling, poor housekeeping practices continued. The report further noted that analytical results from March 1989 revealed high concentrations of hexavalent chromium (up to 80,000 ppb) and total chromium (up to 45,600 ppb).

In 1992, Mineral Pigments drilled two more wells and collected groundwater samples because free-phase petroleum hydrocarbons had been detected on site. The new wells and the existing wells without free-phase petroleum hydrocarbons were sampled for Total Petroleum Hydrocarbons (TPH), semi-volatile organics, total chromium, and hexavalent chromium. TPH was below detection level in the new wells, although 8.6 mg/l hexavalent chromium was detected in one of the wells.

Current Status

This site is on the State Master List that identifies potential hazardous waste sites in Maryland. The Master List includes sites currently identified by the U.S. Environmental Protection Agency's (EPA) Comprehensive Environmental Response Compensation and Liability Information System. EPA has given the site a designation of No Further Remedial Action Planned (NFRAP). The designation of NFRAP by EPA does not mean that MDE has reached the same conclusion concerning further investigation at the site. The information contained in the fact sheet presents a summary of past investigations and site conditions currently known to MDE.

Facility Contact

Arthur O'Connell, Chief	Site and Brownfields Assessments/State Superfund Division Maryland Department of the Environment	410-537-3493

Prince George's County	
1965-1988	A dry cleaning fluid distribution facility operated at the site.
12/1988-	The Department was notified of PCE contamination at the site.
2/1989-	A bulk storage aboveground storage tank used for PCE storage was drained, cleaned, and removed from the property.
3/1989-	Groundwater samples were collected from four newly-installed monitoring wells on the property. PCE was detected at concentrations as high as 142,000 ug/l.
1989-1996	A number of soil, groundwater, and soil vapor investigations were performed at the site.
10/1998-	The property was accepted into the VCP.
5/1999-	Additional soil, groundwater, and surface water testing was performed at the site.
1/28/00-	A proposed response action plan was submitted to the Department for approval.

W.P. BALLARD & COMPANY OF WASHINGTON
10722 Tucker Street
Beltsville, Maryland
(Voluntary Cleanup Program)

Site Description

This 0.8-acre property, owned by W.P. Ballard & Company of Washington, is located in the Beltsville Industrial Center. From 1965 to October 1988, Ballard operated a dry cleaning distribution facility at the property. During this period, large quantities of tetrachloroethene (PCE) were routinely handled and stored on the property. In 1995, Ballard leased the property to Columbia Architectural Products, Inc., a manufacturer of aluminum building facades.

Environmental Concerns

While Ballard occupied the property, tetrachloroethene was brought to the facility by rail car or truck and temporarily stored in a bulk-storage tank located on the western portion of the property. Tetrachloroethene was transferred from the storage tank into tanker trucks, drums, and smaller containers for distribution. Leakage from the bulk storage tank and periodic spills during transfer operations has contaminated on-site soil and groundwater with tetrachloroethene. In addition, free phase tetrachloroethene has been observed in at least one on-site monitoring well. Contaminated groundwater migrating southeast from the property has entered Indian Creek, a tributary to the Anacostia River, located approximately 1,700 feet away.

Environmental concerns at the property first came to MDE's attention in December 1988, when an excavating company notified the Department's Hazardous Waste Program that the on-site bulk-storage tank had leaked tetrachloroethene onto the (unpaved) ground. Shallow soil samples collected from this area in November 1988 indicated tetrachloroethene concentrations as high as 720,000 parts per million. In February 1989, the bulk storage tank was emptied of residual tetrachloroethene, washed, dismantled, and removed from the site. In March 1989, shallow groundwater samples collected from four newly-installed monitoring wells on the site revealed tetrachloroethene concentrations as high as 142,000 parts per billion.

Between 1989 and 1992, Ballard conducted additional investigations to determine the source and extent of site contamination and develop a site remediation strategy. A soil vapor survey was performed, on-site and off-site monitoring wells were installed and sampled, and a soil-vapor extraction pilot test was conducted. Several drafts of a remedial design plan were submitted to the Department during this period; however, none was approved.

An estimated 2,500 people are served by public and residential wells within three miles of the property. The nearest public supply well is 363 feet deep and is located approximately 1.5 miles southeast of the Ballard property and serves the Beltsville National Agricultural Research Center. The nearest residential well is reportedly located approximately 0.4 mile south of the property.

Voluntary Cleanup Program (VCP) Status

On October 23, 1998, the Ballard property was accepted into the VCP with responsible person status. In May/June 1999, at the request of the Department, the participant collected additional soil and groundwater samples from the site and additional surface water samples from Indian Creek. The results of these samples were used in the design of the response action plan for the property.

On January 26, 2000, the Department received a proposed response action plan for the property. At the request of an occupant of an adjoining property, a public informational meeting was held on April 17, 2000 to present the proposed response action plan to the public. The Department received comments on the proposed response action plan from the public for thirty days after the public meeting. The Department issued comments on the proposed response action plan to the participant on July 6, 2000 and is awaiting a response from the participant.

Site Contact

James W. Metz	Maryland Department of the Environment Voluntary Cleanup/Brownfields Division	(410) 631 – 3493

MD-248
Prince George's County

1970	Approximate date when URH began operations.
1985	Citizen complaint of oil release to Indian Creek made to County Health Department.
	Transformers found on site. EPA and HSWMA sampling detected high levels of PCBs. Asbestos also found but no dioxin.
	EPA initiated PCB cleanup and removal. Asbestos removed from site.
1986	Remediation completed.
1989	EPA performed a Site Inspection.
1999	MDE performed a Site Survey.
2000	EPA notified MDE they planned no additional Superfund action.

UNITED RIGGING AND HAULING
Beltsville, Maryland

Site Location

The United Rigging and Hauling site is located ½ mile northeast of Beltsville in Prince George's County, Maryland. The 10-acre site is on Ammendale Road about midway between U.S. Route 1 to the west and the Old Baltimore Pike to the east. A mixture of residential and industrial properties surrounds the site.

Site History

United Rigging and Hauling Company (URH) was a rigging and hauling operation that started in 1970. The company stored large equipment and occasionally acquired, stored and stockpiled of scrap electrical transformers. Property use before 1970 is unknown.

In early May 1985, the Prince George's County Health Department received an anonymous complaint regarding an oil release into nearby Indian Creek. A sample collected by the County from an oil-filled storm water drainage culvert revealed the presence of polychlorinated biphenyls (PCBs) at 235 parts per million (ppm). The County immediately referred the site to the State of Maryland's Hazardous and Solid Waste Management Administration (HSWMA), who notified the Maryland Hazardous Waste Strike Force (HWSF). Additional samples of water, soil, and sediment were taken from the Indian Creek tributary and the drain culvert to be analyzed at the state's laboratory. These samples also showed PCB contamination.

On May 1, 1985, the HWSF obtained a search warrant against URH that included provisions for digging trenches, searching for buried waste, impounding records, and conducting extensive sampling.
The facility stored more than 700 transformers in two different locations. These locations were later designated the Potomac Electric Power Company (PEPCO) Transformer Storage Area and the EEC Transformer Storage Area. The transformers were stored in a haphazard manner and it was apparent that several of the transformers were leaking due to the high concentration of PCBs found in the soil. None of the PCB transformers were found to be PCB labeled. The facility did not maintain inspection logs, annual documents, manifest records, or any other PCB-related documents. The site was open and exposed to the environment with no measures in place to prevent or control spills or to minimize site access.

HWSF collected multiple samples from transformers and on- and off-site soils. This preliminary data showed PCB concentrations ranging from 50 to 80 percent in the transformers, contamination of on-site soil up to 55,000 ppm and off-site migration of PCBs was up to 2,000 ppm. Due to the immediate threat to public health and the environment, the U.S. Environmental Protection Agency (EPA) was notified of the situation. EPA subsequently ordered an emergency cleanup under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

Environmental Investigations

On May 8, 1985, EPA and HSWMA assessed the area and found severely stained soils, oil sheens in drainage culverts leading into the adjacent stream, and more than 760 transformers on site, many leaking and some bearing PCB labels. Between May 13 and July 8, 1985, a total of 565 samples were collected to determine levels of cleanup activities. Laboratory results showed PCB concentrations up to 955,522 ppm in transformers and up to 128,000 ppm in soils. An on-site aqueous sample showed a PCB level of 2.6 parts per billion (ppb).

On May 9, 1985 it was found that the on-site burning of PCBs may have occurred, which increased the possibility of dioxins on site. EPA sampled for dioxin in a burn area on the northern end of the property and results did not show dioxin to be present.

On May 21, 1985, the (DHMH) sampled materials believed to contain asbestos. Sample results showed from 1 percent to 70 percent asbestos in several areas on site. The asbestos was subsequently removed from the site.

EPA initiated the PCB cleanup and removal in late May 1985. By the end of June, PEPCO, which owned most of the transformers, took over the remediation, which was completed in January 1986. Between July 25 and December 17, 1985, all PCB-contaminated soil and debris were removed from site and sent to Model City, New York for disposal. A total of 553 truckloads of soil and debris were removed, for a total removal of approximately 7,728 cubic yards of contaminated material. Three soil samples collected by the state after the cleanup operations were finished revealed PCBs were not detected in the ppm range.

EPA performed a site inspection of the facility on September 28, 1989. PCBs were found at low concentrations in many of the on-site soil and sediment samples. The highest concentration, 3.6 ppm, was found in the sediment at the end of the drainage pipe near the fence line. The second highest concentration, 1.1 ppm, was found at the head of the drainage pipe behind the main building.

In 1999, MDE performed a Site Survey for the URH site. In January 2000, EPA notified MDE on the basis of the *Site Survey Report* that they did not contemplate additional Superfund action for the site.

Current Status

This site is on the State Master List that identifies potential hazardous waste sites in Maryland. The Master List includes sites currently identified by EPA's Comprehensive Environmental Response Compensation and Liability Information System. EPA has given the site a designation of No Further Remedial Action Planned (NFRAP). The designation of NFRAP by EPA does not mean that MDE has reached the same conclusion concerning further investigation at the site. The information contained in the fact sheet presents a summary of past investigations and site conditions currently known to MDE.

Facility Contact

Arthur O'Connell, Chief	Site and Brownfields Assessments/State Superfund Division Maryland Department of the Environment	410-537-3493

An updated Site Management Plan is maintained for the entire facility. In addition, the site-wide Human Health Baseline Risk Assessment and a Baseline Ecological Risk Assessment are ongoing.

Facility Contacts

John Fairbank	Maryland Department of the Environment (410) 537-3440 Federal/NPL Superfund Division

Croom Launch and Control Nike Site (MD-230 & 231)
Prince George's County, Maryland
(W-35)

Site Location

The Croom Nike site is located in Upper Marlboro, Prince George's County, Maryland. The site consists of a 13.27-acre former launch area near Duvall road and a 13-acre former control area on Mt. Calvert Road.

The former launch area is bordered by farmland, rural residential areas and woods. The property includes former barracks, two missile magazines and associated launch pads, and structures currently used for classrooms, automotive mechanics vocational training and storage.

The former control area is bordered by rural residential areas. This property includes structures currently used for classrooms, administrative offices, daycare and a cafeteria. In addition, a basketball court, pool and locker rooms are on the property.

Site History

From the 1950s until the 1960s, the property was used by the Army as a Nike air defense missile site. Nike missile batteries were active in the United States during that time frame as part of a defense system designed to defend against foreign bomber and missile penetrations.

This site was deactivated in the mid-1960s. Since that time, Prince George's County has used the properties for vocational schools, including an automobile maintenance training operation at the former launch area.

Environmental Investigations

In 1985, the U.S. Army Corps of Engineers contracted EA Engineering to conduct a site assessment of the former launch area. Four monitoring wells were installed and low levels of chlorobenzene, dichloroethene, toluene and trichloroethene were detected in groundwater samples. The Maryland Waste Management Administration sampled approximately 40 residential wells in the vicinity of the site in 1986, and organic compounds were detected in eight samples. These eight wells were resampled the same year, and volatile organic compounds were confirmed in one of the eight wells (1,2-dichloroethane at 4 parts per billion (ppb), tetrahydrofuran at 56 ppb and 2-butanone at 31 ppb).

The Corps of Engineers retained EA Engineering to conduct a Remedial Investigation in 1989. Four additional monitoring wells were installed for this effort. Samples were collected from eight monitoring wells, an on-site production well, several residential wells, surface water, sediment, and soil. This effort confirmed the presence of trichloroethene (100-130 ppb) and 1,2-dichloroethane (9-11 ppb) in one monitoring well sample.

In 1992, a Screening Site Inspection report was completed by Halliburton NUS for the U.S. Environmental Protection Agency (EPA). This report confirmed the results of the previous investigations in accordance with EPA documentation requirements.

Supplemental Remedial Investigation activities were conducted by the Corps of Engineers during 1996-97. These activities confirmed the presence of trichloroethene in the groundwater although at lower levels (30 ppb) than prior samples.

A draft Feasibility Study (FS) was published in 1998 by the Corps of Engineers. This document screened several remedial alternatives and carried two through a complete evaluation: no further action and monitored natural attenuation. The Corps of Engineers has been communicating with the Federal Facilities Section to determine the appropriate action and finalize the FS.