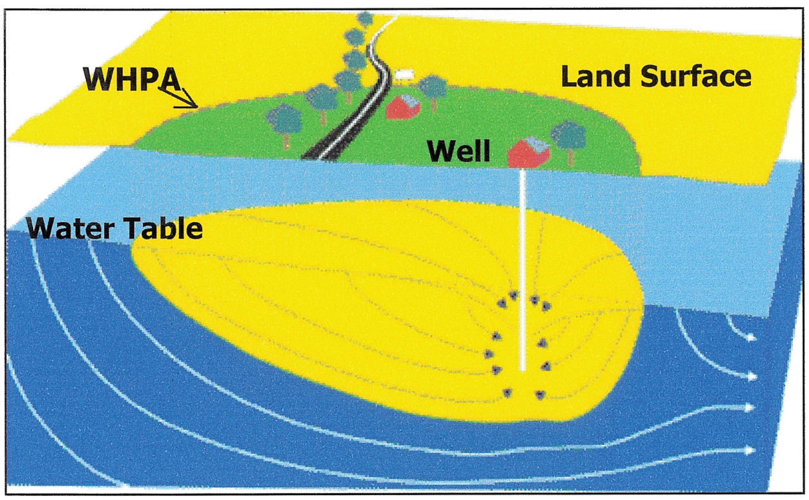
SOURCE WATER ASSESSMENT

FOR SMALL WATER SYSTEMS IN MONTGOMERY COUNTY



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SUMMARY

The Maryland Department of the Environment's Water Supply Program (WSP) has conducted a Source Water Assessment for twelve small systems in Montgomery County. The required components of this report as described in Maryland's Source Water Assessment Program (SWAP) are 1) delineation of an area that contributes water to each source, 2) identification of potential sources of contamination within the areas, and 3) determination of the susceptibility of each water supply to contamination. Recommendations for protecting the drinking water supplies conclude this report.

The sources of water supply wells in Montgomery County are unconfined fractured-rock aquifers. The twelve small water systems included in this report are currently using sixteen wells that pump water from three fractured-rock aquifers. The Source Water Assessment areas were delineated by the WSP using U.S. EPA approved methods specifically designed for each source.

Potential point sources of contamination within the assessment areas were identified from field inspections and contaminant inventory databases. The more common potential sources of contamination identified are underground storage tanks and controlled hazardous substance generators commonly associated with commercial areas. The Maryland Office of Planning's 1997 land use map for Montgomery County was used to identify non-point sources of contamination. The most common type of land use that presents a potential for contamination is agricultural cropland. Private septic systems are another common non-point contaminant source. Ten of the small systems in this report utilize on-site septic systems for the disposal of domestic wastewater. Figures showing land use, potential contaminant sources within Source Water Assessment areas, and aerial photographs of well locations are enclosed at the end of the report.

The susceptibility analysis is based on a review of the existing water quality data for each water system, the presence of potential sources of contamination in the individual assessment areas, well integrity, and the inherent vulnerability of the aquifer. It was determined that some small water systems are susceptible to contamination by nitrate, radon, volatile organic compounds, synthetic organic compounds, and microbiological contaminants. Some small systems may be susceptible to one contaminant, while others are susceptible to one or more groups of contaminants.

INTRODUCTION

The Water Supply Program has conducted a Source Water Assessment for 12 small water systems in Montgomery County (figure 1). It must be noted that one of the systems, Puritan Christian School, is currently an inactive system. Montgomery County is in the central western part of the State, and is bounded by the Potomac River to the southwest, Frederick County to the northwest, Howard County to the northeast, and Prince George's County and Washington, D.C. to the southeast. Based on July 1998 data, the total population of Montgomery County is 834,200 persons (Md. Assoc. of Counties, 1999). As defined in Maryland's Source Water Assessment Plan (SWAP), "small systems" are community and non-transient non-community water systems that have a ground water appropriation permit of less than 10,000 gallons average daily use. All the 12 small systems covered in this report are non-transient non-community systems and obtain their water supply from unconfined fractured rock aquifers.

WELL INFORMATION

Well information for each system was obtained from the Water Supply Program's database, site visits, well completion reports, and sanitary survey inspection reports. A total of 16 wells are used by the 12 systems assessed in this report. Thirteen of the wells were drilled after 1973 and should comply with Maryland's well construction regulations. One of the wells was drilled prior to 1973, when current regulations went into effect, and may not meet the current construction standards. Well completion report data was not available for two of the wells. Table 1 contains a summary of well information for each of the small systems.

Field inspections were conducted for to verify the location of each well and to determine their condition. All the wells were cased above ground except for Laytonsville Elementary School's well which was located in a below ground concrete vault. Systems whose wells are cased below ground surface are more likely to be subject to flooding during heavy rains. This may allow contaminated surface water to enter through the casing and ultimately reach the aquifer. The well cap for Well No. 1 at Pleasant's Excavation Co. (figure 2e) was loose and the electrical wiring was not caulked in place. These openings provide an avenue for contaminants to get into the well and the aquifer. The water supply well for Mater Amoris School (figure 2d) also had a well cap that needed to be tightened.

Hydrogeology

Montgomery County lies within the Piedmont physiographic province. The Piedmont is characterized by gently rolling hills and valleys. The county is mostly underlain by ancient (Precambrian) crystalline metamorphic rocks except in the western portion where it is underlain by younger (Triassic) sedimentary rocks. All the aquifers in the Piedmont are unconfined fractured rock aquifers. Ground water flow in this geologic setting is primarily from precipitation that enters the permeable weathered overburden soils and saprolite (weathered rock), and then flows through joints, bedding plane contacts, and fractures in the rock (Dingman & Ferguson, 1956). In the sedimentary rocks, ground water movement along bedding planes is greater than in the metamorphic rocks and is usually the primary flow direction.

The 12 small systems discussed in this report obtain water from three aquifers – the Ijamsville-Marburg Schist, the Upper Pelitic Shist of the Wissahickon Formation, and the New Oxford Formation (table 1).

Ijamsville-Marburg Schist

The Ijamsville-Marburg Schist is blue-gray to silvery green, fine-grained, muscovite-chlorite-albite-quartz schist, intensely cleaved and closely folded, with interbedded metasiltone, metagraywacke and quartzites (Nutter and Otton, 1969).

Upper Pelitic Schist

The Upper Pelitic Schist of the Wissahickon Formation is an albite-chlorite-muscovite-quartz schist with sporadic thin beds of laminated micaceaous quartzite. Primary sedimentary structures in the formation include normal bedding, graded bedding and soft-sediment deformational structures (Nutter and Otton, 1969).

New Oxford Formation

The New Oxford Formation consists mainly of red and gray shale, siltstone and arkosic sandstone, and a basal conglomerate along the western part of the area. These sedimentary rocks were deposited in geological basin known as the Culpepper basin. The shales and siltstones are commonly bright red to maroon, blocky and platy, thin-to-medium-bedded, and intensely jointed in places. The sandstones vary from pink to light red or reddish gray. The strata dip generally west to southwest (Otton, 1981).

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. As defined in Maryland's SWAP, the wellhead protection areas for "small" public water systems using an average of less than 10,000 gallons per day (gpd), in unconfined fractured-rock aquifers is a fixed radius of 1,000 feet around the well. This radius is based on calculating the land area needed to provide a yield of 10,000 gpd assuming a 400 gpd per acre recharge rate (drought year recharge conditons) and a safety factor. The WHPAs for the 12 systems are shown in Figures 2a through 2k. For systems that have multiple wells, the areas were merged to produce one larger WHPA (figures 2e, 2h, and 2i).

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, discharge permits, large-scale feeding operations, and known ground water contamination sites. These sites are generally associated with commercial or industrial facilities that use chemical substances that may, if inappropriately handled, contaminate ground water via a 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

Potential point sources of contamination were identified and mapped within and near the Wellhead Protection Areas of the 12 small systems. Table 2 lists the potential contaminant sites identified with their associated contaminants and figures 2a-2k show the locations and WHPAs. The point sources listed are identified from MDE contaminant databases and field inspections conducted by MDE employees. Potential contamination sources that were investigated include: underground storage tanks (USTs), leaking underground storage tanks (LUSTs), ground water discharge permit sites (GWD), Controlled Hazardous Substance Generators (CHS), and ground water contamination sites. Miscellaneous (MISC) potential contaminant sites include commercial buildings with chemical storage and vehicle maintenance facilities. The contaminants associated with the types of facilities are based on generalized categories and often the potential contaminant depends on the specific chemicals and processes being used at the individual facility. The potential contaminants for an activity may not be limited to those listed in Table 2. Potential contaminants are grouped as Volatile Organic Compounds (VOC), Synthetic Organic Compounds (SOC), Heavy Metals (HM), Radionuclides (R) and Microbiological Pathogens (MP). A summary of open cases within or near the various WHPAs from the MDE Oil Control Program can be found in Appendix A.

Field inspections were conducted within and near the WHPAs to determine the potential of any unpermitted ground water discharges (e.g. open floor drains) to the three aquifers being used by the small systems in Montgomery County. Facilities located within and near the WHPAs were inspected and no unpermitted discharges in these aquifers were found within or near the WHPAs.

Non-Point Sources

The Maryland Office of Planning's 2000 Land Use map for Montgomery County was used to determine the predominant types of land use in each WHPA (see Tables 7a – 7l). A summary of the total land use within the WHPAs for the 12 systems is shown in Table 7g. The top three land uses are cropland (36%), forest (20%) and low density residential (18%). It must be noted that these land uses are based on the 2000 Montgomery Land Use Map, and field inspections indicated that some of the cropland is now low-density residential land. Pesticides and herbicides used in agriculture are potential non-point sources of SOCs. The application of fertilizers on agricultural fields is a potential non-point source of nitrate. The use of private septic systems and lawn maintenance and landscaping activities in residential areas are potential non-point sources of nitrate and SOCs to ground water.

A review of the Maryland Office of Planning 1995 Montgomery County Sewerage Coverage map indicates that 58% of the County has no plans for sewer service, 34% is in the existing sewer service area or areas under construction, 5% is planned for sewer service within 2 years, 1% is planned for service within 3 to 6 years, and 2% is planned for service within 7 to 10 years (Figure 4 & Table 8). All the small systems in this report except of Laytonsville Elementary School rely on onsite disposal of domestic wastewater. Onsite septic are potential sources of nitrate and pathogens in ground water. Commercial or industrial land use areas outside the existing sewer service present a potential source of all types of contaminants if byproducts and wastes are not disposed of properly.

Other sources that may potentially contaminate the ground water supplies include unregulated heating oil USTs, stormwater drainage ditches, stormwater management ponds, and roads and parking lots within or near WHPAs. Roads are a concern in the event of chemical or petroleum spills, and from the over-application of salts and other chemicals used for snow removal.

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 (treated) water unless otherwise noted. Four systems (see table 6) are currently providing only bottled water for human consumption and therefore are not subject to SDWA monitoring requirements except for bacteria and nitrate. One system (Neutron Products, Inc.) does not use water treatment. The treatment methods currently in use for the remaining 11 systems included in this report are summarized on Table 3.

In accordance with Maryland's SWAP, data from the treatment plant was compared with the Maximum Contaminant Levels (MCLs). If the monitoring data is greater than 50% of a MCL, the written assessment will describe the sources of such a contaminant and, if possible, locate the specific sources that are the cause of the elevated contaminant level. A review of the monitoring data since 1993 indicates that the water supplies for the 12 systems in this report currently meet the drinking water standards Table 4 lists the total water quality samples collected since 1993. Tables 5a-5c provide a list of all detections above 50% of the MCL.

Inorganic Compounds (IOCs)

Nitrate was the only IOC detected above the threshold level of 5 parts per million (ppm) in 9 of the 12 water systems in this report (table 5a). Furthermore, nitrate was detected above the MCL of 10 ppm in 3 of the systems. The nitrate results that exceeded the MCL are shown in bold (table 5a). These systems are currently meeting the nitrate MCL.

Barium was detected at levels well below the MCL of 2 ppm in samples collected from Barnesville School (0.01 ppm) and Montgomery County Resource Recovery Facility (0.28 ppm).

Selenium was detected at levels well below the MCL of 0.05 ppm in two samples collected from Barnesville School at 0.001 and 0.002 ppm respectively.

Several other unregulated IOCs like iron, sodium, sulfate, copper, zinc, manganese, calcium and magnesium have been detected in seven of the twelve systems. Some of these unregulated IOCs like iron, sulfate, copper, zinc and manganese have secondary standards, which are based on taste, and odor concerns in the water supply. All the levels detected were below secondary standards.

Radionuclides

Non-transient non-community systems are currently not regulated for radionuclides, and may not be for radon, although data is available for some of these systems. The only radiological contaminant detected above 50% of the MCL is radium –228 (table 5b) in one sample from the collected from the Circle School. The MCL for radium is 5 picoCuries/Liter (pCi/L). Radon-222 was also detected in several systems (table 5b) at levels of concern. There is currently no MCL for Radon-222, however EPA has proposed an MCL of 300 picocuries per Liter (pCi/L) or an alternate of 4000 pCi/L for community water systems if the State has a program to address the more significant risk from radon in indoor air. Radon-222 has been detected at levels above 50% of the higher proposed MCL of 4000 pCi/L in 5 of the 8 systems that have tested for this contaminant (Table 5b). Two of these systems had radon detects above 4000 pCi/L. Three of the systems have no data available for this contaminant.

Volatile Organic Compounds (VOCs)

Only one VOC has been detected above the 50% MCL threshold. One sample from the Monocacy Elementary School (Table 5c) detected 1,2-dichloroethane at 3 ppb. Other regulated VOCs like toluene and p-dichlorobenzene have been detected at levels well below the MCL at Monocacy Elementary School and the Montgomery County Resource Recovery Facility.

Methyl-tert-butyl-ether (MTBE) is an oxygenate additive that makes gasoline burn cleaner. Due to MTBE's high solubility and mobility, it can enter an aquifer and may contaminate a ground water supply. MTBE is currently an unregulated VOC that has no MCL. EPA's advisory to avoid unpleasant taste and odors is currently at 20-40 ppb. Laytons Village Shopping Center had detects of this contaminant in four samples at 0.7 ppb each time and the latest one (3/2002) at 0.6 ppb. MDE currently investigates areas for potential sources when MTBE levels exceed 10 ppb.

Trihalomethanes, which are disinfection by-products, were detected at levels below concern at Barnesville School, Laytonsville Elementary School, Monocacy Elementary School, Butler School, the Circle School, and the Montogomery County Resource Recovery Facility. Unregulated VOCs were detected at Barnesville School, Laytonsville Elementary School, Monocacy Elementary School, and the Montgomery County Resource Recovery Facility.

Synthetic Organic Compounds (SOCs)

No SOC has been detected above the 50% threshold blank samples in any of the systems since 1993. SOCs have been detected at 6 of the systems at levels below their respective MCLs.

Di- (2-ethylhexyl) phthalate was detected at Barnesville School, Monocacy Elementary School, Laytons Village Shopping Center, and the Montgomery County Resource Recovery Facility at levels well below the MCL of 6ppb.

Pentachlorophenol was detected at the Children's Center of Damascus, Inc. and Laytons Village Shopping Center at 0.3 ppb (6/10/99) and 0.2 ppb (11/15/99), respectively. The MCL for pentachlorophenol is 1 ppb.

Simazine was detected at Laytonsville Elementary School and the Montgomery County Resource Recovery Facility at 1.4 ppb (6/4/99) and 1.1 ppb (5/5/99) respectively. The MCL for simazine is 4 ppb.

1, 2-dibromo 3-chloropropane, which has an MCL of 0.2 ppb was detected at 0.05 ppb at Monocacy Elementary School on 9/20/00.

A sample collected on 11/15/99 from Laytons Village Shopping Center also showed detects of dicamba at 0.3 ppb (no MCL), picloram at 0.14 ppb (MCL 500 ppb), and 2, 4, 5 –TP (Silvex) at 0.37 ppb (MCL 50 ppb).

A sample collected on 5/5/99 also showed detects of methoxychlor at 0.8 ppb (MCL 40 ppb), and di (2-ethylhexyl) adipate at 0.6 ppb (MCL 400 ppb).

Microbiological Contaminants

Ground water under the direct influence of surface water (GWUDI) testing has not been conducted for 11 of the 12 systems. GWUDI testing requires collection and analysis of raw water samples for bacteria (total and fecal coliform). The WSP has requested all the systems to submit all GWUDI testing results by December 31, 2002. The Circle School raw water sample indicates absence of any bacteria.

All of the systems do, however, have quarterly routine bacteriological samples that were collected as required by the Safe Drinking Water Act (Table 6). These samples are generally collected from finished (treated) water, which may not be indicative of the source water conditions. Four of the systems (Barnesville School, Mater Amoris School, Pleasant's Excavation, Inc. and Neutron Products, Inc.) do not have disinfection for treatment of their water supply. Only one system, Neutron Products had repeated positive bacteria results.

SUSCEPTIBILITY ANALYSIS

All of the wells serving the small water systems included in this report pump water from unconfined aquifers. In general, wells in unconfined aquifers are susceptible to contamination from activities on the land surface that occur within the wellhead protection areas. The susceptibility of the individual water supplies to each group of contaminants was determined based on the following criteria: 1) the presence of potential contaminant sources within the WHPA, 2) water quality data, 3) well integrity and 4) the aquifer conditions. Tables 9a-e summarizes the susceptibility of each of the 12 systems covered in this report to each of the groups of contaminants.

Ground water in Piedmont Region comes from precipitation that passes through porous and permeable weathered overburden soil and saprolite and then flows in different directions through joints and fractures in the rock. Saprolite and overlying weathered soils serve as a natural filter and protective barrier from pathogens for properly constructed wells whose casing is extended to competent rock and properly encased in grout. Properly constructed wells with no potential sources of contamination in their WHPAs should be well protected from contamination. According to the Montgomery County 1997 Land Use Map, 20% of the total land use in all the WHPAs is forested. Systems whose recharge areas are within forested lands should be better protected from contamination. However, localized land use will play a role in a developed area. The most common threats of contamination in the WHPAs of Montgomery County are from the over-application of fertilizers on agricultural fields, and effluent from on-site septic systems. Both contribute to nitrate loading in ground water. The common presence of underground storage tanks and commercial activity in the WHPAs suggest that VOC threats are often prevalent.

Inorganic Compounds

Nitrate is present in the wells of nine systems at 5 ppm or greater (Table 5a). The MCL for nitrate is 10 ppm. Three of the systems, Laytonsville Elementary School, Monocacy Elementary School and Butler School have exceeded the established MCL (Table 5a in bold). Sources of nitrate can generally be traced back to land use. Fertilizer applied to agricultural fields and residential lawns, animal waste in pasturelands, and effluent from residential and commercial septic systems are all non-point sources of nitrate loading in ground water. According to 1997 land use, eight of the twelve systems in this report have cropland as the major land use within their respective WHPAs (figure 3). In addition, all the twelve the systems are in areas with no planned public sewerage service based on the 1995 Montgomery County Sewerage Coverage Map (figure 4).

Nine of the systems in this report **are** susceptible to nitrate due to the levels and persistence of this contaminant found, the vulnerability of the unconfined aquifers to land activity, and the presence of nitrate sources in their wellhead protection areas. Based on available sampling data reported since 1993, three of the systems were determined **not** susceptible to nitrate contamination. A nitrate susceptibility chart is outlined for each system in Table 9a.

Barium, selenium, sulfate, iron, manganese, magnesium, and calcium are naturally occurring minerals in the aquifer. Sodium may be related to the treatment process and copper and zinc to the distribution material. Based on the available water quality data, all of the systems in this report were determined **not** susceptible to the other inorganic compounds.

Radionuclides

Non-transient non-community systems are currently not regulated for radionuclides. Radium-228 has been detected at the Circle School at levels greater than the 50% MCL. Radium can be traced to the natural occurrence of uranium in the bedrock. An MCL for radon-222 has not been adopted yet for Maryland. However, the U.S. EPA is proposing an MCL of 300 pCi/L or an alternative of 4000 pCi/L for community drinking water systems if the State has a program to reduce the more significant risk from radon in indoor air, which is the primary health concern. Radon is present in all eight systems that have tested for this contaminant. Four of the systems do not have any radon results available. Five water systems have radon levels above 50% of the higher proposed MCL of 4000 pCi/L. An additional four systems will have radon levels above 50% of the lower proposed MCL of 300 pCi/L.

The source of radon in ground water can be traced back to the natural occurrence of uranium in rocks. Radon is prevalent in ground water throughout the Piedmont Region of Montgomery County due to radioactive decay of uranium bearing minerals in the bedrock (Bolton, 1996).

The susceptibility of the systems to radiological contaminants is shown on table 9b. Based on the higher MCL of 4000 pCi/L, five systems **are** susceptible to radon. Based on the lower MCL of 300 pCi/L nine systems **are** susceptible to radon. Determination of susceptibility to radon cannot be made for three systems due to lack of sampling data.

The Circle School **is** susceptible to radium based on the sampling data and the aquifer characteristics. Based on the production, handling and storage of radioactive materials, the Neutron Products, Inc. **is** susceptible to radiological contaminants. Susceptibility determinations to radium and other radiological contaminants cannot be made at this time for all the other systems due to lack of sampling data.

Volatile Organic Compounds

Ground water contamination by VOCs is known to exist within the WHPA for Laytonsville Elementary School (figure 2c). The Oil Control Program is investigating two cases because VOCs were detected in domestic wells on the west side of the Laytonsville Road. The Laytonsville Voluntary Fire Department (LVFD) and the G. D. Armstrong facility are being investigated since they are upgradient of the domestic well and have USTs on site. The LVFD had a leaking UST which has now been replaced by a new UST that meets the State's current tank regulations. Appendix A provides more details on these sites. No regulated VOCs have been detected at Laytonsville Elementary School.

1, 2-dichloroethane and toluene were detected at Monocacy Elementary School. Only one point source was identified in the WHPA (heating oil UST figure 2f) and not likely to be a source of these compounds. 1, 2- dichloroethane is used as a solvent and as a fumigant. Toluene is a component of gasoline and has wide applications as a solvent.

MTBE has been detected at low levels in four samples collected from Layton Village Shopping Center in 1999 and 2000. The supply well is located between a parking lot and a major roadway (figure 2c) and south and east of the two cases mentioned earlier being investigated by the Oil Control Program. MTBE is commonly in runoff from paved surfaces.

Toluene has been detected four times and p-dichlorobenzene one time in samples collected from the Montgomery County Resource Recovery Facility since 1999. No point sources of contamination were identified in the WHPA for this facility (figure 2k). P-dichlorobenezene is used as an insecticidal fumigant. This facility converts waste it receives to energy. There is a high volume of truck traffic hauling waste to the facility.

The predominant sources of VOCs are point sources of contamination outlined in Table 2. Table 9c provides a summary of the susceptibility of the twelve systems to VOCs Some of the systems that have potential VOC sources like USTs that are in compliance with State regulations within or near their respective wellhead protection areas. If these systems have had no VOC detections in the samples they are not considered susceptible to VOCs (Childrens Center of Damascus, Puritan Christian School, and Butler School). However, others (Laytonsville Elementary School, Pleasant's Excavation Co., and Neutron Products, Inc.) that have point sources related to commercial activity or investigations are considered susceptible to VOCs even though VOCs have not yet been detected in monitoring samples.

Based on the above discussion, six systems **are** susceptible to VOC contamination and six are **not** susceptible to VOC contamination (figure 9c).

Synthetic Organic Compounds

The sources of SOCs to ground water include point and non-point sources such as pesticide application. No potential point sources of SOCs were identified within or near the WHPAs for any of the systems. Non-point sources include pesticides applied to agricultural fields, school and commercial properties, and residential lawns. Eight of the twelve systems in this report have cropland making up the major portion of the land use within their respective WHPAs. Pesticides and chemicals used on residential and commercial lawns and gardens are a potential threat. However, typical lawn maintenance herbicides are very biodegradable and should not pose a significant SOC risk if applied properly.

No SOC above 50% of the MCL was detected in any of the twelve systems. Di (2-ethylhexyl) phthalate was detected in four systems at levels below 50% of the MCL. Phthalate was also detected in the laboratory blanks and its detection is not believed to represent actual water quality. Other SOCs that were detected at levels well below their respective MCLs are described in the Water Quality section. Di (2-ethylhexyl) adipate is used in synthetic rubber, food packaging, and cosmetics. Pentachlorophenol is used as a wood preservative, and is found in cooling tower waste. Simazine, dicamba, picloram and 2, 4, 5-TP (Silvex) are herbicides used on row crops, and lawns. 1, 2-dibrmo 3-chloropropane is a soil fumigant and methoxychlor is an insecticide.

Based on the potential contaminant sources within or near the respective WHPAs, available water quality data, and the vulnerability of unconfined aquifers to contamination, five of the systems in this report **are** considered susceptible to SOCs as outlined in table 10d. Seven systems were determined **not** susceptible to SOC contamination.

Microbiological Contaminants

Sources of microbiological pathogens in surface water are improperly treated wastewater (discharge to surface water or failing septic systems), waste material from mammals, and urban runoff in developed areas. Ground water is generally thought to be not susceptible to contamination by pathogenic microorganisms due to the natural filtration ability of soil and aquifer material. The exceptions to this are 1) wells that are classified as "Ground water under the direct influence of surface water" (GWUDI), 2) wells that may be sensitive to viruses due to a short travel time of water from the source of viral contamination to the well and 3) septic systems that are improperly installed or designed can be a source of microbial contamination in fractured rock.

Raw water testing has not been completed on eleven out of the twelve systems in this report. Raw water quality data is available for the Circle School which did not show presence of any coliform bacteria. Based on the geology and well construction information most of the wells (about 8) for these systems have a low risk of contamination to protozoa and bacteria.

All the systems are required to sample quarterly for bacteria from the finished water. Four of the systems do not use disinfection for treatment and therefore the results may be indicative of raw water (Table 6). Only one of these systems (Neutron Products, Inc.) had repeated positive bacteria results. An initial sanitary survey of this facility by WSP and repeat sampling indicated that the positive bacteria results were probably associated with the distribution system. The WSP is planning a followup investigation to determine the frequent positive bacteria results in the water supply. Well No. 1 at Pleasant's Excavation Co., has a loose well cap which exposes the well to insects that can nest under the cap and cause microbial contamination. The other seven systems need to be tested for surface water influence in order to properly determine their susceptibility to microbial contamination.

Based on the above discussion, four systems **are** not considered susceptible to microbiological contamiants, and one system **is** considered susceptible to microbiological contaminants. Susceptibilty to microbiological contaminants cannot be determined for seven systems due to lack of available raw water quality data (table 9e).

Management of the Source Water Assessment Area

With the information contained in this report, the individual water system owners as well as the Montgomery County government have a basis for better understanding the risks to drinking water supplies for the small non-transient-non-community ground water systems. Being aware of the areas delineated for wellhead protection, knowing potential contaminant sources, evaluating future development, working with agricultural producers and soil conservation agencies, and effective outreach and education are examples of management practices that will help protect the water supply. Specific management recommendations for consideration are listed below. The following recommendations are intended for 1) a countywide wellhead protection effort, and 2) for individual water systems.

Recommendations For County Agencies:

Form a Local Planning Team

- A local planning team representing all the interests in the county should be formed to begin to implement a source water protection plan. Montgomery County Departments of Environmental Protection, Permitting Services and Planning with the county schools, private schools, day care and commercial facilities, farmers and local residents should work together to reach a consensus on how to protect the water supplies.
- A management strategy adopted by the county should be consistent with the level of resources available for implementation. Montgomery County is currently working on a ground water protection strategy, which should incorporate wellhead protection management into it. Funding is available through MDE for wellhead protection programs.

Public Awareness and Outreach

- Conduct education outreach to the facilities listed in Table 2. Important topics include: (a) minimizing the risk of contamination from all in-ground tanks and lines (b) inspection of all waste streams that may go into dry wells, septic tanks or other ground water discharge points, (c) reporting chemical and petroleum spills, and (d) proper material and chemical storage practices.
- Informing property owners and businesses located within WHPAs that their activities could have serious impacts on the respective water supplies.
- Road signs at outside of the planned WSSC service area can be used to make the public aware of protecting their ground water resources, and to help in the event of spill notification and response.

Planning/ New Development

- Plans for new commercial development should consider placement of water supply wells a priority for such facilities as gas stations, and other users of hazardous materials. Additionally, ensuring the adequacy of the well to supply water for the facilities in the long term will ensure that additional wells in less desirable locations are not necessary.
- A Countywide strategy for addressing water quality protection issues for small systems deserves consideration. A cooperative effort is needed to minimize future risks to contamination beyond minimum setback requirements.

Land Acquisition/Easements

- The availability of loans for purchasing land or easements for the purpose of protecting designated wellhead protection areas is available from MDE for non-transient non-community water systems owned by non-profit organizations. Loans are offered at zero percent interest and zero points.

Contingency Plan

- Develop a spill response plan in concert with the Fire Departments and other emergency response personnel.

RECOMMENDATIONS FOR INDIVIDUAL SYSTEMS:

Planning/New Development

- MDE recommends that water supply system owners within Montgomery County should encourage the County to develop a countywide a wellhead protection ordinance to protect all public water systems.
- Individual systems should be aware of the WHPA and evaluate possible effects to their water supply before making any changes to their property. They should voice their concern to the zoning office when they become aware of any changes to neighboring properties

Cooperative Efforts with Other Agencies

- Systems that have cropland making up part of their wellhead protection areas can request the assistance of the University of Maryland Agricultural Extension Service and the Soil Conservation Service to work with farmers to adopt Best Management Practices (BMP's) for cropland located in their WHPA.
- The systems may also encourage farmers to participate in the New Conservation Reserve Program (CREP) applicable to the cropland located within wellhead protection areas. Government funding is available to qualified farmers equal to the cost and financial benefit of farming the area. The Natural Resources Conservation Service is responsible for determining the environmental benefits of each acre offered for participation.

Monitoring

- Systems should continue to monitor for contaminants that have been previously detected to ensure public health protection.
- Systems whose wellhead protection areas are within or near open LUST cases should stay in contact with the MDE Oil Control Program for the latest status and updates of these cases.
- Systems should continue to monitor for all Safe Drinking Water Act contaminants as required by MDE.
- Systems are recommended to annually collect raw water for microbiological contaminants to ensure the integrity of their well.

Contaminant Source Inventory Updates/ Inspections

- Water system owners should conduct its own survey of their wellhead protection area to ensure that there are no additional potential sources of contamination. Updated records of new development within the WHPA should be maintained.
- Periodic inspections and a regular maintenance program for the supply wells will ensure their integrity and protect the aquifer from contamination.
- Some of the systems in this report have unused wells that are no longer connected to the distribution. Such wells should be abandoned and sealed as per current State regulations to prevent contamination to the aquifer.

Changes in Use

- Water system owners are required to notify the MDE Water Supply Program if new wells are to be added or if they wish to increase their water useage. Drilling a new well outside the current wellhead protection area would modify the area, therefore the Water Supply Program should be contacted if a new well is being proposed.

REFERENCES

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U.S. Environmental Protection Agency, 1991, Delineation of Wellhead Protection Areas in Fractured Rocks: Office of Ground Water and Drinking Water, EPA/570/9-91-009, 144 pp.

OTHER SOURCES OF DATA

Water Appropriation and Use Permits
Public Water Supply Sanitary Survey Inspection Reports
MDE Water Supply Program Oracle® Database
MDE Waste Management Sites Database
Department of Natural Resources Digital Orthophoto Quarter Quadrangles
USGS Topographic 7.5 Minute Quadrangles
Maryland Office of Planning 2000 Montgomery County Land Use Map
Maryland Office of Planning 1995 Montgomery County Sewer Map

TABLES

PWSID	PWS NAME	PLANT ID	SOURCE ID	SOURCE NAME	GAP	GAP AMOUNT (gpd)	WELL PERMIT NO	TOTAL DEPTH (ft)	CASING DEPTH (ft)	YEAR DRILLED	AQUIFER
1150001	THE BARNESVILLE SCHOOL	01	02	SCHOOL WELL 1	MO1967G001	2300	MO670242	175	55	1967	IJAMSVILLE FM-MARBURG SCHIST
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	01	01	WELL1	MO1985G008	2000	MO811251	400	48	1985	IJAMSVILLE FM-MARBURG SCHIST
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	01	SCHOOL WELL 1	MO1988G006	8800	NA	NA	NA	1988	UP. PELITIC SCHIST WISSAHICKON
1150014	MATER AMORIS SCHOOL	01	01	M.A.S. WELL 1	MO1984G018	2500	MO733332	300	55	1981	LW. PELITIC SCHIST WISSAHICKON
1150016	PLEASANTS EXCAVATION CO., INC.	01	01	WELL 1	MO1985G006	1000	NA	NA	NA	NA	IJAMSVILLE FM-MARBURG SCHIST
1150016	PLEASANTS EXCAVATION CO., INC.	02	02	WELL 2	MO1985G006	1000	MO811236	120	53	1985	IJAMSVILLE FM-MARBURG SCHIST
1150018	MONOCACY ELEMENTARY SCHOOL	01	02	NEW WELL	MO1971G001	2500	M0880268	250	50	1988	IJAMSVILLE FM-MARBURG SCHIST
1150021	PURITAN CHRISTIAN SCHOOL	01	01	P.C.S. WELL 1	N/A	1500	NA	NA	NA	NA	UP. PELITIC SCHIST WISSAHICKON

Table 1. Well Information for the Small Nontransient Noncommunity Water Supply Wells.

PWSID	PWS NAME	PLANT ID	SOURCE ID	SOURCE NAME	GAP	GAP AMOUNT (gpd)	WELL PERMIT NO	TOTAL DEPTH (ft)	CASING DEPTH (ft)	YEAR DRILLED	AQUIFER
1150038	BUTLER SCHOOL	01	02	MAIN BLDG HORSE BARN WELL 1	MO1982G006	2500	MO733493	300	33	1982	UP. PELITIC SCHIST WISSAHICKON
1150038	BUTLER SCHOOL	01	03	MAIN BLDG SCHOOL WELL 2	MO1982G006	2500	MO930726	400	40	1996	UP. PELITIC SCHIST WISSAHICKON
1150038	BUTLER SCHOOL	01	04	PARK HOUSE BLDG 3	MO1982G006	2500	NA	NA	NA	1982	UP. PELITIC SCHIST WISSAHICKON
1150043	LAYTONS VILLAGE SHOPPING CTR	01	01	SHOPPING CENTER WELL	MO1985G012	5000	MO811408	170	120	1986	UP. PELITIC SCHIST WISSAHICKON
1150044	NEUTRON PRODUCTS, INC.	02	01	WELL 1 WEST	MO1969G002	9300	M0810848	210	45	1984	NEW OXFORD FORMATION
1150044	NEUTRON PRODUCTS, INC.	01	02	WELL 2 EAST	MO1969G002	9300	MO731117	90	46	1976	NEW OXFORD FORMATION
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	01	WELL 1	MO1998G001	3500	MO940626	400	40	1998	UP. PELITIC SCHIST WISSAHICKON
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	01	MCRRF WELL	MO1990G011	2200	MO920428	675	62	1993	NEW OXFORD FORMATION

Table 1 (continued). Well Information for the Small Nontransient Noncommunity Water Supply Wells.

Type	Site Name	Address	Potential Contaminant	Reference Location	Status
UST	Children's Center of Damascus	9751 Hawkins Creamery Rd	VOC	Figure 2b	1 tank in use
UST	G.D. Armstrong, Inc.	21625 Laytonsville Rd	VOC	Figure 2c, 1	3 tanks in use
LUST	G.D. Armstrong, Inc.	21508 Laytonsville Rd	VOC	Figure 2c, 2	Case No. 90-0700-M02
MISC	Erdle Automotive	21402 Laytonsville Rd	VOC, HM	Figure 2c, 3	Active
MISC	ATCO Tire Co.	21419 Laytonsville Rd	VOC, HM	Figure 2c, 4	Active
LUST	Laytonsville VFD	21400 Laytonsville Rd	VOC	Figure 2c, 5	Case No. 00-0098-M02
MISC	Sheila L. Brush, DDS	6856 Olney Laytonsville Rd	HM, R	Figure 2c, 6	Active
CHS	Pleasant's Excavation, Inc.	24024 Frederick Rd	VOC, HM	Figure 2e	Active
UST	Pleasant's Excavation, Inc.	24024 Frederick Rd	VOC	Figure 2e	5 tanks in use
CHS	Diggins & Riggins	23924 Frederick Rd	VOC	Figure 2e	Active
UST	Puritan Christian School	6325 Griffith Rd	VOC	Figure 2g	1 tank in use
MISC	Private Construction Equipment Storage	? 6322 Griffith Rd	VOC	Figure 2g	Active
AST	Butler School	15951 Germantown Rd	VOC	Figure 2h	2 tanks in use
CHS	Neutron Products, Inc.	22301 Mount Ephraim Rd	VOC, R	Figure 2i	Active
UST	Robert Dayoff	22304 Mount Ephraim Rd	VOC	Figure 2i	2 tanks in use
GWD	Gothic Dairy Barn	Martinsburg & Washe Rd	N, MP	Figure 2k	Active

Table 2. Potential Contaminant Sources within Wellhead Protection Areas (see figures for location)

PWSID	PWS NAME	PLANT ID	TREATMENT METHOD	REASON FOR TREATMENT
1150001	THE BARNESVILLE SCHOOL	01	pH ADJUSTMENT	CORROSION CONTROL
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	01	pH ADJUSTMENT	CORROSION CONTROL
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	01	ION EXCHANGE	SOFTENING
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	01	ULTRAVIOLET RADIATION	DISINFECTION
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	pH ADJUSTMENT	CORROSION CONTROL
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	HYPOCHLORINATION, PRE	DISINFECTION
1150014	MATER AMORIS SCHOOL	01	pH ADJUSTMENT	CORROSION CONTROL
1150016	PLEASANTS EXCAVATION CO., INC.	01	pH ADJUSTMENT	CORROSION CONTROL
1150016	PLEASANTS EXCAVATION CO., INC.	02	pH ADJUSTMENT	CORROSION CONTROL
1150018	MONOCACY ELEMENTARY SCHOOL	01	HYPOCHLORINATION, PRE	DISINFECTION
1150021	PURITAN CHRISTIAN SCHOOL	01	ULTRAVIOLET RADIATION	DISINFECTION
1150021	PURITAN CHRISTIAN SCHOOL	01	FILTRATION, CARTRIDGE	PARTICULATE REMOVAL
1150038	BUTLER SCHOOL	01	pH ADJUSTMENT	CORROSION CONTROL
1150038	BUTLER SCHOOL	01	HYPOCHLORINATION, PRE	DISINFECTION
1150038	BUTLER SCHOOL	02	ULTRAVIOLET RADIATION	DISINFECTION
1150043	LAYTONS VILLAGE SHOPPING CENTER	01	pH ADJUSTMENT	CORROSION CONTROL
1150043	LAYTONS VILLAGE SHOPPING CENTER	01	HYPOCHLORINATION, POST	DISINFECTION
1150043	LAYTONS VILLAGE SHOPPING CENTER	01	ION EXCHANGE	IRON REMOVAL
1150044	NEUTRON PRODUCTS, INC.	01	NO TREATMENT	NONE
1150044	NEUTRON PRODUCTS, INC.	02	NO TREATMENT	NONE
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	HYPOCHLORINATION, POST	DISINFECTION
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	HYPOCHLORINATION, PRE	DISINFECTION

Table 3. Treatment Methods for Montgomery County Small Systems

PWSID	PWS NAME	PLANT ID	Nitrate		SOCs		VOCs		IOCs (except nitrate)	
			No. of Samples	No. of samples > 50% MCL	No. of Samples	No. of samples > 50% MCL	No. of Samples	No. of samples > 50% MCL	No. of Samples	samples > 50% MCL
1150001	THE BARNESVILLE SCHOOL	01	14	0	2	0	11	0	6	0
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	01	20	4	2	0	9	0	3	0
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	38	29	3	0	5	0	3	1
1150014	MATER AMORIS SCHOOL	01	15	0	2	0	8	0	4	0
1150016	PLEASANTS EXCAVATION CO., INC.	01	9	6	1	0	3	0	1	0
1150018	MONOCACY ELEMENTARY SCHOOL	01	24	22	8	0	11	1	3	0
1150021	PURITAN CHRISTIAN SCHOOL	01	16	0	2	0	8	0	3	0
1150038	BUTLER SCHOOL	01	26	12	2	0	8	0	3	0
1150038	BUTLER SCHOOL	02	10	1	0	0	0	0	0	0
1150043	LAYTONS VILLAGE SHOPPING CENTER	01	23	7	3	0	12	0	2	0
1150044	NEUTRON PRODUCTS, INC.	01	22	17	1	0	8	0	1	0
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	15	12	1	0	5	0	2	0
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	4	4	2	0	6	0	2	0

Table 4. Total Water Quality Samples collected for all the small Montgomery County Systems.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150006	CHILDREN'S CENTER OF DAMASCUS,INC.	01	NITRATE	10	11-Nov-79	6.2
1150006	CHILDREN'S CENTER OF DAMASCUS,INC.	01	NITRATE	10	14-Feb-94	8.05
1150006	CHILDREN'S CENTER OF DAMASCUS,INC.	01	NITRATE	10	8-Sep-94	7.23
1150006	CHILDREN'S CENTER OF DAMASCUS,INC.	01	NITRATE	10	8-Jan-97	5.08
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**14-Feb-94**	**11.3**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**16-Feb-94**	**11.5**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	9-Jun-94	7.66
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	8-Aug-94	8.4
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	8-Sep-94	8.36
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**1-Dec-94**	**11.4**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**8-Dec-94**	**11.2**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**5-Jan-95**	**12.8**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**19-Jan-95**	**10.6**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**2-Feb-95**	**10.3**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	3-Jul-95	8.66
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**24-Aug-95**	**10.9**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**15-Dec-95**	**11.2**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	22-Feb-96	9.6
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	20-Jun-96	8.2
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	26-Nov-96	8.5

Table 5a. Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**8-Jan-97**	**10.6**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**9-Jan-97**	**10.6**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	6-Mar-97	8.5
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	5-Mar-98	8.9
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**10**	**NITRATE**	**10**	**22-Sep-98**	**11.8**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	24-Mar-99	9.3
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	COPPER	1.3	4-Jun-99	1
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	4-Jun-99	9
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	30-Sep-99	9.6
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**24-Jan-00**	**11.2**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**14-Jun-00**	**10.2**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**17-Jul-00**	**11.9**
1150013	**LAYTONSVILLE ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**16-Nov-00**	**10.6**
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	NITRATE	10	6-Feb-01	9.6
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	6-Dec-95	5.1
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	25-Mar-97	5.7
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	7-Dec-98	8.6
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	2-Dec-99	9.3
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	28-Feb-00	9.7
1150016	PLEASANT'S EXCAVATION CO., INC	01	NITRATE	10	11-Nov-01	6.5

Figure 5a (continued). Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	31-Jan-94	7.64
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	9-Jun-94	8.1
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	8-Sep-94	8.25
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	1-Dec-94	9.3
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	7-Apr-95	7.96
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	15-Dec-95	9.72
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	22-Feb-96	8.43
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	25-Apr-96	6.8
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	26-Nov-96	6.4
1150018	**MONOCACY ELEMENTARY SCHOOL**	**01**	**NITRATE**	**10**	**8-Jan-97**	**10.1**
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	30-Apr-97	6.3
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	12-May-98	6.45
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	24-Mar-99	6.9
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	22-Jun-99	6.8
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	25-Oct-99	7.7
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	24-Jan-00	7.2
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	17-Jul-00	6.8
1150018	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	2-Nov-00	7.1
1150016	MONOCACY ELEMENTARY SCHOOL	01	NITRATE	10	11-Nov-01	6.5
1150038	BUTLER SCHOOL	01	NITRATE	10	31-Jan-94	7.34

Table 5a (continued). Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150038	BUTLER SCHOOL	01	NITRATE	10	5-Jan-95	7
1150038	BUTLER SCHOOL	01	NITRATE	10	15-Dec-95	7.88
1150038	BUTLER SCHOOL	01	NITRATE	10	28-Apr-97	6.07
1150038	BUTLER SCHOOL	01	NITRATE	10	8-Sep-97	6.6
1150038	BUTLER SCHOOL	01	NITRATE	10	12-Nov-97	5.48
1150038	BUTLER SCHOOL	01	NITRATE	10	17-Jul-00	5
1150038	BUTLER SCHOOL	01	NITRATE	10	26-Sep-00	5.8
1150038	BUTLER SCHOOL	01	NITRATE	10	10-Sep-01	6
1150038	BUTLER SCHOOL	01	NITRATE	10	09-Jan-02	5
1150038	BUTLER SCHOOL	01	NITRATE	10	14-Mar-02	5.3
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	NITRATE	10	18-Dec-96	5.3
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	NITRATE	10	29-Dec-97	5.2
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	NITRATE	10	13-Mar-98	5.9
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	NITRATE	10	28-Sep-00	5.8
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	NITRATE	10	3-Jan-02	6.9
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	13-Feb-96	7.1
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	13-Feb-96	7.1
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	13-Feb-96	8
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	10-Dec-96	7
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	10-Dec-96	8.8

Table 5a (continued). Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	9-Apr-97	8.4
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	20-May-97	8.2
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	20-May-97	7.6
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	13-Nov-97	7.3
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	13-Nov-97	8.9
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	24-Mar-98	9.4
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	24-Mar-98	7.4
1150044	NEUTRON PRODUCTS, INC.	01	NITRATE	10	16-Nov-99	9.1
1150044	**NEUTRON PRODUCTS, INC.**	**01**	**NITRATE**	**10**	**26-Dec-01**	**10.4**
1150044	**NEUTRON PRODUCTS, INC.**	**01**	**NITRATE**	**10**	**18-Mar-01**	**10.4**
1150044	**NEUTRON PRODUCTS, INC.**	**02**	**NITRATE**	**10**	**26-Mar-01**	**11.6**
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	19-May-98	6.4
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	28-Nov-99	5.6
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	1-Dec-99	5.1
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	7-Jun-00	6.6
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	26-Sep-00	5.7
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	29-Sep-00	5
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	1-Dec-00	5
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	15-Mar-01	5.2
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	20-Mar-01	5.2

Figure 5a (continued). Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPM)	SAMPLE DATE	RESULT (PPM)
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	06-Sep-01	6.1
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	09-Oct-01	5.3
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	NITRATE	10	14-Nov-01	5.3
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	NITRATE	10	18-Nov-98	5.4
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	NITRATE	10	10-May-99	5.3
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	NITRATE	10	10-May-99	5.3
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	01	NITRATE	10	8-Feb-00	5.5

Figure 5a (continued). Inorganic Compound (IOC) results above 50% of the MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (pCi/L)	SAMPLE DATE	RESULT (pCi/L)
1150001	THE BARNESVILLE SCHOOL	01	RADON-222	300/4000*	9-Apr-97	1810
1150006	CHILDREN'S CENTER OF DAMASCUS,INC.	01	RADON-222	300/4000*	9-Apr-97	3535
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	01	RADON-222	300/4000*	13-May-97	2665
1150014	MATER AMORIS SCHOOL	01	RADON-222	300/4000*	12-May-97	3395
1150018	MONOCACY ELEMENTARY SCHOOL	01	RADON-222	300/4000*	24-Mar-97	170
1150021	PURITAN CHRISTIAN SCHOOL	1	RADON-222	300/4000*	13-May-97	4645
1150038	BUTLER SCHOOL	01	RADON-222	300/4000*	9-Apr-97	1600
1150043	LAYTONSVILLE VILLAGE SHOPPING CENTER	01	RADON-222	300/4000*	13-May-97	4705
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	RADIUM-228	5	31-May-00	2.87
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	01	RADON-222	300/4000*	18-Sep-01	485

Table 5b. Radionuclide results above 50% of the or proposed* MCL.

PWSID	PWS NAME	PLANT ID	CONTAMINANT NAME	MCL (PPB)	SAMPLE DATE	RESULT (PPB)
1150018	MONOCACY ELEMENTARY SCHOOL	01	1,2-DICHLOROETHANE	5	24-Mar-95	3

Table 5c. Volatile Organic Compound (VOC) results above 50% of the MCL.

PWSID	PWS NAME	No. of samples	No. of positive samples	Disinfection Treatment?	Bottled Water?
1150001	THE BARNESVILLE SCHOOL	22	0	N	N
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	24	0	Y	N
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	23	0	Y	Y
1150014	MATER AMORIS SCHOOL	23	0	N	N
1150016	PLEASANTS EXCAVATION CO., INC.	25	0	N	Y
1150018	MONOCACY ELEMENTARY SCHOOL	23	0	Y	Y
1150021	PURITAN CHRISTIAN SCHOOL	20	0	Y	N
1150038	BUTLER SCHOOL	27	0	Y	N
1150043	LAYTONS VILLAGE SHOPPING CENTER	20	0	Y	N
1150044	NEUTRON PRODUCTS, INC.	26	16	N	Y
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	12	0	Y	N
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	13	0	Y	N

Table 6. Routine Bacteriological Samples from distribution for each system since 1996.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Institutional	7.49	10.4
Cropland	42.36	59.1
Pasture	5.74	8.0
Forest	16.17	22.5

Table 7a. Land Use Summary for the Barnesville School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	14.57	20.3
Medium Density Residential	1.62	2.3
Cropland	44.62	62.1
Forest	10.95	15.3

Table 7b. Land Use Summary for the Children's Center of Damascus WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	13.16	18.3
Medium Density Resdential	5.87	8.2
Commercial /Institutional	20.77	29.0
Cropland	30.02	41.8
Forest	1.94	2.7

Table 7c. Land Use Summary for the Laytonsville Elementary School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	37.61	48.2
Forest	37.15	51.8

Table 7d. Land Use Summary for the Mater Amoris School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Commercial	13.59	17.9
Industrial	18.58	24.5
Cropland	14.10	18.6
Pasture	5.09	6.7
Forest	24.49	32.3

Table 7e. Land Use Summary for the Pleasant's Excavation Co. WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Institutional	11.49	16.0
Cropland	52.31	72.9
Pasture	5.35	7.5
Forest	2.61	3.6

Table 7f. Land Use Summary for the Monocacy Elementary School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	8.9	11.4
Cropland	31.74	44.3
Pasture	11.37	15.8
Forest	20.46	28.5

Table 7g. Land Use Summary for the Puritan Christian School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	22.93	19.7
Institutional	1.19	1.0
Cropland	28.09	24.1
Pasture	23.98	20.6
Forest	40.48	34.6

Table 7h. Land Use Summary for the Butler School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	21.35	29.8
Commercial/Institutional	9.71	13.5
Cropland	23.24	32.3
Pasture	9.44	13.2
Forest	8.02	11.2

Table 7i. Land Use Summary for the Laytons Village Shopping Center WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	28.66	33.2
Industrial	7.22	8.4
Cropland	30.01	34.6
Pasture	2.3	2.7
Forest	18.22	21.1

Table 7j. Land Use Summary for the Neutron Products WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Low Density Residential	19.10	36.6
Cropland	44.36	61.8
Pasture	8.30	11.6

Table 7k. Land Use Summary for the Circle School WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Industrial	66.27	92.3
Forest	5.49	7.7

Table 7l. Land Use Summary for the Montgomery Co. Resource Recovery Facility WHPA.

LAND USE CATEGORIES	AREA (in acres)	PERCENTAGE OF TOTAL AREA
Cropland	340.9	36
Forest	185.0	20
Low Density Residential	162.5	18
Industrial	92.1	10
Pasture	71.6	8
Commercial/Institutional	64.2	7
Medium Density Residential	7.4	1

Table 7m. Summary of Total Land Use in Montgomery County Small System WHPAs.

SEWER SERVICE AREA	AREA (in acres	PERCENTAGE OF TOTAL AREA
No Planned Service	183,173	58
Existing Service	108,801	34
Service within 2 years	17,038	5
Service within 3 to 6 years	2,297	1
Service within 7 to 10 years	6,713	2

Table 8. Sewer Service Area Summary for Montgomery County.

PWSID	PWS NAME	Are Contaminant Sources present in the WHPA ?	Are Contaminants detected in WQ samples at Levels of Concern	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to Nitrate?
1150001	THE BARNESVILLE SCHOOL	YES	NO	NO	YES	NO
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	YES	YES	NO	YES	YES
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	YES	YES	NO	YES	YES
1150014	MATER AMORIS SCHOOL	YES	NO	NO	YES	NO
1150016	PLEASANTS EXCAVATION CO., INC.	YES	YES	YES	YES	YES
1150018	MONOCACY ELEMENTARY SCHOOL	YES	YES	NO	YES	YES
1150021	PURITAN CHRISTIAN SCHOOL	YES	NO	NO	YES	NO
1150038	BUTLER SCHOOL	YES	YES	NO	YES	YES
1150043	LAYTONS VILLAGE SHOPPING CENTER	YES	YES	NO	YES	YES
1150044	NEUTRON PRODUCTS, INC.	YES	YES	NO	YES	YES
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	YES	YES	NO	YES	YES
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	YES	YES	NO	YES	YES

Table 9a. Susceptibility Chart for Nitrate.

PWSID	PWS NAME	Are Contaminant Sources present in the WHPA ?	Are Contaminants detected in WQ Samples at Levels of	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to Radiological Compounds
1150001	THE BARNESVILLE SCHOOL	YES (naturally occurring)	YES	NO	YES	MAYBE
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	YES (naturally occurring)	YES	NO	YES	YES
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	YES (naturally occurring)	YES	NO	YES	YES
1150014	MATER AMORIS SCHOOL	YES (naturally occurring)	YES	NO	YES	YES
1150016	PLEASANTS EXCAVATION CO., INC.	YES (naturally occurring)	NO DATA	NO	YES	CANNOT BE DETERMINED
1150018	MONOCACY ELEMENTARY SCHOOL	YES (naturally occurring)	MAYBE	NO	YES	MAYBE
1150021	PURITAN CHRISTIAN SCHOOL	YES (naturally occurring)	YES	NO	YES	YES
1150038	BUTLER SCHOOL	YES (naturally occurring)	YES	NO	YES	MAYBE
1150043	LAYTONS VILLAGE SHOPPING CENTER	YES (naturally occurring)	YES	NO	YES	YES
1150044	NEUTRON PRODUCTS, INC.	YES (natural and manufactured)	NO DATA	NO	YES	YES
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	YES (naturally occurring)	YES(radium) NO (radon)	NO	YES	YES (radium) CANNOT BE DETERMINED - (radon)
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	YES (naturally occurring)	NO DATA	NO	YES	CANNOT BE DETERMINED

Table 9b. Susceptibility Chart for Radiological Compounds

PWSID	PWS NAME	Are Contaminant Sources present in the WHPA ?	Are Contaminants detected in WQ samples at Levels of Concern	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to VOCs?
1150001	THE BARNESVILLE SCHOOL	NO	NO	NO	YES	NO
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	YES	NO	NO	YES	NO
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	YES	NO	NO	YES	YES
1150014	MATER AMORIS SCHOOL	NO	NO	NO	YES	NO
1150016	PLEASANTS EXCAVATION CO., INC.	YES	NO	YES	YES	YES
1150018	MONOCACY ELEMENTARY SCHOOL	YES	YES	NO	YES	YES
1150021	PURITAN CHRISTIAN SCHOOL	YES	NO	NO	YES	NO
1150038	BUTLER SCHOOL	YES	NO	NO	YES	NO
1150043	LAYTONS VILLAGE SHOPPING CENTER	YES	YES	NO	YES	YES
1150044	NEUTRON PRODUCTS, INC.	YES	NO	NO	YES	YES
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	NO	NO	NO	YES	NO
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	YES	YES	NO	YES	YES

Table 9c. Susceptibility Chart for Volatile Organic Compounds

PWSID	PWS NAME	Are Contaminant Sources present in the WHPA ?	Are Contaminants detected in WQ samples at Levels of Concern	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to SOCs?
1150001	THE BARNESVILLE SCHOOL	YES	NO	NO	YES	NO
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	YES	YES	NO	YES	YES
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	YES	YES	NO	YES	YES
1150014	MATER AMORIS SCHOOL	NO	NO	NO	YES	NO
1150016	PLEASANTS EXCAVATION CO., INC.	NO	NO	NO	YES	NO
1150018	MONOCACY ELEMENTARY SCHOOL	YES	YES	NO	YES	YES
1150021	PURITAN CHRISTIAN SCHOOL	YES	NO	NO	YES	NO
1150038	BUTLER SCHOOL	NO	NO	NO	YES	NO
1150043	LAYTONS VILLAGE SHOPPING CENTER	YES	YES	NO	YES	YES
1150044	NEUTRON PRODUCTS, INC.	YES	NO	NO	YES	NO
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	YES	NO	NO	YES	NO
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	NO	YES	NO	YES	NO

Figure 9d. Susceptibility Chart for Synthetic Organic Compounds.

PWSID	PWS NAME	Are Contaminant Sources present in the WHPA ?	Are Contaminants detected in raw water? (no disinfection)	Is Well Integrity a Factor?	Is the Aquifer Vulnerable?	Is the System Susceptible to Microbiological Contaminants
1150001	THE BARNESVILLE SCHOOL	YES	NO	NO	NO	NO
1150006	CHILDRENS CENTER OF DAMASCUS, INC.	YES	NO DATA	NO	NO	CANNOT BE DETERMINED
1150013	LAYTONSVILLE ELEMENTARY SCHOOL	NO	NO DATA	NO	NO	CANNOT BE DETERMINED
1150014	MATER AMORIS SCHOOL	YES	NO	NO	NO	NO
1150016	PLEASANTS EXCAVATION CO., INC.	YES	NO	YES	NO	YES
1150018	MONOCACY ELEMENTARY SCHOOL	YES	NO DATA	NO	NO	CANNOT BE DETERMINED
1150021	PURITAN CHRISTIAN SCHOOL	YES	NO DATA	NO	NO	CANNOT BE DETERMINED
1150038	BUTLER SCHOOL	YES	NO DATA	NO	NO	CANNOT BE DETERMINED
1150043	LAYTONS VILLAGE SHOPPING CENTER	YES	NO DATA	NO	NO	CANNOT BE DETERMINED
1150044	NEUTRON PRODUCTS, INC.	YES	YES (in distribution system)	NO	NO	NO
1150045	SENECA ACADEMY & THE CIRCLE SCHOOL	YES	NO	NO	NO	NO
1150046	MONTGOMERY CO RESOURCE RECOVERY FACILITY	YES	NOT DATA	NO	NO	CANNOT BE DETERMINED

Table 9e. Susceptibility Chart for Microbiological Contaminants.

John,
Please review
Thanks,
Forest

MEMORANDUM

TO: Norman Lazarus

FROM: John Smiechowski, Regional Supervisor, Region I, Oil Control Program

SUBJECT: Domestic Well Contamination, Laytonsville, MD

DATE: July 13, 2001

Enclosed is a city map and a map of the monitoring wells at G.D. Armstrong in Laytonsville, MD. Also enclosed are recent domestic well sample results for domestic wells around G.D Armstrong and Laytonsville VFD. There have been historic releases from both facilities and ongoing cases. All of the wells sampled except for the Datler residence up the street from Laytonsville VFD have shown impacts from tank releases of motor fuel. The well supplying the school across the street from the Laytonsville VFD has shown impacts in the past, but is presently clean. These domestic wells are generally shallow (about 50-70 feet below ground surface) and sometimes have poor water quality related to nitrate contamination. There are low levels of BTEX and MTBE in the monitoring wells surrounding G.D. Armstrong but no free product at this time. The facility passed a recent compliance inspection. In addition there is an active station up the road at the Rt. 108 and Brinks road intersection and a historic case at a closed station that existed across the street from the current station in the past. Based upon current and historical evidence of tank releases and poor domestic water well quality in much of Laytonsville we would strongly support placing the residents on a city water supply using a deeper, protected aquifer.

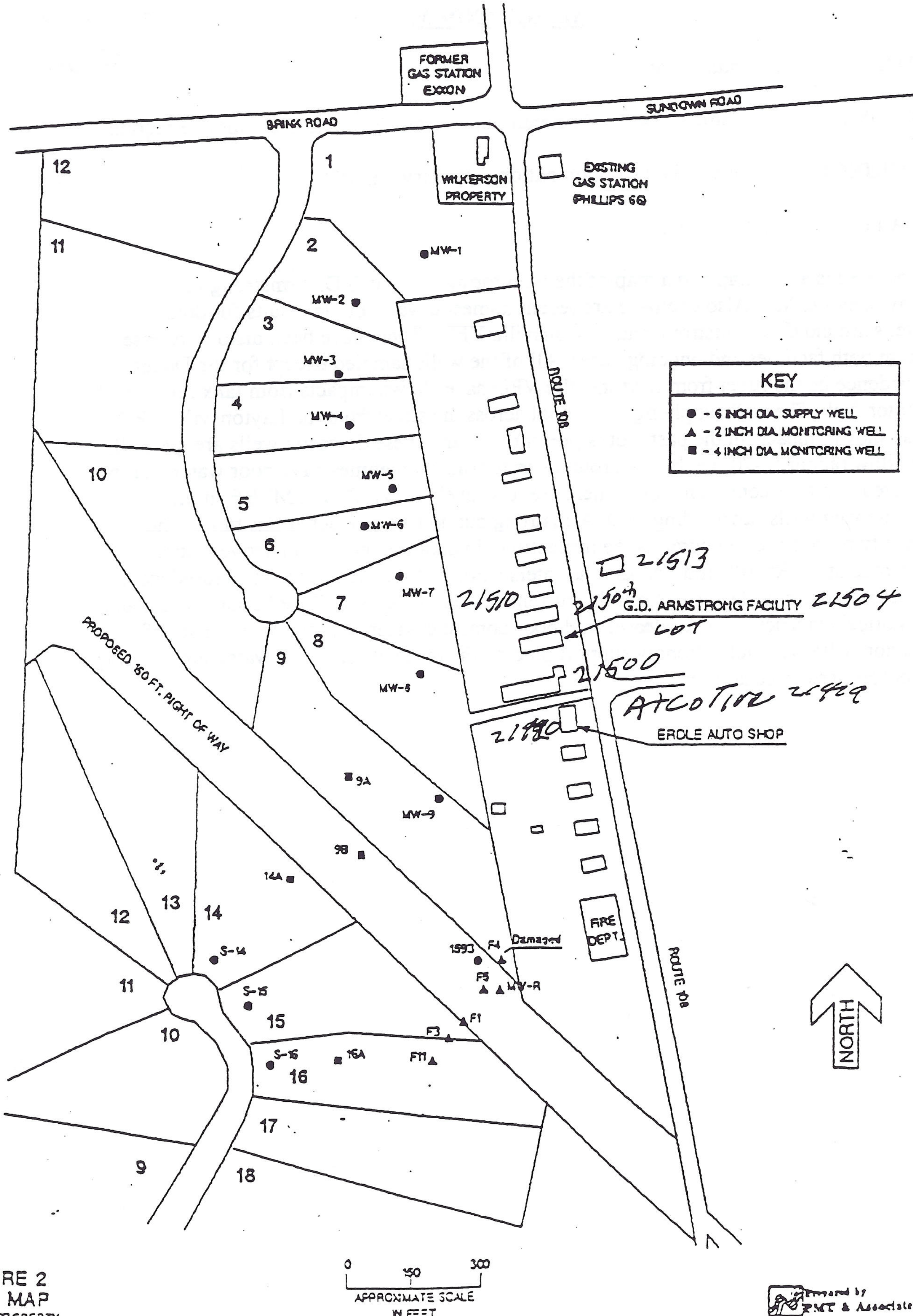

FIGURE 2
SITE MAP
FULKS PROPERTY
LAYTONSVILLE, MARYLAND

Prepared by
PMT & Associates, Inc.
October 25, 1996

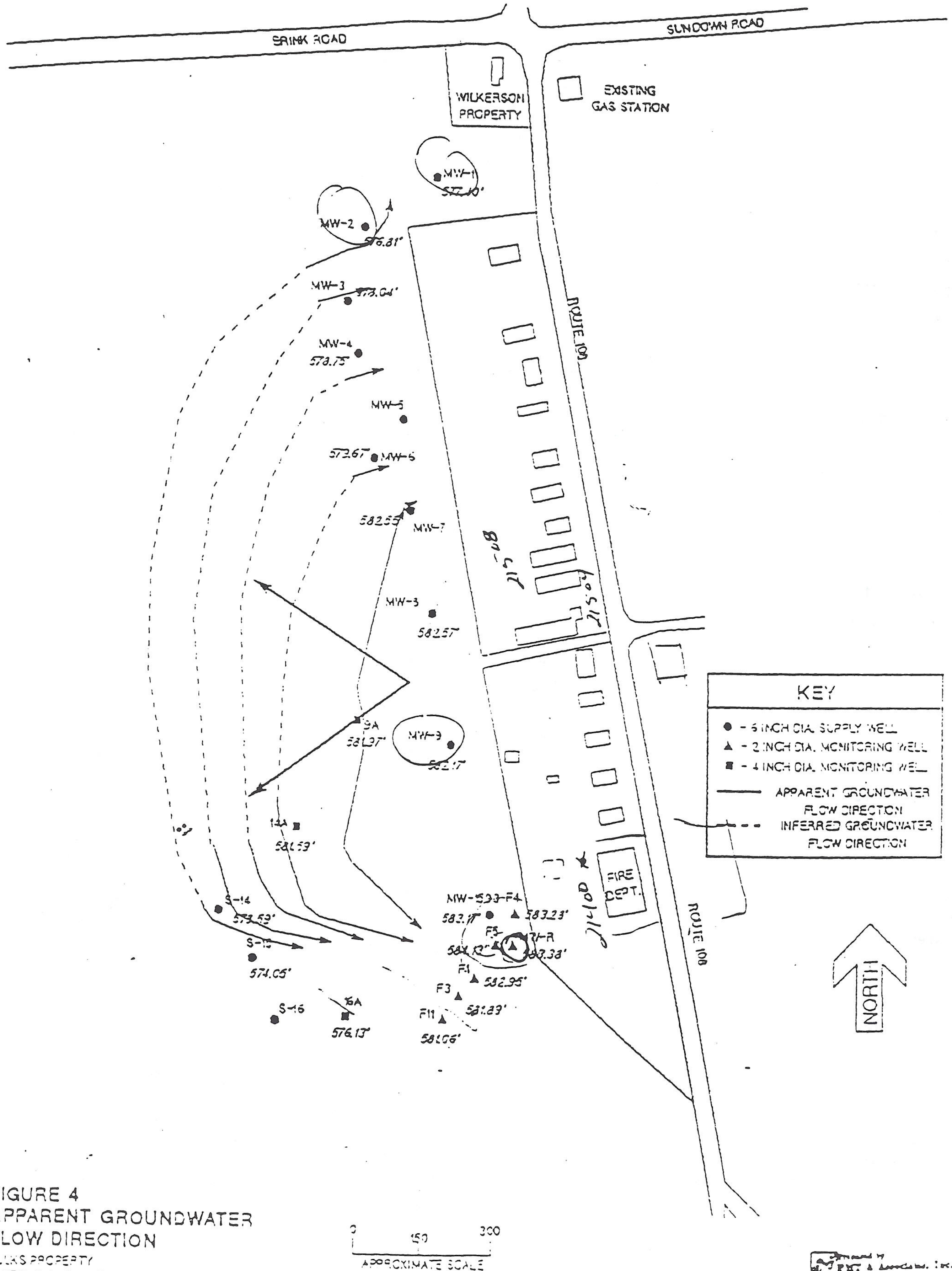

FIGURE 4
APPARENT GROUNDWATER
FLOW DIRECTION

FULKS PROPERTY
LAYTONSVILLE, MARYLAND

Prepared by
PMT & Associates, Inc.

OFFICES:
6630 BALTIMORE NATIONAL PIKE
ROUTE 40 WEST
BALTIMORE, MARYLAND 21228
410-747-8770
800-932-9047
410-788-8723 Fax
www.phaseonline.com

PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS
No. 01051826 Page 1 of 2
Nutshell Enterprises
May 24, 2001

Project: G.D. Armstrong Bulk Plant
Site Location: Laytonsville, MD
Project Number: N/A
Matrix: Water
Date Sampled: 05/16/01
Date Received: 05/18/01

	Result	Unit	Method	PQL	Date Analyzed
Sample ID: MW-1417					
Purgeable Aromatics					
Benzene	500	ug/L	EPA 8021B	20	05/23/01
Toluene	< 20	ug/L	EPA 8021B	20	05/23/01
Ethylbenzene	38	ug/L	EPA 8021B	20	05/23/01
Total Xylenes	35	ug/L	EPA 8021B	20	05/23/01
Methyl-t-butyl ether	< 20	ug/L	EPA 8021B	20	05/23/01
Naphthalene	59	ug/L	EPA 8021B	20	05/23/01
Sample ID: MW-1418					
Purgeable Aromatics					
Benzene	540	ug/L	EPA 8021B	5	05/23/01
Toluene	11	ug/L	EPA 8021B	5	05/23/01
Ethylbenzene	30	ug/L	EPA 8021B	5	05/23/01
Total Xylenes	6	ug/L	EPA 8021B	5	05/23/01
Methyl-t-butyl ether	100	ug/L	EPA 8021B	5	05/23/01
Naphthalene	< 5	ug/L	EPA 8021B	5	05/23/01
Sample ID: MW-1419					
Purgeable Aromatics					
Benzene	76	ug/L	EPA 8021B	1	05/21/01
Toluene	< 1	ug/L	EPA 8021B	1	05/21/01
Ethylbenzene	< 1	ug/L	EPA 8021B	1	05/21/01
Total Xylenes	< 1	ug/L	EPA 8021B	1	05/21/01
Methyl-t-butyl ether	4	ug/L	EPA 8021B	1	05/21/01
Naphthalene	< 1	ug/L	EPA 8021B	1	05/21/01

Reviewed by: [signature]
Quality Assurance Chemist

Notes:
PQL - Practical Quantitation Limit
Results reported on an as received basis
USEPA methods recommend that the appearance of detectable levels of the above compounds be confirmed when unfamiliar samples are analyzed.

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS
No. 01051826
Nutshell Enterprises
May 24, 2001

Project: G.D. Armstrong Bulk Plant
Site Location: Laytonsville, MD
Project Number: N/A
Matrix: Water
Date Sampled: 05/16/01
Date Received: 05/18/01

	Result	Unit	Method	PQL	Date Analyzed
Sample ID: MW-1475					
Purgeable Aromatics					
Benzene	< 1	ug/L	EPA 8021B	1	05/21/01
Toluene	< 1	ug/L	EPA 8021B	1	05/21/01
Ethylbenzene	< 1	ug/L	EPA 8021B	1	05/21/01
Total Xylenes	< 1	ug/L	EPA 8021B	1	05/21/01
Methyl-t-butyl ether	< 1	ug/L	EPA 8021B	1	05/21/01
Naphthalene	1	ug/L	EPA 8021B	1	05/21/01
Sample ID: 21500 Laytonsville Rd.					
Purgeable Aromatics					
Benzene	91	ug/L	EPA 8021B	1	05/21/01
Toluene	< 1	ug/L	EPA 8021B	1	05/21/01
Ethylbenzene	< 1	ug/L	EPA 8021B	1	05/21/01
Total Xylenes	28	ug/L	EPA 8021B	1	05/21/01
Methyl-t-butyl ether	34	ug/L	EPA 8021B	1	05/21/01
Naphthalene	17	ug/L	EPA 8021B	1	05/21/01
Sample ID: 21508 Laytonsville Rd.					
Purgeable Aromatics					
Benzene	< 1	ug/L	EPA 8021B	1	05/21/01
Toluene	< 1	ug/L	EPA 8021B	1	05/21/01
Ethylbenzene	< 1	ug/L	EPA 8021B	1	05/21/01
Total Xylenes	< 1	ug/L	EPA 8021B	1	05/21/01
Methyl-t-butyl ether	3	ug/L	EPA 8021B	1	05/21/01
Naphthalene	< 1	ug/L	EPA 8021B	1	05/21/01

Reviewed by: [signature]
Quality Assurance Chemist

Notes:
PQL - Practical Quantitation Limit
Results reported on an as received basis
USEPA methods recommend that the appearance of detectable levels of the above compounds be confirmed when unfamiliar samples are analyzed.

MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000 • 1-800-633-6101 • http:// www. mde. state. md. us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 26, 2001

Mr. Hugh McNaughton
G.D. Armstrong, Inc.
21504 Laytonsville Road
Laytonsville MD 20882

RE: Requirement for Filtration System for domestic well
G.D. Armstrong, Inc.
21504 Laytonsville Road
Laytonsville, MD
Case No. 90-0700MO2

Dear Mr. McNaughton:

The Waste Management Administration's Oil Control Program has received June 26, 2001 sampling results for your domestic well, which showed significant Benzene and MTBE contamination. Based upon the results of our meeting of July 25, 2001 the Administration will require installation of a Filtration System for the Well at G.D. Armstrong, Inc., 21504 Laytonsville Road, Laytonsville, Maryland, Case No. 90-0700MO2 as soon as possible.

We are also requesting sample results for the domestic well at Phillips 66 at the corner of Sundown Road and Route 108, Laytonsville as soon as possible. There is a second unused well with a broken pump in it on your property. Please sample this well as soon as possible and provide sample results to the Administration. If you decide to abandon this well, please provide abandonment documentation from a licensed well driller after completion. If the pump is repaired and the well is put back in service, we will require sample results for this well when it is back in use before the water can be used by your facility and tenants.

Thank you for your cooperation in this matter. If you have any questions or require additional information please do not hesitate to contact the undersigned or Project Geologist Forest Arnold at (410) 631-3442.

Sincerely,

John Smiechowski
Region 1 Supervisor
Oil Control Program

cc: Forest Arnold, MDE, Baltimore, MD
John Myers, MDE, Baltimore, MD

G. D. Armstrong Co., Inc. Results of Well Testing

(Numbers in parts per billion)

Test Well No 1417: facing loading rack from street, to left side behind rack

	MDDE	Kamber	ATEC 8/15/91	ATEC 3/17/92	Gascoyne 11/12/92	Penniman/Browne 8/4/93
Benzene✓	1100.	1000.	332.	710.	880.	99.4
Toluene✓	63.	22.	6.5	13.	10.	8.4
Xylene✓	195.	370.	95.8	100.	170.	20.8
Ethylbenzene	102.	100.	--	35.	60.	7.7
Napthalene✓	--	130.	56.5	83.	37.	44.1
MTBE✓	549.	630.	<1.*	46.	89.	56.4

Test Well No 1418: Test well on far side of holding pond.

	MDDE	Kamber	ATEC 8/15/91	ATEC 3/17/92	Gascoyne 11/12/92	Penniman/Browne 8/4/93
Benzene✓	3555.	4300.	751.	1800.	1500.	1639.0
Toluene✓	46.	<5.*	2.8	16.	<10.*	22.0
Xylene✓	31.	48.	9.3	17.	<10.*	32.3
Ethylbenzene	21.	29.	--	42.	30.	31.1
Napthalene✓	--	51.	29.2	<1.*	<10.*	83.2
MTBE✓	321.	140.	<1.*	290.	150.	228.0

Test Well No 1419: Test well near driveway, to right & behind loading rack

	MDDE	Kamber	ATEC 8/15/91	ATEC 3/17/92	Gascoyne 11/12/92	Penniman/Browne 8/4/93
Benzene✓	367.	180.	158.	330.	380.	68.9
Toluene✓	6.	2.	1.9	<1.*	<1.*	8.4
Xylene✓	45.	19.	11.5	15.	23.	17.9
Ethylbenzene	4.	<1.*	--	<1.*	1.	5.3
Napthalene✓	--	<10.*	15.1	16.	21.	38.6
MTBE✓	8	<1.*	<1.*	<1.*	ND.	<10.0*

Test Well No 1475: Test well behind Mullinix building

	MDDE	Kamber	ATEC 8/15/91	ATEC 3/17/92	Gascoyne 11/12/92	Penniman/Browne 8/4/93
Benzene✓	367.	400.	42.	490.	720.	30.5
Toluene✓	5.	3.	<1.*	<1.*	10.	20.9
Xylene✓	45.	100.	15.2	140.	260.	29.5
Ethylbenzene	4.	2.	--	<1.*	<1.*	6.3
Napthalene✓	--	<10.*	<1.*	62.	41	24.3
MTBE✓	7	<1.*	<1.*	<1.*	ND.	<10.0*

✓ = Test required by MDOE Letter of 4/12/91

* = Below detection limit (limit indicated)

G. D. Armstrong Co., Inc. Results of Well Testing

(Numbers in parts per billion)

Test Well No 1417: facing loading rack from street, to left side behind rack

	Penniman 10/17/94	EnRefLab 5/9/95	PhSepSci 10/3/96	PhSepSci 8/18/97	PhSepSci 2/23/99	PhSepSci 5/8/00
Benzene✓	408.	420.	460.	1,100.	710.	31
Toluene✓	16.1	<5.*	4.	21.	32.	3
Xylene✓	46.7	28.	22.	110.	95.	5
Ethylbenzene	19.4	16.	31.	88.	53.	<2
Napthalene✓	44.4	36.	35.	87.	40.	22
MTBE✓	79.1	<5.*	89.	26.	59.	8

Test Well No 1418: Test well on far side of holding pond.

	Penniman 10/17/94	EnRefLab 5/9/95	PhSepSci 10/3/96	PhSepSci 8/18/97	PhSepSci 2/23/99	PhSepSci 5/8/00
Benzene✓	1855.	1000.	490.	780.	1200.	18
Toluene✓	14.1	<5.*	4.	18.	24.	<1
Xylene✓	39.8	8.	7.	21.	64.	2
Ethylbenzene	40.7	16.	18.	30.	49.	1
Napthalene✓	77.7	24.	48.	48.	6.	1
MTBE✓	344.0	300.	85.	<1.	260.	8

Test Well No 1419: Test well near driveway, to right & behind loading rack

	Penniman 10/17/94	EnRefLab 5/9/95	PhSepSci 10/3/96	PhSepSci 8/18/97	PhSepSci 2/23/99	PhSepSci 5/8/00
Benzene✓	229.	330.	88.	65.	200.	16
Toluene✓	<5.*	<5.*	<1.	3.	12.	10
Xylene✓	13.0	17.	7.	7.	35.	1
Ethylbenzene	<5.*	<5.*	<1.	1.	5.	<1
Napthalene✓	32.4	23.	9.	24.	27.	17
MTBE✓	<10.*	<5.*	3.	<1.	8.	<1

Test Well No 1475: Test well behind Mullinix building

	Penniman 10/17/94	EnRefLab 5/9/95	PhSepSci 10/3/96	PhSepSci 8/18/97	PhSepSci 2/23/99	PhSepSci 5/8/00
Benzene✓	66.8	22.	<1.	110.	390.	<2
Toluene✓	<5.*	<5.*	<1.	1.	15.	<2
Xylene✓	23.4	7.	<1.	38.	140.	<2
Ethylbenzene	<5.*	<5.*	<1.	1.	6.	<2
Napthalene✓	<10.*	5.	<1.	10.	56.	3
MTBE✓	<10.*	<5.*	<1.	<1.	<1.	<2

✓ = Test required by MDOE Letter of 4/12/91

* = Below detection limit (limit indicated)

G. D. Armstrong Co., Inc. Results of Well Testing

(Numbers in parts per billion)

Test Well No 1417: facing loading rack from street, to left side behind rack

	PhSepSci 5/24/01
Benzene✓	500.
Toluene✓	<20.
Xylene✓	35.
Ethylbenzene	38.
Napthalene✓	59.
MTBE✓	<20.

Test Well No 1418: Test well on far side of holding pond.

	PhSepSci 5/24/01
Benzene✓	540.
Toluene✓	11.
Xylene✓	6.
Ethylbenzene	30.
Napthalene✓	<5.
MTBE✓	100.

Test Well No 1419: Test well near driveway, to right & behind loading rack

	PhSepSci 5/24/01
Benzene✓	76.
Toluene✓	<1.
Xylene✓	<1.
Ethylbenzene	<1.
Napthalene✓	<1.
MTBE✓	4.

Test Well No 1475: Test well behind Mullinix building

	PhSepSci 5/24/01
Benzene✓	<1.
Toluene✓	<1.
Xylene✓	<1.
Ethylbenzene	<1.
Napthalene✓	1.
MTBE✓	<1.

✓ = Test required by MDOE Letter of 4/12/91

* = Below detection limit (limit indicated)

MDE
MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000 • 1-800-633-6101 • http://www.mde.state.md.us

Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 12, 2001

Ms. Janet Datler
21404 Laytonsville Road
Laytonsville MD 20882

RE: Case No. 90-0098 MO2
Laytonsville Fire Station
21400 Laytonsville Road
Laytonsville, Maryland

Dear Ms. Datler:

The Waste Management Administration's Oil Control Program has reviewed the June 11, 2001 sampling results from your domestic well. A copy of the analytical data is enclosed with this letter. As you can see, all contaminants are at the non-detect level except for low levels of Chloromethane (0.5 parts per billion), Chloroform (3.7 parts per billion), and 1,2-Dichloroethane (0.9 parts per billion). Chloromethane and Chloroform are unregulated compounds. 1,2-Dichloroethane is a regulated compound, but your level is below the regulatory level of 5.0 parts per billion. Low levels of all three compounds are typically related to chlorination of water and sample preservation with hydrochloric acid.

Please contact Mr. Forest Arnold, project geologist, if you have any questions at 410-631-3442.

Sincerely,

John J. Smiechowski, Region I Section Head
Compliance/Remediation Division
Oil Control Program

FA/nlb
Enclosure
cc: Mr. Mick Butler
Mr. Herbert Meade

MARYLAND DEPARTMENT OF THE ENVIRONMENT

MDE

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Parris N. Glendening
Governor

Jane T. Nishida
Secretary

July 27, 2001

Ms. Nancy Stadler
Laytonsville VFD
21408 Laytonsville Road
Laytonsville MD 20882

RE: Sampling Results for domestic well
Laytonsville VFD
21408 Laytonsville Road
Laytonsville, MD
Case No. 90-0098MO2

Dear Ms. Stadler:

The Waste Management Administration's Oil Control Program has received the June 11, 2001 and July 11, 2001 sampling results for your domestic well and wanted to notify you of these results. All contaminants were at the non-detect level in this sample except for Methy-tert-Butyl Ether (MTBE) at 20.8 parts per billion (ppb) and Chloromethane at 2.1 ppb, chloroethance at 1.1. ppb, and 1,2-Dichlorethane at 0.6 ppb. A resample of your well on July 11, 2001 found MTBE at 16.2 ppb.

The Health Advisory Level for MTBE is 20-40 ppb. The MTBE levels in your water are slightly above this level. Chloromethane and chloroethane are unregulated compounds and low levels of this compound are typically related to sample preservation with hydrochloric acid. 1,2-Dichloroethane is a regulated compound, but your levels are below the regulatory level of 5ppb. Low levels of this compound are typically related to sample preservation with hydrochloric acid.

Due to the elevated levels of MTBE, it appears that there is breakthrough of contaminants in your carbon filtration system. The system should have two carbon canisters with a sampling port between the first and second canister in series so that contaminant breakthrough from the firs unit can be detected before breaking through the second canister and entering your water supply. The water should not be used for drinking water until the carbon filtration system can be demonstrated to be properly functioning. The water should be sampled every two months for the first six months and if breakthrough is not occurring sampling can be decreased to every three months. Please provide sampling results to the Administration.

Thank you for your cooperation in this matter. If you have any questions or require additional information please do not hesitate to contact the undersigned or Project Geologist Forest Arnold at (410) 631-3442.

Sincerely,

John Smiechowski
Region 1 Supervisor
Oil Control Program

JM:ms
Enclosure

cc: Forest Arnold, MDE, Baltimore, MD
John Myers, MDE, Baltimore, MD

DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

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...IL CONTROL ...

Certificate of Analysis - Volatiles

Sample Name: 912694 21400
Date Analyzed: 06/22/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	ND
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	0.6
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	2.1
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	1.1
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	20.8
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

Chemist: L. Jones
Section Head: Deborah Miller [illegible]

Date Reviewed: 6/26/01
Date Approved: 6/26/01

Phone: (410) 767-5643 Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

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...IL CONTROL PROGR...

Certificate of Analysis - Volatiles

Method:	EPA 624/8260
Date Analyzed:	07/17/01
Sample Name:	920106 Laytonsville VFD

Contaminants	DL*	Result*
Bromodichloromethane	5	ND
Bromoform	5	ND
Chloroform	5	ND
Dibromochloromethane	5	ND
Benzene	5	ND
Carbon Tetrachloride	5	ND
Chlorobenzene	5	ND
1,4-Dichlorobenzene	5	ND
1,1-Dichloroethene	5	ND
1,2-Dichloroethane	5	ND
1,2-Dichlorobenzene	5	ND
1,2-Dichloropropane	5	ND
cis-1,2-Dichloroethene	5	ND
trans-1,2-Dichloroethene	5	ND
Ethylbenzene	5	ND
Styrene	5	ND
Tetrachloroethene	5	ND
Trichloroethene	5	ND
1,1,1-Trichloroethane	5	ND
Toluene	5	ND
Vinyl Chloride	5	ND
o-Xylene	5	ND
m+p-Xylene	10	ND
Total Xylenes	15	ND
Methylene Chloride	5	ND
1,1,2-Trichloroethane	5	ND
1,2,4-Trichlorobenzene	5	ND
Chloromethane	5	ND
Bromomethane	5	ND
Dichlorodifluoromethane	5	ND
Chloroethane	5	ND
Trichlorofluoromethane	5	ND
1,1-Dichloroethane	5	ND
Ethyl-tert-Butyl Ether (ETBE)	5	ND

Contaminants	DL*	Result*
1,3-Dichlorobenzene	5	ND
Dibromomethane	5	ND
1,1-Dichloropropene	5	ND
trans-1,3-Dichloropropene	5	ND
1,1,2,2-Tetrachloroethane	5	ND
1,3-Dichloropropane	5	ND
2,2-Dichloropropane	5	ND
cis-1,3-Dichloropropene	5	ND
2-Chlorotoluene	5	ND
4-Chlorotoluene	5	ND
Bromobenzene	5	ND
1,3,5-Trimethylbenzene	5	ND
1,2,4-Trimethylbenzene	5	ND
1,2,3-Trichlorobenzene	5	ND
n-Propylbenzene	5	ND
n-Butylbenzene	5	ND
Naphthalene	5	ND
Hexachlorobutadiene	5	ND
Isopropylbenzene	5	ND
1,2,3-Trichloropropane	5	ND
1,2-Dibromo-3-Chloropropane	5	ND
p-Isopropyltoluene	5	ND
tert-Butylbenzene	5	ND
sec-Butylbenzene	5	ND
Bromochloromethane	5	ND
1,1,1,2-Tetrachloroethane	5	ND
1,2-Dibromoethane	5	ND
2-Hexanone (MBK)	5	ND
2-Butanone (MEK)	5	ND
4-Methyl-2-Pentanone (MIBK)	5	ND
Acetone	25	ND
Methyl-tert-Butyl Ether (MTBE)	5	16.2
2-Chloroethylvinylether	5	ND
tert-Amyl Methyl Ether (TAME)	5	ND

*All results are in parts per billion (ppb)
e = estimated

ND = Less than the detection limit

Chemist: Charles J. Thomas

Date Reviewed: 7-18-01

Section Head: Deborah Miller-Tuck

Date Approved: 7/23/01

Phone: (410) 767-5643 Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912817 21500 Rt 108
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	2.5	na	ND
Bromoform	2.5	na	ND
Chloroform	2.5	na	ND
Dibromochloromethane	2.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	2.5	5	96.30
Carbon Tetrachloride	2.5	5	ND
Chlorobenzene	2.5	100	ND
1,4-Dichlorobenzene	2.5	75	ND
1,1-Dichloroethene	2.5	7	ND
1,2-Dichloroethane	2.5	5	ND
1,2-Dichlorobenzene	2.5	600	ND
1,2-Dichloropropane	2.5	5	ND
cis-1,2-Dichloroethene	2.5	70	ND
trans-1,2-Dichloroethene	2.5	100	ND
Ethylbenzene	2.5	700	ND
Styrene	2.5	100	ND
Tetrachloroethene	2.5	5	ND
Trichloroethene	2.5	5	ND
1,1,1-Trichloroethane	2.5	200	ND
Toluene	2.5	1000	ND
Vinyl Chloride	2.5	2	ND
o-Xylene	2.5	na	35.96
m+p-Xylene	5.0	na	ND
Total Xylenes	7.5	10000	35.96
Methylene Chloride	2.5	5	ND
1,1,2-Trichloroethane	2.5	5	ND
1,2,4-Trichlorobenzene	2.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	2.5	na	ND
Chloromethane	2.5	na	ND
Bromomethane	2.5	na	ND
Chloroethane	2.5	na	ND
Trichlorofluoromethane	2.5	na	ND
1,1-Dichloroethane	2.5	na	ND
1,3-Dichlorobenzene	2.5	na	ND
Dibromomethane	2.5	na	ND
1,1-Dichloropropene	2.5	na	ND
trans-1,3-Dichloropropene	2.5	na	ND
1,1,2,2-Tetrachloroethane	2.5	na	ND
1,3-Dichloropropane	2.5	na	ND
2,2-Dichloropropane	2.5	na	ND
cis-1,3-Dichloropropene	2.5	na	ND
2-Chlorotoluene	2.5	na	ND
4-Chlorotoluene	2.5	na	ND
Bromobenzene	2.5	na	ND
1,3,5-Trimethylbenzene	2.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	1.47
1,2,3-Trichlorobenzene	2.5	na	ND
n-Propylbenzene	0.5	na	1.52
n-Butylbenzene	0.5	na	0.94
Naphthalene	2.5	na	16.60
Hexachlorobutadiene	2.5	na	ND
Isopropylbenzene	0.5	na	8.03
1,2,3-Trichloropropane	2.5	na	ND
1,2-Dibromo-3-Chloropropane	25.0	na	ND
p-Isopropyltoluene	0.5	na	1.15
tert-Butylbenzene	2.5	na	ND
sec-Butylbenzene	0.5	na	1.47
Bromochloromethane	2.5	na	ND
1,1,1,2-Tetrachloroethane	2.5	na	ND
1,2-Dibromoethane	2.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	2.5	na	39.15
Ethyl-tert-Butyl Ether (ETBE)	2.5	na	ND
tert-Amyl Methyl Ether (TAME)	2.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones
Date Reviewed: 7/5/01
Section Head: Deborah Miller, Jr.
Date Approved: 7/5/01

Phone: (410) 767-5643 Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912818 GD Armstrong
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	2	na	ND
Bromoform	2	na	ND
Chloroform	2	na	ND
Dibromochloromethane	2	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	2	5	62.82
Carbon Tetrachloride	2	5	ND
Chlorobenzene	2	100	ND
1,4-Dichlorobenzene	2	75	ND
1,1-Dichloroethene	2	7	ND
1,2-Dichloroethane	2	5	ND
1,2-Dichlorobenzene	2	600	ND
1,2-Dichloropropane	2	5	ND
cis-1,2-Dichloroethene	2	70	ND
trans-1,2-Dichloroethene	2	100	ND
Ethylbenzene	2	700	ND
Styrene	2	100	ND
Tetrachloroethene	2	5	ND
Trichloroethene	2	5	ND
1,1,1-Trichloroethane	2	200	ND
Toluene	2	1000	ND
Vinyl Chloride	2	2	ND
o-Xylene	2	na	20.51
m+p-Xylene	4.0	na	ND
Total Xylenes	6.0	10000	20.51
Methylene Chloride	2	5	ND
1,1,2-Trichloroethane	2	5	ND
1,2,4-Trichlorobenzene	2	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	2	na	ND
Chloromethane	2	na	ND
Bromomethane	2	na	ND
Chloroethane	2	na	ND
Trichlorofluoromethane	2	na	ND
1,1-Dichloroethane	2	na	ND
1,3-Dichlorobenzene	2	na	ND
Dibromomethane	2	na	ND
1,1-Dichloropropene	2	na	ND
trans-1,3-Dichloropropene	2	na	ND
1,1,2,2-Tetrachloroethane	2	na	ND
1,3-Dichloropropane	2	na	ND
2,2-Dichloropropane	2	na	ND
cis-1,3-Dichloropropene	2	na	ND
2-Chlorotoluene	2	na	ND
4-Chlorotoluene	2	na	ND
Bromobenzene	2	na	ND
1,3,5-Trimethylbenzene	2	na	ND
1,2,4-Trimethylbenzene	0.5	na	0.81
1,2,3-Trichlorobenzene	2	na	ND
n-Propylbenzene	0.5	na	0.83
n-Butylbenzene	0.5	na	0.52
Naphthalene	0.5	na	11.23
Hexachlorobutadiene	2	na	ND
Isopropylbenzene	0.5	na	4.04
1,2,3-Trichloropropane	2	na	ND
1,2-Dibromo-3-Chloropropane	20.0	na	ND
p-Isopropyltoluene	0.5	na	0.59
tert-Butylbenzene	2	na	ND
sec-Butylbenzene	0.5	na	0.80
Bromochloromethane	2	na	ND
1,1,1,2-Tetrachloroethane	2	na	ND
1,2-Dibromoethane	2	na	ND
Methyl-tert-Butyl Ether (MTBE)	2	na	24.05
Ethyl-tert-Butyl Ether (ETBE)	2	na	ND
tert-Amyl Methyl Ether (TAME)	2	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones
Date Reviewed: 7/5/01

Section Head: Deborah Miller-Tuck
Date Approved: 7/5/01

Phone: (410) 767-5643 Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912821 Atco Tire
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	2	na	ND
Bromoform	2	na	ND
Chloroform	2	na	ND
Dibromochloromethane	2	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	2	5	42.86
Carbon Tetrachloride	2	5	ND
Chlorobenzene	2	100	ND
1,4-Dichlorobenzene	2	75	ND
1,1-Dichloroethene	2	7	ND
1,2-Dichloroethane	2	5	ND
1,2-Dichlorobenzene	2	600	ND
1,2-Dichloropropane	2	5	ND
cis-1,2-Dichloroethene	2	70	ND
trans-1,2-Dichloroethene	2	100	ND
Ethylbenzene	2	700	ND
Styrene	2	100	ND
Tetrachloroethene	2	5	ND
Trichloroethene	2	5	ND
1,1,1-Trichloroethane	2	200	ND
Toluene	2	1000	ND
Vinyl Chloride	2	2	ND
o-Xylene	2	na	17.73
m+p-Xylene	4.0	na	ND
Total Xylenes	6.0	10000	17.73
Methylene Chloride	2	5	ND
1,1,2-Trichloroethane	2	5	ND
1,2,4-Trichlorobenzene	2	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	2	na	ND
Chloromethane	0.5	na	0.58
Bromomethane	2	na	ND
Chloroethane	2	na	ND
Trichlorofluoromethane	2	na	ND
1,1-Dichloroethane	2	na	ND
1,3-Dichlorobenzene	2	na	ND
Dibromomethane	2	na	ND
1,1-Dichloropropene	2	na	ND
trans-1,3-Dichloropropene	2	na	ND
1,1,2,2-Tetrachloroethane	2	na	ND
1,3-Dichloropropane	2	na	ND
2,2-Dichloropropane	2	na	ND
cis-1,3-Dichloropropene	2	na	ND
2-Chlorotoluene	2	na	ND
4-Chlorotoluene	2	na	ND
Bromobenzene	2	na	ND
1,3,5-Trimethylbenzene	2	na	ND
1,2,4-Trimethylbenzene	0.5	na	0.75
1,2,3-Trichlorobenzene	2	na	ND
n-Propylbenzene	0.5	na	0.30
n-Butylbenzene	0.5	na	0.50
Naphthalene	0.5	na	9.77
Hexachlorobutadiene	2	na	ND
Isopropylbenzene	0.5	na	4.24
1,2,3-Trichloropropane	2	na	ND
1,2-Dibromo-3-Chloropropane	20.0	na	ND
p-Isopropyltoluene	0.5	na	0.60
tert-Butylbenzene	2	na	ND
sec-Butylbenzene	0.5	na	0.83
Bromochloromethane	2	na	ND
1,1,1,2-Tetrachloroethane	2	na	ND
1,2-Dibromoethane	2	na	ND
Methyl-tert-Butyl Ether (MTBE)	2	na	29.50
Ethyl-tert-Butyl Ether (ETBE)	2	na	ND
tert-Amyl Methyl Ether (TAME)	2	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones
Date Reviewed: 7/5/01

Section Head: Deborah Miller, Dir
Date Approved: 7/5/01

Phone: (410) 767-5643 Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry

TRACE ORGANICS SECTION

201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912820 21513 Rt 108 **Method:** EPA 524.2
Date Analyzed: 06/30/01

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	ND
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	ND
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	ND
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	ND
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	2.3
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K Jones
Date Reviewed: 7/3/01
Section Head: [signature]
Date Approved: 7/3/01

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912822 Erola Auto
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	ND
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	ND
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	ND
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	ND
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	2.12
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones　　Date Reviewed: 7/3/01

Section Head: Deborah Miller　　Date Approved: 7/3/01

Phone: (410) 767-5643　　Fax: (410) 333-5237

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912819 Gillespia
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	1.8
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	ND
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	0.8
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	ND
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	6.3
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

Chemist: K. Jones Date Reviewed: 7/3/01

Section Head: Deborah Miller-Tuck Date Approved: 7/3/01

Phone: (410) 767-5[illegible] Fax: (410) [illegible]

State of Maryland
DHMH - Laboratories Administration
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TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

Certificate of Analysis - Volatiles

Sample Name: 912816 ~~Enc ing~~ Envir Eng.
Date Analyzed: 06/30/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	1.5
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	ND
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	ND
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	ND
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Napnthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	6.1
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones   Date Reviewed: 7/3/01

Section Head: Deborah Miller-Tuck   Date Approved: 7/3/01

Phone: (410) 767-5643   Fax: (410) 333-5237

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DHMH - Laboratories Administration
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TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

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Certificate of Analysis - Volatiles

Laytonsville VFD - resampled 7-10-01

Sample Name: 912694 21400
Date Analyzed: 06/22/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	ND
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	ND
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	0.6
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	2.1
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	1.1
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	20.8
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: K. Jones

Section Head: Deborah Miller-Smith

Date Reviewed: 6/26/01

Date Approved: 6/26/01

State of Maryland
DHMH - Laboratories Administration
Division of Environmental Chemistry
TRACE ORGANICS SECTION
201 W. Preston Street, Baltimore, MD 21201
J. Mehsen Joseph, Ph.D., Director

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Certificate of Analysis - Volatiles

Sample Name: 912695 21404 *Patler Residence*
Date Analyzed: 06/22/01
Method: EPA 524.2

Contaminants	DL*	MCL*	Result*
TRIHALOMETHANES			
Bromodichloromethane	0.5	na	ND
Bromoform	0.5	na	ND
Chloroform	0.5	na	3.7
Dibromochloromethane	0.5	na	ND
TOTAL THMs	-	100	-
REGULATED			
Benzene	0.5	5	ND
Carbon Tetrachloride	0.5	5	ND
Chlorobenzene	0.5	100	ND
1,4-Dichlorobenzene	0.5	75	ND
1,1-Dichloroethene	0.5	7	ND
1,2-Dichloroethane	0.5	5	0.9
1,2-Dichlorobenzene	0.5	600	ND
1,2-Dichloropropane	0.5	5	ND
cis-1,2-Dichloroethene	0.5	70	ND
trans-1,2-Dichloroethene	0.5	100	ND
Ethylbenzene	0.5	700	ND
Styrene	0.5	100	ND
Tetrachloroethene	0.5	5	ND
Trichloroethene	0.5	5	ND
1,1,1-Trichloroethane	0.5	200	ND
Toluene	0.5	1000	ND
Vinyl Chloride	0.5	2	ND
o-Xylene	0.5	na	ND
m+p-Xylene	1.0	na	ND
Total Xylenes	1.5	10000	ND
Methylene Chloride	0.5	5	ND
1,1,2-Trichloroethane	0.5	5	ND
1,2,4-Trichlorobenzene	0.5	70	ND

Contaminants	DL*	MCL*	Result*
UNREGULATED			
Dichlorodifluoromethane	0.5	na	ND
Chloromethane	0.5	na	0.5
Bromomethane	0.5	na	ND
Chloroethane	0.5	na	ND
Trichlorofluoromethane	0.5	na	ND
1,1-Dichloroethane	0.5	na	ND
1,3-Dichlorobenzene	0.5	na	ND
Dibromomethane	0.5	na	ND
1,1-Dichloropropene	0.5	na	ND
trans-1,3-Dichloropropene	0.5	na	ND
1,1,2,2-Tetrachloroethane	0.5	na	ND
1,3-Dichloropropane	0.5	na	ND
2,2-Dichloropropane	0.5	na	ND
cis-1,3-Dichloropropene	0.5	na	ND
2-Chlorotoluene	0.5	na	ND
4-Chlorotoluene	0.5	na	ND
Bromobenzene	0.5	na	ND
1,3,5-Trimethylbenzene	0.5	na	ND
1,2,4-Trimethylbenzene	0.5	na	ND
1,2,3-Trichlorobenzene	0.5	na	ND
n-Propylbenzene	0.5	na	ND
n-Butylbenzene	0.5	na	ND
Naphthalene	0.5	na	ND
Hexachlorobutadiene	0.5	na	ND
Isopropylbenzene	0.5	na	ND
1,2,3-Trichloropropane	0.5	na	ND
1,2-Dibromo-3-Chloropropane	5.0	na	ND
p-Isopropyltoluene	0.5	na	ND
tert-Butylbenzene	0.5	na	ND
sec-Butylbenzene	0.5	na	ND
Bromochloromethane	0.5	na	ND
1,1,1,2-Tetrachloroethane	0.5	na	ND
1,2-Dibromoethane	0.5	na	ND
Methyl-tert-Butyl Ether (MTBE)	0.5	na	ND
Ethyl-tert-Butyl Ether (ETBE)	0.5	na	ND
tert-Amyl Methyl Ether (TAME)	0.5	na	ND

*All results are in parts per billion (ppb)
ND = Less than the detection limit
na = not applicable

Chemist: *K. Jones*
Date Reviewed: *6/26/01*
Section Head: *Deborah Miller-Dick*
Date Approved: *6/26/01*

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PHASE SEPARATION SCIENCE, INC.

CERTIFICATE OF ANALYSIS
No. 01051826
Nutshell Enterprises
May 24, 2001

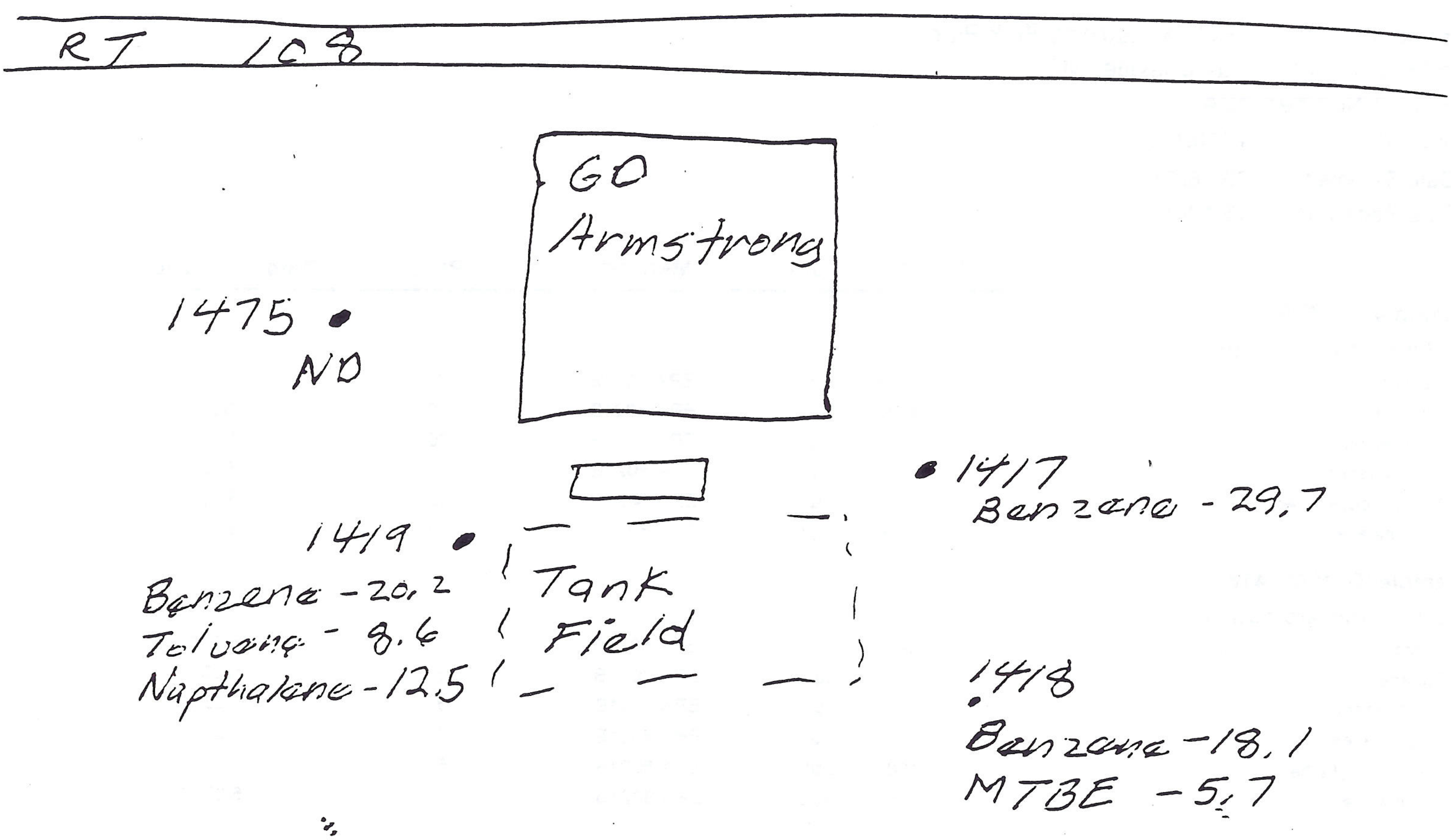
Project: G.D. Armstrong Bulk Plant
Site Location: Laytonsville, MD
Project Number: N/A
Matrix: Water
Date Sampled: 05/16/01
Date Received: 05/18/01

	Result	Unit	Method	PQL	Date Analyzed
Sample ID: MW-1417					
Purgeable Aromatics					
Benzene	500	ug/L	EPA 8021B	20	05/23/01
Toluene	< 20	ug/L	EPA 8021B	20	05/23/01
Ethylbenzene	38	ug/L	EPA 8021B	20	05/23/01
Total Xylenes	35	ug/L	EPA 8021B	20	05/23/01
Methyl-t-butyl ether	< 20	ug/L	EPA 8021B	20	05/23/01
Naphthalene	59	ug/L	EPA 8021B	20	05/23/01
Sample ID: MW-1418					
Purgeable Aromatics					
Benzene	540	ug/L	EPA 8021B	5	05/23/01
Toluene	11	ug/L	EPA 8021B	5	05/23/01
Ethylbenzene	30	ug/L	EPA 8021B	5	05/23/01
Total Xylenes	5	ug/L	EPA 8021B	5	05/23/01
Methyl-t-butyl ether	100	ug/L	EPA 8021B	5	05/23/01
Naphthalene	< 5	ug/L	EPA 8021B	5	05/23/01
Sample ID: MW-1419					
Purgeable Aromatics					
Benzene	76	ug/L	EPA 8021B	1	05/21/01
Toluene	< 1	ug/L	EPA 8021B	1	05/21/01
Ethylbenzene	< 1	ug/L	EPA 8021B	1	05/21/01
Total Xylenes	< 1	ug/L	EPA 8021B	1	05/21/01
Methyl-t-butyl ether	4	ug/L	EPA 8021B	1	05/21/01
Naphthalene	< 1	ug/L	EPA 8021B	1	05/21/01

Reviewed by: ____________________
Quality Assurance Chemist

Notes:
PQL - Practical Quantitation Limit
Results reported on an as received basis
SEPA methods recommend that the appearance of detectable levels of the above compounds be confirmed when unfamiliar samples are analyzed.

Results of Split Samples - GD Armstrong, Laytonsville 5/9/00 in ppb



Trip Blank - ND