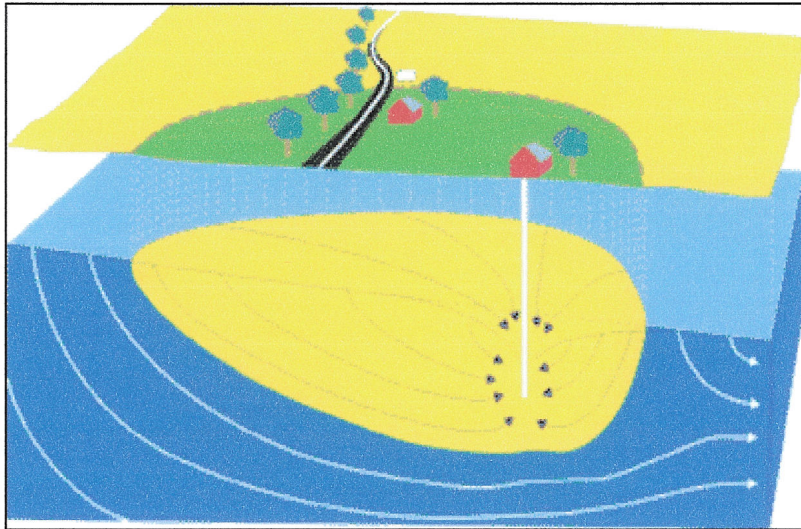


**SOURCE WATER ASSESSMENT**  
for  
**BTR HAMPSTEAD, INC.**  
**CARROLL COUNTY, MD**



**Prepared By**  
**Water Management Administration**  
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**March 2006**



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## SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for the BTR Hampstead (formerly Black & Decker) facility. The required components of this report as described in Maryland's Source Water Assessment Plan (SWAP) are: 1) delineation of an area that contributes water to the source, 2) identification of potential sources of contamination, and 3) determination of the susceptibility of the water supply to contamination. Recommendations for protecting the drinking water supply conclude this report.

The source of BTR Hampstead facility's water supply is an unconfined saprolite and fractured rock aquifer, known as the Lower Pelitic Schist. An onsite ground water remediation system made up of nine wells and a water treatment system also provides piped water to the facility for its water supply. The Source Water Assessment Area was delineated by the Water Supply Program based on water table maps and topographic boundaries.

Potential sources of contamination within the assessment area were identified based on site visits, file reviews and land use maps. It has been documented that past practices at the facility have caused ground water contamination. The two principal contaminants are chlorinated solvents, tetrachloroethylene (PCE) and trichloroethylene (TCE). Well information and water quality data were also reviewed. Figures showing land uses and potential contaminant sources within the Source Water Assessment Area and an aerial photograph of the well locations are enclosed at the end of the report.

The susceptibility analysis for the BTR Hampstead facility's water supply is based on a review of the water quality data, potential sources of contamination, aquifer characteristics, and well integrity. It was determined that the BTR Hampstead facility's water supply is susceptible to contamination by volatile organic compounds, but not to synthetic organic compounds, microbiological contaminants or inorganic compounds.

## INTRODUCTION

The Water Supply Program (WSP) has conducted a source water assessment for the BTR Hampstead facility's water supply in Carroll County (figure 1). The BTR Hampstead water supply is considered a nontransient noncommunity (NTNC) water system, which is defined as a public water system that regularly serves at least 25 of the same individuals over six months per year. Until 1999 this facility was formerly the Black & Decker manufacturing plant. In 1999 AG/GFI Hampstead, Inc. acquired the property. In 2005 the BTR Capital Group became the new owner of the property. There is an ongoing ground water remediation at the site, due to storage and use of industrial solvents and onsite hazardous waste disposal during time Black & Decker was operating the manufacturing plant. Black & Decker is the responsible party for this cleanup and is operating under a consent order from MDE. The cleanup involves extraction of contaminated ground water from 9 wells, and pumping it to a water treatment plant where it is run through an air stripper to remove volatile organic compounds. BTR is then responsible for distributing this water for the facility's use. Currently, the facility has a population of 472.

## WELL INFORMATION

The BTR Hampstead facility is currently served water by nine wells (EW-2 through EW-10)). These wells were drilled as part of a ground water remediation that Black & Decker had to conduct to remove volatile organic compounds from ground water on site. Well information was obtained from the Water Supply Program's database, site visits, well completion reports, sanitary survey inspection reports and published reports. A review of well data and sanitary surveys of the BTR Hampstead water system indicates all the wells except for EW9 were constructed in a manner to allow the extraction of water directly from the weathered saprolite. Well information is shown in Table 1 below.

SOURCE ID	WELL NAME	PERMIT NO	TOTAL DEPTH (ft)	CASING DEPTH (ft)	YEAR DRILLED
2	EW2	CL882241	110	50*	1992
3	EW3	CL882059	118	58*	1991
4	EW4	CL882242	98	48*	1992
5	EW5	CL881939	98	48*	1991
6	EW6	CL882065	115	55*	1991
7	EW7	CL815768	78	58	1988
8	EW8	CL882062	98	38*	1991
9	EW9	CL881937	141	81*	1991
10	EW10	CL882060	90	80	1991

**Table 1. BTR Hampstead, Inc. Well Information.**

\*well screened in saprolite

BTR Hampstead has a Water Appropriation Permit that allows it to use an average of 432,000 gallons per day (gpd) and 720,000 gpd in the month of maximum use. This permit is based on a long-term ground water remediation plan for cleanup of contaminated ground water and use of the cleaned up water for industrial and potable use. Based on reported pumpage for the past three years, the BTR Hampstead facility pumped an average of 228,847 gpd.

## **HYDROGEOLOGY**

The BTR Hampstead facility is located in the Piedmont physiographic province and is underlain by the Lower Pelitic Schist of the Wissahickon Formation (remapped as the Prettyboy Schist by Edwards in 1993). This formation is an unconfined, fractured rock aquifer composed of greenish gray-tan to medium gray, fine-grained quartz-muscovite-chlorite-schist. In this type of setting, the underlying crystalline rocks have negligible primary porosity and permeability and ground water is stored in and moves through fractures in the rocks. Ground water flow rates depend upon the openness of the fractures and their degree of interconnection. Unconsolidated overburden (saprolite) above the crystalline rock frequently has much greater primary porosity and permeability than the rock has, allowing additional ground water to be stored (Duigon, 1994). Ground water systems in crystalline rock tend to be localized and flow is within topographic divides towards the nearest perennial streams. (Bolton, 1998).

## **SOURCE WATER ASSESSMENT AREA DELINEATION**

For ground water systems, a Wellhead Protection Area (WHPA) is considered to be the source water assessment area for the system. The source water assessment area for public water systems with an average appropriation amount of greater than 10,000 gpd and drawing from fractured-rock aquifers is the watershed area that contributes to the well. This area is modified by geological boundaries, ground water divides and by annual average recharge needed to supply the well (MD SWAP, 1999). For the BTR Hampstead facility, annual ground water level maps generated from monitoring the ongoing remediation were reviewed to assist in the delineation of the WHPA. The delineated WHPA represents the area which contribute ground water to the wells. The total area of the WHPA is about 436 acres, which is sufficient to support the reported daily average of 228,847 gallons under average precipitation conditions.

## **POTENTIAL SOURCES OF CONTAMINATION**

Potential sources of contamination are classified as either point or non-point sources. Examples of point sources of contamination are leaking underground storage tanks, landfills, ground water discharge permits, large-scale feeding operations, and CERCLA (Superfund) sites. These sites are generally associated with commercial or industrial facilities that use chemical substances that may, if inappropriately handled, contaminate ground water via discrete point location. Non-

point sources of contamination are associated with certain types of land use practices such as the use of pesticides, application of fertilizers or animal wastes, or septic systems that may lead to ground water contamination over a larger area.

### ***Point Sources***

The BTR Hampstead site is listed as a CERCLA and also as a Controlled Hazardous Substance (CHS) Generator site in MDE contaminant databases. In 1984 contamination of Black & Decker production wells was first identified, when a local gasoline spill was investigated. MDE required the site owner to conduct an investigation into the sources of contamination (chlorinated solvents). The site was investigated from 1985 to 1990 and seven areas were identified as possible sources of contamination. The investigation indicated two VOCs, trichloroethylene (TCE) and tetrachloroethylene (PCE) as the primary contaminants in ground water. From 1990 to 1993 remedial design investigations were undertaken by Black & Decker and 10 ground water extraction wells were installed at the site. A ground water remediation system was then constructed to provide for the hydraulic capture of the contaminated ground water on site. The remediation system became fully operational in late 1994. For more details on this site please refer to the fact sheet in Appendix 1 at the end of this report.

The facility also has a NPDES Discharge Permit for discharge treated wastewater into a stream on the property. Additional potential sources of contamination were identified from MDE and Carroll County contaminant databases as well as a field surveys. All the potential sources of contamination are identified in Figure 2. Sites that were identified as potential contaminant sources are two automobile related businesses that handle hazardous substances (MISC), another CHS Generator, a pesticide dealer (PEST), and service station that has underground storage tanks (UST) with gasoline products. The last site had leaking underground tanks (LUST) that were removed and replaced with new ones. Table 2 lists the facilities identified and their potential types of contaminants. Potential contaminants are grouped as Volatile Organic Compounds (VOC), Synthetic Organic Compounds (SOC), Heavy Metals (HM), and Metals (M), Nitrate (N), and Microbiological Pathogens (MP).

ID	Type	Site Name	Address	Potential Contaminant	Comments
1	CERCLA	BTR Hampstead, Inc.	626 Hanover Pike	VOC	Cerlis Site MD-370
2	CHS	BTR Hampstead, Inc.	626 Hanover Pike	VOC	
3	PEST	Southern State	505 Hanover Pike	SOC	
4	CHS	Joseph A. Banks	500 Hanover Pike	VOC	
5	NPDES	BTR Hamsptead, Inc.	626 Hanover Pike	VOC, MP, N	Permit No. MD0001881
6	MISC	Hampstead Performance Ctr.	818 South Main St	VOC, HM	
7	UST/LUST	Hampstead Exxon	822 South Main St	VOC	3 Tanks in use, 4 tanks removed
48	MISC	Millender's Garage, Inc	844 South Main St.	VOC, HM	

**Table 2. Potential Contaminant Point Sources within BTR Hampstead, Inc's WHPA (see figure 2 for locations).**

### *Non-Point Sources*

The Maryland Department of Planning's 2002 digital land use map for Carroll County was used to determine the predominant types of land use in the WHPA. This map was modified and original cropland areas changed to industrial land based on the construction of a Solo Cup Corporation warehouse adjacent to BTR Hampstead, Inc. on the north side (figure 3). Table 3 shows the revised land use categories in the BTR Hampstead WHPA. The largest portion of the WHPA is industrial land, followed by cropland. The conversion of the farmland to a large industrial center may reduce the amount of water available to the ground water remediation effort, unless stormwater from the facility roof was directed to a ground water infiltration system.

LAND USE CATEGORIES	TOTAL AREA (acres)	PERCENTAGE OF WHPA
Medium Density Residential	15.89	3.65
Commercial	40.27	9.24
Industrial	210.89	48.38
Cropland	85.32	19.57
Pasture	17.60	4.04
Forest	52.85	12.13
Water	13.02	2.99
Total	435.84	100.00

**Table 3. Land Use Summary for BTR Hampstead, Inc.'s WHPA.**

Agricultural land (cropland and pasture) is commonly associated with nitrate loading of ground water. Cropland also represents a potential source of SOCs depending on use of pesticides and herbicides. Some of the cropland in the southeast side is being developed for residential use.

A review of the Maryland Department of Planning's 2002 Carroll County Sewer Map indicates that there is no planned sewer service for 71% of the WHPA



(figure 4). The BTR Hampstead facility has a wastewater plant which has a NPDES discharge permit to discharge treated process and waste waters to an unnamed tributary of Deep Run. The Joseph A. Bank facility in the southern part of the WHPA and a couple of farms in the southeast use onsite septic systems for wastewater disposal. The conversion of cropland to low density residential use on onsite septic is not likely to increase the nitrate loading. Along with nitrates from cropland the onsite septic systems are also potential sources of the nitrates to the supply wells. Table 4 lists the sewer service area categories within the WHPA.

SEWER SERVICE AREA CATEGORIES	TOTAL AREA (acres)	PERCENTAGE OF WHPA
Existing Service	95.65	21.95
Service within 2 to 6 years	23.1	5.30
Planned future growth	6.78	1.56
No planned service	310.31	71.19
Total	435.84	100.00

Table 4. Sewer Service Area Summary for BTR Hampstead, Inc.'s WHPA.

## WATER QUALITY DATA

Water Quality data was reviewed from the Water Supply Program's database and system files for Safe Drinking Water Act contaminants. The State's SWAP defines a threshold for reporting water quality data as 50% of the Maximum Contaminant Level (MCL). If a monitoring result is at or greater than 50% of a MCL, this assessment will describe the sources of such a contaminant and, if possible, locate the specific sources which may be the cause of the elevated contaminant level. All data reported is from the finished (treated) water unless otherwise noted. As indicated earlier, the BTR Hampstead facility is under a consent order from MDE to cleanup ground water contaminated by VOCs. The contaminated ground water is pumped from the wells and sent through an air stripper to remove the VOCs. The water is then disinfected with sodium hypochlorite, and then treated with soda ash to adjust its pH for corrosion control. In the facility, point of use activated carbon treatment is also used for redundancy.

A review of the monitoring data since 1991 for the BTR Hampstead facility's water supply indicates that it meets the current drinking water standards. The water quality sampling results are summarized in Table 4.

PLANT NO	Nitrate		SOCs		VOCs		IOCs (except nitrate)	
	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL	No. of Samples Collected	No. of samples > 50% MCL
01	40	24	3	0	154	5	16	0

Table 5. Summary of Water Quality Samples for the BTR Hampstead, Inc Water Supply.

### *Inorganic Compounds (IOCs)*

The only IOC detected above 50% of the MCL was nitrate. The MCL for nitrate is 10 ppm. The nitrate detections above 50% of the MCL in the BTR Hampstead Inc. water supply are shown in Table 6. A review of all the nitrate detections indicated that the most recent data is consistently less than 5.0 ppm in contrast to the levels measured about a decade ago.

CONTAMINANT NAME	SAMPLE DATE	RESULT (mg/l)
NITRATE	4-Mar-94	6.0
NITRATE	5-Aug-94	8.1
NITRATE	3-Feb-95	7.9
NITRATE	31-Mar-95	6.7
NITRATE	5-May-95	5.8
NITRATE	16-May-95	5.9
NITRATE	4-Aug-95	5.5
NITRATE	23-Oct-95	5.9
NITRATE	3-Nov-95	5.3
NITRATE	7-Feb-96	5.6
NITRATE	1-May-96	5.7
NITRATE	7-Aug-96	5.5
NITRATE	7-Nov-96	5.1
NITRATE	5-Feb-97	5.6
NITRATE	7-Apr-97	5.4
NITRATE	7-Aug-97	5.0
NITRATE	5-Nov-97	5.1
NITRATE	11-Mar-98	5.4
NITRATE	13-Mar-00	5.0
NITRATE	19-Dec-00	5.0
NITRATE	7-Feb-01	5.3
NITRATE	8-Mar-01	5.1
NITRATE	6-Feb-02	5.0
NITRATE	6-Mar-02	5.3

Table 6. IOC detections above 50% of the MCL for the BTR Hampstead, Inc. Water Supply.

### *Volatile Organic Compounds (VOCs)*

Tetrachloroethylene (PCE) and trichloroethylene (TCE) are the two VOCs that have been detected at greater than 50% of their MCL of 5 ppb. These detections were at the time when there was no remediation treatment or when the treatment

had just been installed. Since 1996 there have been no detections of these two VOCs in the finished water. In production well samples (prior to treatment) collected as part of an investigation in 1991, TCE was detected at 50,000 ppb and PCE at 1,600,000 ppb, respectively. Raw water samples collected from the production wells in 2003 had TCE detections ranging from 5 to 960 ppb, and PCE detections from 4 to 72 ppb (Weston, 2003).

Low levels of methylene chloride have been detected in the water supply (0.6 to 1 ppb). The MCL for methylene chloride is 5 ppb. The other VOCs that have been detected are trihalomethanes (THMs). THMs are disinfection by-products that are produced as a result of the reaction between chlorine used for disinfection and organic material in the water supply. The MCL for THMs is 80 ppb and is the total of four THMs. The total of the THMs detected in the water has been well below the MCL.

CONTAMINANT NAME	MCL (ppb)	SAMPLE DATE	RESULT (ppb)
TETRACHLOROETHYLENE	5	7-Nov-92	3
TRICHLOROETHYLENE	5	4-Nov-94	9
TRICHLOROETHYLENE	5	7-Apr-95	3
TRICHLOROETHYLENE	5	4-Sep-96	910
TETRACHLOROETHYLENE	5	4-Sep-96	240

Table 7. VOC detections above 50% of the MCL for the BTR Hampstead, Inc. Water Supply.

#### ***Synthetic Organic Compounds (SOCs)***

No SOC above 50% of the MCL have been detected in the BTR Hampstead Inc. water supply. The only SOC detected one time were picloram and di(ethylhexyl)phthalate. Picloram, which has an MCL of 500 ppb was detected in a sample collected on December 12, 1990 at 0.15 ppb.

Di(ethylhexyl)phthalate, which has an MCL of 6 ppb was detected in a sample collected on November 24, 2003 at 0.4 ppb. Pthalate was also found in the laboratory blank and is not believed to represent the water supply.

#### ***Microbiological Contaminants***

Ground water under the influence of surface water (GWUDI) testing was conducted for the BTR Hampstead, Inc. wells. The GWUDI testing at BTR Hampstead, Inc. required collection and analysis of raw water samples for bacteria (total and fecal coliform), pH, temperature and turbidity following at least 0.5 inch of rain. Samples collected in March of 2004 following 1.1 inches of rain were negative for coliform bacteria (table 8). In addition all nontransient noncommunity systems are required to conduct quarterly routine bacteriological sampling for their water supply as required by the Safe Drinking Water Act. These samples are generally collected from finished (treated) water, which may not be indicative of the source water conditions. None of the forty-one routine bacteriological samples collected for the BTR Hampstead, Inc. water supply however has shown any coliform detection.

SOURCE NAME	RAIN DATE	RAIN AMT (inches)	SAMPLE DATE	TEMP (CENTIGRADE)	PH	TURBIDITY	TOTAL COLIFORM (MPN/100)	FECAL COLIFORM (MPN/100)
EW2 (PH-3A)	6-Mar-04	1.11	6-Mar-04	14	5.3	-0.1	-1.1	-1.1
EW3 (PH-1A)	6-Mar-04	1.11	6-Mar-04	14	5.5	-0.1	-1.1	-1.1
EW4 (PH-4A)	6-Mar-04	1.11	6-Mar-04	14	5.5	-0.1	-1.1	-1.1
EW5 (PH-2A)	6-Mar-04	1.11	6-Mar-04	15	5.6	-0.1	-1.1	-1.1
EW6 (PH-13)	6-Mar-04	1.11	6-Mar-04	13	5.9	0.21	-1.1	-1.1
EW7 (RFW-5B)	6-Mar-04	1.11	6-Mar-04	12	5.8	-0.1	-1.1	-1.1
EW8 (PH-10)	6-Mar-04	1.11	6-Mar-04	12	5.9	0.14	-1.1	-1.1
EW9 (PH-8)	6-Mar-04	1.11	6-Mar-04	12	6.2	-0.1	-1.1	-1.1
EW10 (PW-7)	6-Mar-04	1.11	6-Mar-04	12	5.9	-0.1	-1.1	-1.1

**Table 8. Ground Water Under the Influence of Surface Water Testing Data for BTR Hampstead, Inc.**

## SUSCEPTIBILITY ANALYSIS

BTR Hampstead, Inc.'s wells obtain water from an unconfined fractured-rock aquifer. Wells in unconfined aquifers are generally vulnerable to any activity on the land surface that occurs within the WHPA. Therefore, managing this area to minimize the risk to the supply and continued routine monitoring of contaminants is essential in assuring a safe drinking water supply. The susceptibility of the wells to contamination is determined for each group of contaminants based on the following criteria: (1) available water quality data, (2) presence of potential contaminant sources in the WHPA, (3) aquifer characteristics, (4) well integrity, and (5) the likelihood of change to the natural conditions.

The susceptibility of the water supply to the various types of contaminants is summarized in Table 8.

### *Inorganic Compounds (IOCs)*

Nitrate has been detected the BTR Hampstead, Inc. water supply above 50% of the MCL (table 6). A review and analysis of the nitrate data shows a decreasing trend. Sources of nitrate can generally be traced to land use. A significant portion of the WHPA, which was cropland in the past, is now in industrial use. Due to the size of the building less fertilizer is now applied for landscaping than was previously applied for growing crops on the property. Commercial and residential onsite septic systems in the WHPA in areas not planned for sewer service are also sources of nitrate in ground water.

Based on the downward trend of nitrate in the water supply, and the changes in land use from agricultural to industrial use, the BTR Hampstead, Inc. water supply is **not** susceptible to nitrate contamination, or to other inorganic compounds.

### ***Volatile Organic Compounds (VOCs)***

Very high levels of VOCs were detected in BTR Hampstead's (formerly Black & Decker) water supply in 1991. BTR Hampstead is listed as a CERCLA site in MDE's contaminant database due to contamination of ground water at the site. The site is currently undergoing a ground water remediation (pump and treat) to contain the contamination within the property and to remove VOCs from the ground water. In addition, there are several sources of VOC contamination in the WHPA.

Based on the above discussion, the BTR Hampstead water supply is determined to be susceptible to VOC contamination.

### ***Synthetic Organic Compounds (SOCs)***

No SOCs above 50% of a MCL have been detected in the BTR Hampstead, Inc. water supply. SOCs were not detected in raw water samples during the site investigation for ground water contamination. Application of pesticides can be sources of SOCs, but SOC contamination at levels of concern is uncommon for wells in Maryland.

Based on the above analysis, the BTR Hampstead, Inc. water supply is **not** susceptible to SOC contamination.

### ***Microbiological Contaminants***

Based on raw water bacteriological data collected following 1.1 inches of rain, BTR Hampstead, Inc.'s wells were determined not to be GWUDI. In addition, no bacteria have been detected in any of the routine bacteriological samples collected for the BTR Hampstead, Inc. water supply.

Based on the above discussion, the BTR Hampstead, Inc. water supply is **not** susceptible to microbiological contaminants.

CONTAMINANT TYPE	Are Contaminant Sources present in the WHPA?	Are Contaminants detected in WQ samples at 50% of the MCL	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to the Contaminant
Nitrate	YES	YES	NO	YES	NO*
Inorganic Compounds (except nitrate)	NO	NO	NO	YES	NO
Volatile Organic Compounds	YES	YES	NO	YES	YES
Synthetic Organic Compounds	NO	NO	NO	YES	NO
Microbiological Contaminants	YES	NO	NO	YES	NO

Table 9. Susceptibility Summary for the BTR Hampstead, Inc. water supply.

\*see text for discussion

## MANAGEMENT OF THE WHPA

### *Public Awareness and Outreach*

- Notify businesses and facilities that are located in the WHPA about best management practices for handling, storing and disposing hazardous substances on site and new underground tank regulations.

### *Cooperative Efforts with Other Agencies*

- Continue to work closely with MDE to ensure that the ground water remediation is proceeding as per the requirements of the consent order signed in 1995.
- Work with Carroll County Health Department to identify any unused wells in the WHPA and to ensure that they are abandoned and sealed in compliance with the State's well construction standards.

### *Monitoring*

- Continue to monitor for all Safe Drinking Water Act contaminants as required by MDE.
- Regularly monitor nitrate levels and analyze data to determine whether the downward trend continues.
- Continue to sample the raw water for VOCs as required in the consent order and ensure treatment is effective in removal of all VOCs prior to distribution for water supply.
- Annual raw water sampling for bacteriological water quality is recommended as a check on well integrity.

***Changes in Use***

- Any increase in pumpage or addition of new wells to the system may require revision of the WHPA. The system is required to contact the Water Supply Program when an increase pumpage is applied for or when new wells are being considered.

***Contaminant Source Inventory/Well Inspection***

- The system owners should review the potential sources of contaminants within the WHPA and update them if necessary, including a consideration of historical uses.
- Periodic inspections and a regular maintenance program for the supply wells will ensure their integrity and protect the aquifer from contamination.

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## OTHER SOURCES OF DATA

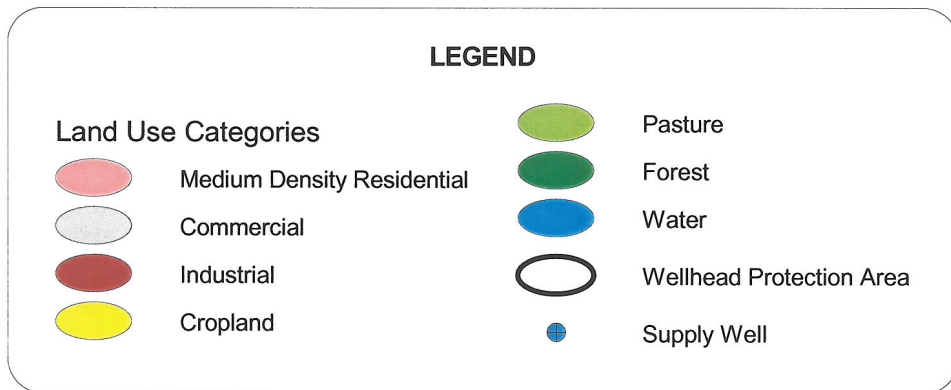
Water Appropriation and Use Permit: CL1966G029  
Public Water Supply Inspection Reports  
MDE Water Supply Program Oracle Database  
MDE Waste Management Sites Database  
Department of Natural Resources Digital Orthophoto Quarter Quadrangles:  
Hampstead  
USGS Topographic 7.5-Minute Linesboro Quadrangle  
Maryland Department of Planning 2002 Carroll County Land Use Map  
Maryland Department of Planning 2003 Carroll County Sewer Map



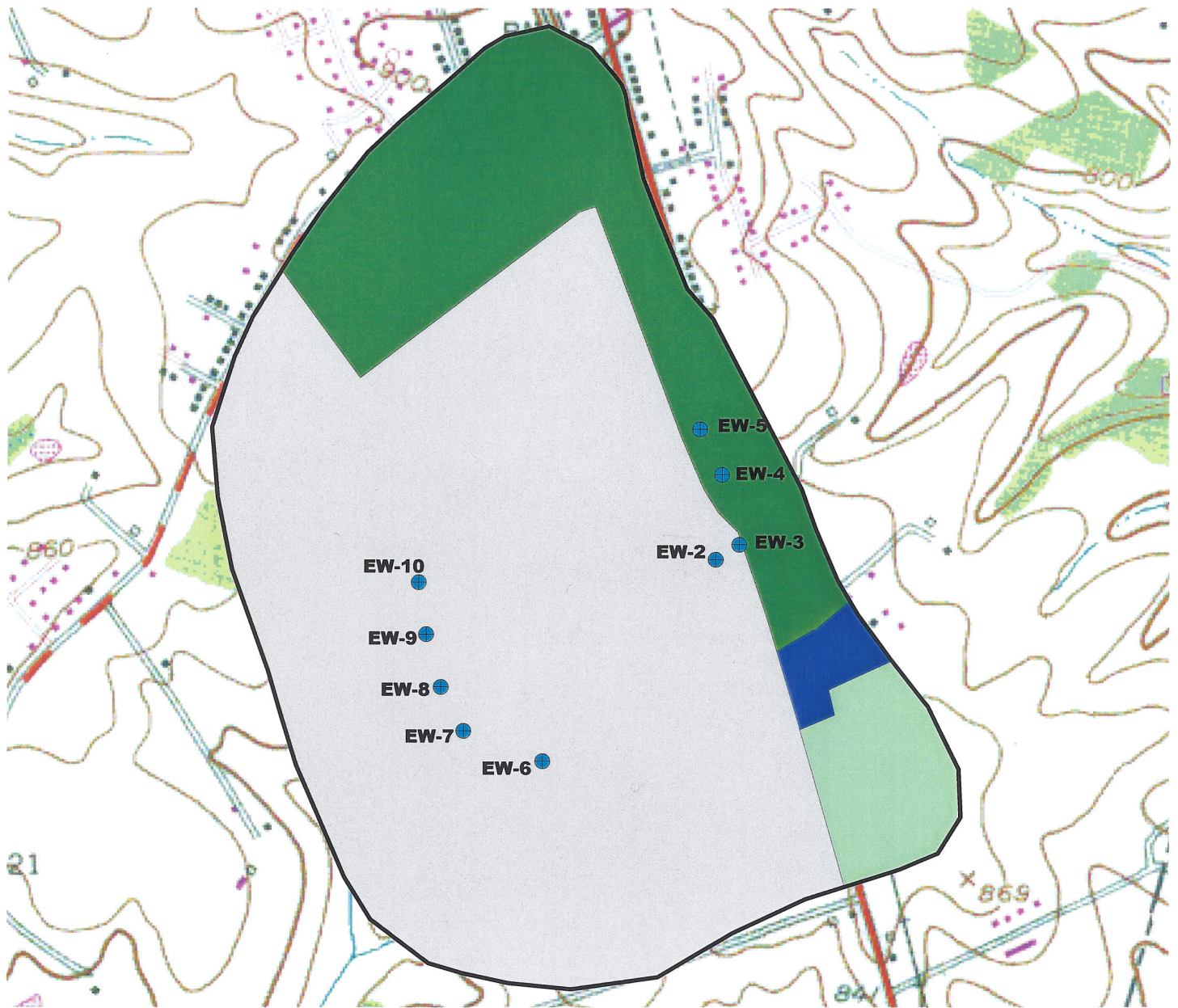
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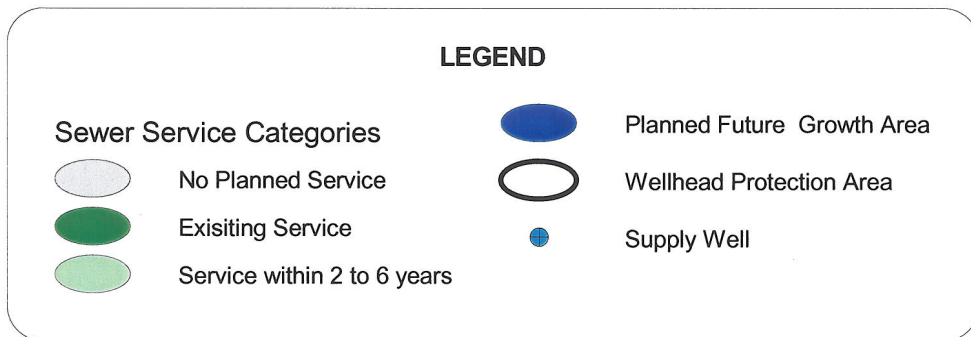
**Figure 3. Land Use Map of the BTR Hampstead , Inc. Wellhead Protection Area**



Base Map: USGS 7.5 minute Topographic Quad- Linesboro.  
 Source: MD Dept. of Planning Land Use Map (2002)



**Figure 4. Sewer Service Area Map of the BTR Hampstead , Inc. Wellhead Protection Area**



Base Map: USGS 7.5 minute Topographic Quad - Llnesboro  
 Source: MD Dept of Planning Sewer Map (2003)



**APPENDIX**

## **MD-370 Carroll County**

DHMH ordered Black and Decker to conduct a ground water investigation after chlorinated solvents were identified in their production wells in 1984.

In 1986, Black and Decker installed an air stripping unit to provide for remediation of the potable water supply.

Black and Decker had carbon filters installed on a dairy barn well downgradient of the site in 1987 due to PCE contamination

In 1989, Weston completed an investigation which identified two plumes: a TCE plume on the eastern portion of the site and a PCE plume on the western portion.

NUS Corporation completed a Site Inspection for the EPA in 1991.

Weston installed a ground water remediation system in 1994.

Black and Decker entered the State Deferral Program in 1995, agreeing to address the ground water contamination under State oversight.

Weston installed a soil vapor extraction system in 1997.

## **BLACK AND DECKER**

### ***Site Description***

The 286-acre Black and Decker property is located at 3626 Hanover Pike, in the predominantly rural setting of northeastern Carroll County. Approximately 140 acres of the northern and western sections of the property are leased to local dairy farmers. The main facility is situated centrally on the remaining 146 acres. A wastewater treatment plant and associated lagoons are located on the south end of the property.

### ***Site History***

The site was purchased in 1951 by Black and Decker. Prior to that time, it was probably used for agricultural purposes. From 1952 to 1987, the plant's activities were predominantly the manufacturing of power hand tools. By 1987, the plant had shifted operations from manufacturing to distribution. Currently, the facility serves as the principal distribution center of Black and Decker products on the East Coast.

During the manufacturing period from 1952 to 1987, several areas on the property are believed to have been used for disposal of debris and off-specification tool products. In Black and Decker's manufacturing processes, numerous solvents and oils were used and stored on-site in both underground storage tanks (USTs) and aboveground storage tanks. All of the USTs have been excavated, cleaned and filled with sand.

### ***Environment Investigations***

Contamination of production wells was first identified at Black and Decker in April 1984 when a local gasoline spill was investigated. In September 1984, in response to this contamination, the Maryland Department of Health and Mental Hygiene (DHMH) ordered Black and Decker to provide information regarding storage and disposal of chlorinated solvents, provide surface water and ground water sampling results, identify extent and source of contamination and to implement corrective action if necessary. In April 1985, Geraghty and Miller installed 21 monitoring wells as part of the investigation. A soil investigation was completed by BCM Eastern in 1986. BCM Eastern installed an air stripper unit to treat the on-site potable water supply when the investigation revealed that the water was contaminated with chlorinated solvents. Additionally, in 1987 carbon filters were installed on an adjacent farm well used to water dairy cattle due to tetrachloroethene (PCE) contamination.

Roy F. Weston (Weston) was contracted to perform an environmental investigation, which was completed in 1989. Weston installed 17 additional monitoring wells as part of this investigation. Seven areas were identified as possible sources of ground water and/or soil contamination: the previous storage tank areas, a past plant landfill area, two past heat-treating residue and waste deposition areas, a past off-specification product disposal area, an area of past used-product burning and the on-site lagoons. A UST area was identified to be a continuing source of ground water contamination. The investigation also identified separate plumes of ground water contamination; trichloroethene (TCE) was the primary ground

water contaminant on the eastern half of the site and tetrachloroethene (PCE) was determined to be the primary contaminant on the western half of the site. Weston recommended the installation of a ground water pump and treat system that would create a hydraulic barrier to contaminant migration.

NUS Corporation completed a Site Inspection in February 1991. In ground water samples collected as part of this investigation, TCE was detected at a maximum concentration of 12,000 micrograms/liter (m g/l) in a monitoring well located on the south side of the plant. PCE was detected at a maximum concentration of 1,800 m g/l collected from a monitoring well in the former landfill area located west of the plant. On-site production well samples (prior to filtration) contained TCE and PCE at up to 50 m g/l and 1,600 m g/l, respectively. Outfall effluent contained PCE at up to 89 m g/l. TCE was detected at up to 7 micrograms/kilogram (m g/kg) in sediment collected from the West Lagoon and PCE was detected at up to 46 m g/kg in sediment collected from below the effluent outfall pipe.

From 1990 to 1993, remedial design investigations were undertaken by Black and Decker and ten ground water extraction wells were installed at the site. The installation and testing of the extraction wells resulted in the construction of a ground water remediation system which provides for the hydraulic capture of the contaminated ground water on-site. The remediation system went into full-scale operation in August 1994.

As part of a supplemental investigation, Weston conducted a test pit investigation at the site in August 1996. Only two pits (of eight total) contained waste material. These were in areas that an electromagnetic survey indicated buried metal objects. These pits revealed waste at an initial depth of two feet and extended to eight feet. The waste material included sanding disks with a metallic mesh backing, metal shelving, electrical wiring, and some small metal tubing. Soil sample test results for the waste pit indicated that the waste was not hazardous and did not contribute to ground water contamination at the site.

Weston installed an enhanced soil vapor extraction system at the northernmost corner of the plant building. This system went into full scale operation in November 1997.

### ***Current Status***

In the spring of 1993, the Black and Decker site was proposed for the State Deferral Pilot Program due to both the site's potential for inclusion on the National Priorities List and Black and Decker's apparent willingness to undertake necessary remedial actions and investigations at the site. MDE and Black and Decker signed a Consent Order to finalize remedial investigations in April 1995 and since that time remedial investigations have been handled under MDE's State Deferral Program. The ground water remediation system and the enhanced soil vapor extraction system are in operation and continue to remove contamination from the ground water. MDE continues to work with Black and Decker under the State Deferral Program Consent Order to ensure that all requirements of the Consent Order are met.